

ones are now caught, and none but large fish have the green roes. I never saw a green-roed rock less than  $2\frac{1}{2}$  feet long; some are much larger.

A good many small fish, 2 or 3 inches long, are seen in the summer and in the winter; sometimes thousands are caught at a haul from 10 to 20 inches long. I recollect a haul made about 40 years ago, when 800 of these fish, over 3 feet long, were taken, and I think the largest weighed over 70 pounds. Rockfish could be bought then for less than a cent a pound. Now they are worth 8 cents at the seine.

HARMONY VILLAGE, VA., *January 30, 1882.*

#### ANSWERS TO QUESTIONS RELATIVE TO CATFISH.

By CHARLES E. HIESTER.

##### A.—NAME.

1. What is the name by which this fish is known in your neighborhood?—A. The catfish.

##### B.—DISTRIBUTION.

2. Is it found throughout the year, or only during a certain time; and for what time?—A. They are found in warm days in February, and all through the warm weather; when the water freezes they go into the mud.

##### C.—ABUNDANCE.

3. If resident, is it more abundant at certain times of the year; and at what times?—A. They are most abundant about May 1.

4. How abundant is it, compared with other fish?—A. At least fifty times more abundant than any other.

5. Has the abundance of the fish diminished or increased within the last ten years?—A. Increased.

6. If diminished or increased, what is the supposed cause?—A. Almost every egg hatches, and the young ones are not relished as food by other fishes on account of their stingers; bass and pike are about the only fish that can eat them.

##### D.—SIZE.

8.\* What is the greatest size to which it attains (both length and weight), and what the average?—A. Fourteen inches length; 1 to  $1\frac{3}{4}$  pound. Average, 10 or 11 inches; and average weight, three-fourths of a pound.

9. State the rate of growth per annum, if known; and the size at one, two, three or more years.—A. One year old, 3 inches; two years old, 5 to 6 inches; after that, cannot say.

10. Do the sexes differ in respect to shape, size, rate of growth, &c.?—A. No difference except just before spawning.

\* Certain questions in the list were not answered and their omission accounts for the numbers not being consecutive. For full list of questions see Report of the Commissioner, part I, page 3.

## E.—MIGRATIONS AND MOVEMENTS.

25. Are these fish anadromous; that is, do they run up from the sea into fresh water for any purpose? And if so, for what?—A. I don't think the catfish is anadromous.

30. What are the favorite localities of this fish? Say whether in still water or currents, shallow or deep water, on the sand, in grass, about rocks, &c.—A. Still, deep water, with mud bottom.

31. What depth of water is preferred by these fish?—A. Three to four feet appears to suit them very well.

32. What the favorite temperature and general character of water?—A. Still, cloudy water, near the temperature of spring water, but warmer.

## F.—RELATIONSHIPS.

33. Do these fish go in schools after they have done spawning, or throughout the year, or are they scattered and solitary?—A. Before spawning they go in schools; after spawning the large ones scatter.

34. Have they any special friends or enemies?—A. Enemies. Muskrats and snapping turtles take them from behind, and eat all but the head and stingers; pike and bass take them head first and swallow the whole fish. They live and thrive in the midst of their enemies. In one winter, in a single runway 10 feet wide and 100 yards long, 20 bushels of marketable fish were taken; and in the same winter we caught 75 snappers, weighing from 4 to 10 pounds, and 115 muskrats, within a space of three-fourths of a mile immediately surrounding the runway.

35. To what extent do they prey on other fish, and on what species?—A. Never found another fish inside of a catfish.

36. To what extent do they suffer from the attacks of other fish or other animals?—A. Less than any other fish, on account of their stingers.

## G.—FOOD.

37. What is the nature of their food?—A. They appear to live on the larvæ of insects and on flies that fall into the water; they never jump out of the water.

## H.—REPRODUCTION.

40. Is there any marked change in the shape or color of either sex during the breeding season; or any peculiar development of, or on any portion of the body, as the mouth, fins, scales, &c.?—A. No change in color, but softer.

41. Are there any special or unusual habits during the spawning season?—A. They burrow under the mud.

43. At what age does the male begin to breed, and at what age the female?—A. Two years.

46. Where do these fish spawn, and when?—A. In shallow water; in June.

48. Is the water ever whitened or colored by the milt of the male?—A. Just where the spawn is the water appears to be cloudy.

49. What temperature of water is most favorable for hatching?—A. Ordinary ditch water in June, away from the spring.

50. At what depth of water are the eggs laid; if on or near the bottom?—A. One to three feet, and on the bottom.

51. What is the size and color of the spawn?—A. Color, dark brown; size varies with the age of the fish.

52. What is the estimated number for each fish, and how ascertained?—A. Never counted them; should judge from 1,000 to 2,000.

54. Do the eggs, when spawned, sink to the bottom and become attached to stones?—A. They sink to the bottom; do not know whether they are attached or not.

55. Do the fish heap up or construct any kind of nest, whether of sand, gravel, grass, or otherwise; and, if so, is the mouth, the snout, or the tail used for the purpose, or what; and, if so, how is the material transported; or do they make any excavation in the sand or gravel?—A. They make no nest at all that I have seen.

56. Do they watch over their nest, if made, either singly or in pairs?—A. They watch singly.

57. When are the eggs hatched, and in what period of time after being laid?—A. Cannot say certainly, but think in two or three days.

58. What percentage of eggs laid is usually hatched?—A. Every egg.

59. What percentage of young attains to maturity?—A. All, except those destroyed by snappers, muskrats, and bass, which is a very small percentage; never saw a dead one.

60. What is the rate of growth?—A. About 3 inches a year.

61. Do the parents, either or both, watch over the young after they are hatched?—A. One parent watches *under* them after they are hatched.

62. Do they carry them in their mouth or otherwise?—A. No.

63. What enemies interfere with, or destroy the spawn or the young fish? Do the parent fish devour them?—A. I know of no enemies to either, and think the parents do not devour them.

64. Are the young fish found in abundance, and in what localities?—A. Yes; they travel in schools in shallow water.

65. On what do they appear to feed?—A. Never saw them feed on anything.

#### I.—ARTIFICIAL CULTURE.

66. Have any steps been taken to increase the abundance of this fish by artificial breeding?—A. No.

#### K.—PROTECTION.

67. Are these fish protected by law, or otherwise?—A. No.

#### L.—DISEASES.

68. Has any epidemic or other disease ever been noticed among them,

such as to cause their sickness or death in greater or less number?—A. No, except sulphur water from the mines along the Susquehanna.

#### M.—PARASITES.

70. Are crabs, worms, lampreys, or other living animals found attached to the outside or on the gills of these fish?—A. Never found any.

#### N.—CAPTURE.

71. How is this fish caught; if with a hook, what are the different kinds of bait used, and which are preferred?—A. For hook, red angle-worm.

72. If in nets, what kind?—A. Funnel or set net.

73. At what season and for what period is it taken in nets, and when with the line?—A. Pond fish are best in the spring. River fish are caught all the year round, but principally in spring.

76. Is the time of catching with nets or pounds different from that with lines?—A. No.

#### O.—ECONOMICAL VALUE AND APPLICATION.

78. What disposition is made of the fish caught; whether used on the spot or sent elsewhere; and, if so, where?—A. The demand of the home market for these fish is in excess of the supply.

79. What is its excellence as food, fresh or salted?—A. It is one of the very best of the small pan-fishes, and has no noticeable small bones.

80. How long does it retain its excellence as a fresh fish?—A. As long as any other fish, and longer than most of them.

81. To what extent is it eaten?—A. It is eaten and relished by all classes of people, and they would eat more of them if they could get them.

82. Is it salted down, and to what extent?—A. It is not salted down, because the demand of the fresh fish exceeds the supply.

83. Is it used, and to what extent, as manure, for oil, or for other purposes, and what?—A. Its quality as a table fish will ever prevent it being used for any other purpose.

84. What were the highest and lowest prices of the fish per pound during the past season, wholesale and retail, and what the average, and how do these compare with former prices?—A. Retail, 12 to 20 cents; average, 15 cents. The price does not vary in our market.

86. Where is the principal market of these fish?—A. They will sell anywhere.

HARRISBURGH, DAUPHIN COUNTY, PA., *March 21, 1882.*