of a colony of fishes. Quite a number of fishes are known as chubs, and several genera and species are called stone toters and rollers, from their habit of making heaps, though not as large as the above.

The chub in question is one of the *Cyprinidæ*, the *Semotilus bullaris* or *Leucosomus cataractus*, of Baird, a very attractive fish, attaining a length of twenty inches and a weight of two and sometimes three pounds. The head is distinct from the body, as regards absence of scales, and of a dark olive hue; the back brownish, with blue and sometimes green reflections. The sides, when turned to the sun, flashed a beautiful silvery tint, and the scales being large, it was, all in all, a very attractive creature. Mr. Clerk and myself frequently took them on a fly, and agreed that, so far as making a desperate fight for liberty was concerned, they were not far behind the black bass. They were also taken while trolling with a minnow bait; though this can hardly be considered their natural food, the somewhat large, fleshy lips being seemingly adapted for a vegetable diet. They are extremely common in the St. Lawrence, frequenting clear water, and abound in New England streams and as far south as Virginia, and probably have a much wider range to the west through the great lakes. In all localities they have local names, some of which are fall fish, dace, roach, horned dace, etc.

PHOTOGRAPHIC NOTES.

How to Remedy Flare or Ghost Spots in Lenses.—In an interesting paper read before the Buffalo Photographers' Convention by Mr. J. Traill Taylor, editor of the *Photographic Times*, we find the following practical directions for disposing of the flare spot frequently met with in combination lenses of the symmetrical or rectilinear type:

"Concerning flare spots," he says, "they are never seen when the lenses are used in the studio, but only when a bright sky forms part of the included subject, and only then when a very small stop or diaphragm is used.

To ascertain whether a lens has a flare spot, it should be screwed on to the camera and brought into a room lighted by a gas flame or oil light.

Go to a distance of several feet, and examine the flame on the ground glass.

The image will be sharp, bright, and inverted, now move the camera slightly, so as to cause the inverted image to be a little to one side of the center of the focusing screen, and in nine cases out of ten there will be seen a ghostly image at the opposite side of the center.

This secondary image is non-inverted, and upon rotating the camera it moves in the opposite direction to the primary image. The nature of this secondary image or ghost, and the cause of its formation, may be examined in the following way: Move the camera so that the ghost shall be near the margin, and then, placing the eye in the line of that image and the lens, withdraw the ground glass, when the posterior surface of the lens will be found to be quite luminous. That the false image is, in this case, caused by a reflection from the back surface of the anterior lens is demonstrable by unscrewing the cell containing it until it almost drops out of the tube; and then, keeping an eye upon both the primary and secondary images on the ground glass, move or slightly wriggle the front cell, which by its being nearly unscrewed may now be easily done, when it will be seen that while the primary or legitimate image of the flame remains motionless, the ghostly image caused by the reflection from the front lens dances about all over the plate.

But observe further, there is a certain distance between the front and back lenses at which this secondary image is sharp and bright, and in proportion as either the front or back lens cells is screwed in or out, so does the image become more attenuated and expanded, till at last it ceases to be seen altogether, while all this time the real image is not seen to suffer in any way. This tendency of the ghostly image to pass out of focus with such extreme rapidity, upon separating the lenses by a few turns of the screw, or by making them come nearer each other, provides the means by which this evil may be cured.

The most perfect mount for lenses of this class would be that in which the privilege was afforded the user of making an adjustment to suit work of any nature by the separation of the lenses to a very limited extent, so as to be used under the most perfect conditions for the special work in hand. With a lens of about eleven inches focus, a sliding adjustment of half an inch has been adopted with beneficial results."

Photographing the Interior of Guns.—Experiments have been made at the Royal Gun Factories, Woolwich, in order to test the application of a new electric lamp designed for making examinations and photographs of gun interiors. The system of somburizing the bores of guns by means of electricity has only been a short time in use, and has proved of great value; but the want of an electric dynamo has prevented its general adoption at many places where it would have been of considerable use, and the authorities have now taken up readily a portable battery designed by Messrs. Johnson & Phillips for the purpose of supplying the place of a dynamo in such cases. The battery, without being necessarily powerful, is chiefly serviceable on account of its constancy, as it can maintain a light of unerring brilliancy for inspections with all the leisure they may desire. The experiment was to try the battery and a dynamo in competition. Two 8 inch guns were placed side by side in the new boring mills, and photographs were taken of their interiors by both processes, the results as far as could be judged being equally satisfactory.

Rendering Paper Prints Translucent.—At a meeting of the London and Provincial Photographic Association, we take from the report published in the *British Journal of Photo.* the statement of Mr. G. H. E. Sutton, of how he makes paper prints translucent by means of burnt linseed oil. He first raised the oil to the boiling point, then taking it to an open field where there was no danger of fire, he burnt it until it reached the stage desired; this he found by testing from time to time with a knife. The oil, when well burnt, was always green and of the consistence of treacle. It was mixed with litharge, sugar of lead, and soap, and when cold was rubbed over the back of the print with a piece of rag. It dried quickly on the prints, which did not cockle. To one pint of oil was added litharge and acetate of lead each equal in bulk to the size of a walnut. In place of making the burnt linseed oil, it is suggested by the editor of the *British Journal of Photo.* that it can be purchased already made of three different consistencies, "thin," "middle," and "strong," under the title of "burnt oil," from all dealers in printing materials.

WALTER BENTLEY WOODBURY.

The well known inventor of the Woodbury process of photo-printing died suddenly from an overdose of laudanum at Margate, England, an English watering place, on the 5th ult., and was buried in Abney Park Cemetery, near the remains of other departed notables in photography.

Says the *Photo. News:* "Mr. Woodbury, who was fifty-one years of age at the time of his death, had practiced photography as a profession since he was seventeen years of age, he having then commenced work in Australia. Soon after this he established a studio in Java, and produced excellent work under very trying circumstances. Some of his views taken in Java were published by Negretti and Zambra about twenty-five years ago.

About this time he came to London, but shortly returned to Java, and established himself on a somewhat larger scale in Batavia, but soon afterward he came to London and introduced the process now so well known under the name of Woodburytype.

Since then he has been actively engaged in devising and perfecting many processes bearing on photography, and in writing in such a way as to popularize science.

Among his inventions may be especially mentioned—setting aside his very notable invention, the Woodburytype—the photo-filigrave, the Goupil method of photo-gravure, and various block processes; but he made a host of minor inventions, and since 1864 took out nearly thirty patents."

From the above brief sketch it will be seen that Mr. Woodbury largely contributed by his industry and perseverance to the successful working of many of the photo-printing processes in use at the present time, and it was in acknowledgment of the fundamental character of his invention of the Woodbury type in its relation to photography that he was awarded one of the seven gold medals issued in the Photographic Department of the recent International Inventions Exhibition, held in London.

His first patent taken out in this country was in 1866, followed by three in 1868, one in 1882, and one during the present year.

Briefly described, the Woodbury process consists in making a solution of gelatine prepared with a slight admixture of Indian ink and potassium bichromate, then spreading the same upon a leveled glass plate, letting it dry.

The film may be stripped from the plate and exposed to the light behind a negative in the usual manner, or it may be printed on the plate. An unusual length of time is required in printing, because of the comparative slow sensitiveness of the bichromated film.

Development is made by hot water, as in the carbon process. The film when dried possesses a strong relief and is exceedingly hard and tough, and when compressed against a soft metal, like lead, acts as a die, making a corresponding reverse in the same. It was the capability of the tough, hardened gelatine film to resist great pressure that Mr. Woodbury made use of. Accordingly, he devised a special hydraulic press arranged to prevent the film from spreading horizontally, but at the same time subjecting it to a contact pressure of several hundred tons upon soft type metal. The metal impression was then placed in a peculiar printing press, inked over with a compound of gelatine and India ink, and a sheet of hard pressed smooth paper laid upon it; a plate of heavy plate glass now comes down upon the back of the paper, pressing it against the metal mould, and after a pressure of two or three minutes is raised; upon lifting the paper, a beautiful impression in permanent printing ink is seen.

The ink may be varied in color, permitting a large variety of colored impressions to be made. Thousands of copies may be pulled from one metal impression, and the number obtainable from a single gelatine relief is almost incredible.

In 1880 Mr. Woodbury further improved and simplified the process by dispensing with the heavy hydraulic press and adopting instead the pressure of two rollers.

His method is as follows: A positive is made upon a glass plate instead of a negative; from this a relief mould of bichromated gelatine is produced as before, which is attached to a heavy, smooth plate of glass, so that its level character may be depended upon.

When dry, a sheet of tin foil is placed upon the gelatine mould, and, to force the thin metal securely into every crevice, mould and tin foil are sent through an ordinary rolling press. The mould with its tin foil lined surface is now removed from the glass plate and put into the Woodbury printing press, from which impressions equal in every respect to those taken from a hydraulic pressed lead relief are readily turned out.

This simple process is the subject of an American patent taken out during the present year, and, we may say, is one of Mr. Woodbury's last improvements.

We refer those of our readers who are interested in obtaining further details to the SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 213 and 243. A beautiful example of a Woodbury print may be found in the *British Journal Photographic Almanac* for 1884.

Trout Killed by Mosquitoes.

Mr. C. H. Murray, of Denver, writes to Professor Baird the following:

In the middle or latter part of June—I think it was—in 1882, I was prospecting on the headwaters of the Tumiche Creek, in the Gunnison Valley, Col. About nine o'clock in the morning I sat down in the shade of some willows that skirted a clear but shallow place in the creek. In a quiet part of the water, where their movements were readily discernible, were some fresh-hatched brook or mountain trout; and circling about over the water was a small swarm of mosquitoes. The trout were very young, still having the pellucid sac puffing out from the region of the gills, with the rest of their body almost transparent when they would swim into a portion of the water that was lighted up by direct sunshine. Every few minutes these baby trout—for what purpose I do not know, unless to get the benefit of more air—would come to the surface of the water, so that the top of their head was level with the surface of the water. When this was the case, a mosquito would alight, and immediately transfix the trout by inserting his proboscis, or bill, into the brain of the fish, which seemed incapable of escaping. The mosquito would hold his victim steady until he had extracted all the life juices; and when this was accomplished, and he flew away, the dead trout would turn over on his back and float down the stream. I was so interested in this before unheard of destruction of fish, that I watched the depredations of these mosquitoes for more than half an hour; and in that time over twenty trout were sucked dry, and their lifeless shells sent floating away with the current. It was the only occasion that I was ever witness to the fact, and I have been unable by inquiry to ascertain if others have observed a similar destruction of fish. I am sure the fish were trout, as the locality was quite near snow line, and the water very cold, and no other fish were in the stream at that altitude. From this observation, I am satisfied that great numbers of trout, and perhaps infant fish of other varieties in clear waters, must come to their death in this way; and, if the fact has not been heretofore recorded, it is important to those interested in pisciculture.

The Seal Fishery.

During the past month the steamers from provincial ports engaged in the seal fishery have been returning home, having had one of the most successful seasons ever made in that business. Full returns will be given later.

The following from the *Island Press* is of interest:

"The seal fishery has been unusually successful this year. Many steamers have returned from the sealing grounds loaded down almost to the water's edge. Steamer Ranger, with over 200 men on board, returned to St. John's with 35,600 prime young harp seals, the largest catch for her tonnage ever taken into any port in the world, every nook and corner of the ship being jammed full. She was compelled to steam slowly from the time of leaving the ice, to prevent upsetting, and had to creep home inch by inch. Fortunately the sea was calm all the way. Her deck, covered to the top of her rails with 7,100 seals, was a sight never before seen in St. John's. The companion-way was covered in, only room enough being left for a man to squeeze himself into the doorway. The lazaret contained 720, and 250 were stowed under the bunks in which the men slept. Eight puncheons were filled with oil, and the rest was stowed in the hold."