

A BRIEF HISTORY OF THE GATHERING OF FRESH-WATER PEARLS IN THE UNITED STATES.

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The gathering of pearls from the fresh-water shells of North America, although a matter of comparatively recent date among the present inhabitants, really goes back very far into the unrecorded past, and early attracted notice among the first European explorers. In the prehistoric period the mound-builders of the Mississippi Valley gathered immense quantities of these pearls, as is amply shown by the stores of them found on the "hearths" of a number of mounds, especially in Ohio, by the recent explorations of Prof. F. W. Putnam and Mr. W. K. Moorehead. By age, burial, and in some cases funeral or sacrificial fires, these pearls have lost their luster and beauty; but they were evidently highly prized by these ancient people and gathered by the hundred thousand. The finding of two bushels in a single series of mounds is an evidence of their abundance.

The first explorers who traveled among the Indian tribes speak frequently of the number and beauty of the pearls in possession of the natives. Especially marked are these accounts in connection with the great expedition of De Soto, from Florida through the present Gulf States to Mississippi, in 1540-41. Garcilasso de la Vega and other narrators give minute accounts of pearls as worn by the Indians; and from the accounts given by them to De Soto at various times, and as taken by the Spaniards from burial-places of native chieftains, it is quite evident that perhaps all of these referred to were not marine, but fresh-water pearls. De Soto's narratives, which undoubtedly referred to the latter, seem exaggerated, but the recent finds substantiate them. The process is described, moreover, of gathering the shells and opening them by heat, which was shown to De Soto, at his request, by a friendly chief. In the same way several early English travelers, from New England to Florida, refer to the Indians as having pearls, undoubtedly from the fresh-water Unionidæ.

No particular attention, however, was given to the subject until about forty years ago. The natives had been dispossessed, and the white race, occupied with other interests and necessities, took little note of the hosts of fresh-water shells inhabiting the streams and lakes, and did not suspect their power of producing pearls. In the rivers of Saxony and Bohemia, indeed, and those of Scotland and Ireland and the lakes of Finland, such pearls have long been known and valued, although Union life is far less abundant there than in our great river systems of America; but not until the middle of the present century was a search begun or any important discovery made.

NOTE.—This article is chiefly an abstract of a more comprehensive report on pearls by the same writer, which will appear hereafter in this volume. The present paper was prepared for the Fishery Congress by special request, for the purpose of calling the attention of delegates to the latent resources, in many parts of the country, in pearls and pearl-bearing shells.

This was all changed, however, by the first great pearl excitement in 1857, when large and valuable Unio pearls were first obtained in New Jersey. First, a pearl of fine luster, weighing 93 grains, was found at Notch Brook, near Paterson. It became known as the "queen pearl," and was sold by Tiffany & Co. to the Empress Eugenie of France for \$2,500. It is to-day worth four times that amount. (See colored plate No. 8, Gems and Precious Stones of North America.) The news of this sale created such an excitement that search for pearls was started throughout the country. The Unios at Notch Brook and elsewhere were gathered by the million and destroyed, often with little or no result. A large, round pearl, weighing 400 grains, which would doubtless have been one of the finest pearls of modern times, was ruined by boiling to open the shell. Within one year pearls were sent to the New York market from nearly every State—in 1857 fully \$15,000 worth. In 1858 it fell off to some \$2,000; in 1859, about \$2,000; in 1860, about \$1,500; in 1860-63, only \$1,500. The excitement thus abated until about 1868, when there was a slight revival of interest, and many fine pearls were obtained from Little Miami River, Ohio.

Some of the finest American pearls that were next found came from near Waynesville, Ohio, \$30,000 worth being collected in that vicinity during the pearl excitement of 1876. Since 1880 pearls have come from comparatively new districts farther west and south, the supply from which is apparently on the increase. At first few were found, or rather few were looked for, west of Ohio; but gradually the line extended, and Kentucky, Tennessee, and Texas became the principal pearl-producing States, and some pearls were sent north from Florida.

A few years later the interest extended to the Northwestern States. During the summer of 1889 a quantity of magnificently colored pearls were found in the creeks and rivers of Wisconsin—in Beloit, Rock County; Brodhead and Albany, Green County; Gratiot and Darlington, Lafayette County; Boscobel and Potosi, Grant County; Prairie du Chien and Lynxville, Crawford County. Of these pearls, more than \$10,000 worth were sent to New York within three months, including a single pearl worth more than \$500, and some among them were equal to any ever found for beauty and coloring. The colors were principally purplish red, copper red, and dark pink. Within the past eight years probably over \$200,000 worth of pearls have been sold from this district.

These discoveries led to immense activity in pearl-hunting through all the streams of the region, and in three or four seasons the shells were almost exterminated. In 1890 the search extended through other portions of Wisconsin, especially Calumet and Manitowoc counties, and also in Illinois, along the Mackinaw River and its tributary creeks, in McLean, Tazewell, and Woodford counties.

In 1889 the exhibit of American pearls received an award of a gold medal and the collaborateur a silver medal for the literature. At the Columbian Exposition at Chicago, in 1893, large and beautiful exhibits of pearls of great variety of tints, set in the finest jewelry, were exhibited in the Manufactures building, and formed notable features in the Wisconsin State building and the Mines building.

The northwestern pearl excitement subsided in a few seasons, as the others had done in turn before, by the exhaustion of the mussel beds and the consequent cessation of product. About every ten years or so a new wave of interest arises in connection with fresh discoveries at some point where the shells have lain long undisturbed; it again absorbs the attention and excites the imagination of the community

around and spreads to other parts of the country; a fresh campaign of ignorant extermination is carried on for several summers, then the yield is exhausted, and there is nothing more but to leave nature to recuperate, if possible, and slowly to restore, in limited amount, the abundant life that has been destroyed.

During the season of 1897 the pearl fever has broken out in various parts of the country, the particular scene of discovery and excitement being the hitherto undisturbed streams and bayous of Arkansas. These waters teem with Unios, and pearls have at times been found by the rural population for years past; but there has been, usually, no knowledge of their nature or their value. They have been simply regarded as "pretty stones," and used as playthings by the children—like the first South African diamond, that attracted the notice of a trader in 1866 as he saw it in the hands of the children of his Boer host at the Vaal River.

Several valuable pearls, however, were this year found by persons from St. Louis and Memphis, who at once sent them to those cities and ascertained their reality and value. The same parties then searched for more, and took steps to lease the land where pearls were found abundant. Ere long the facts became known, and a wild excitement set in and spread through large portions of Arkansas, extending into Missouri, Kansas, and the territory of the Choctaw Nation. The first important discoveries were on small lakes or bayous, formed by affluents of the White River, in White County. The subsequent activities prevailed along the general valley of White River and its branches, then on the Arkansas, the Ouachita, and the Black, Cache, and St. Francis rivers, thus affecting almost all sections of the State. In one district an entire lake was leased, guarded, and fenced for its pearl contents alone.

The newspapers took up the subject and published highly sensational accounts of the treasures to be had in what was largely proclaimed as "the Arkansas Klondike." These articles were copied all over the country, and led to a great amount of pearl-hunting in many States, both east and west. Iowa, Tennessee, Georgia, New York, and Connecticut were all more or less stirred up to activity. The former pearl region of Tennessee was less affected than a new section in the eastern part of the State, along Clinch River, where great crowds have been searching for pearls, and large quantities were obtained. The Georgia interest has been chiefly along the Oostenaula, near and above Rome. The New York activity has been in the north-western angle of the State, along Grass River, in St. Lawrence County. Connecticut has yielded some good results to the searchers on the Mystic and the Shepang rivers, at almost opposite ends of the State.

REASON FOR THE PEARL INVESTIGATION.

In view of the great interest and possible importance of discoveries from time to time made in various parts of the United States, particularly in the Mississippi Valley, of pearls yielded by the fresh-water bivalve shells (*Unionida*) so abundant in many of our inland waters, I was invited, in 1894, to undertake a systematic inquiry, for the United States Commission of Fish and Fisheries, to ascertain, as far as possible, the facts relating to the occurrence and distribution of the pearl-bearing species, and the extent and conduct of the pearl industry as thus far developed. The value and elegance of many of the pearls, especially as shown in exhibits made at the Columbian Exposition in 1893; the popular excitements or "pearl fevers" at times arising in districts where a few pearls have been found, and characterized by whole-

sale and reckless destruction of the shells over large areas; the total lack of system in the search for pearls, as contrasted with the methods that have been developed on a smaller but far more profitable scale in Europe, all seemed to call for a careful investigation by the Commission, with a view to better knowledge and wiser direction in the matter of inland American pearl fisheries.

Undoubtedly, for a considerable period after the first explorations, the pearl resources of North America seem to have attracted little attention. The Indian race was contending with the whites for the possession of the country; it was a time of uncertainty and strife for both races; and not until the great waterways of the Mississippi Valley had been won by the whites, the region occupied, and settled communities established, do we again begin to find any indications of the search for fresh-water pearls. For some two centuries the Unios lived and multiplied in the rivers and streams unmolested by either the native tribes that had used them for food, or the pioneers of the new race that had not yet learned of their hidden treasures of pearl.

It is with some surprise that one notes that so few American conchologists have paid attention to our native pearls. It is probably accounted for by the fact that the pearls are contained in old, distorted, and diseased shells, which are not so desirable for collections as the finer specimens. Collectors who have opened many thousands of Unios have never observed a pearl of value. Pearls are usually found either by farmers, who devote their spare time to this industry, and if no result is obtained suffer no loss, or by persons in country villages who are without regular occupation, but are ever seeking means for rapid increase of fortune. Multitudes of shells that do not contain pearls are destroyed in the search.

HABITAT OF THE FRESH-WATER MUSSELS.

From the many inquiries sent out, the general indications from the answers are quite plain, to the effect that the shells are chiefly found in rather rapid streams, in which the bottom would naturally be sandy or gravelly and the water clear. Other species, however, occur on muddy or clayey bottoms, where the current is slower. The references to rock bottom do not concern so much the immediate surface where the shells are found, as the underlying bed on which the softer materials rest. In the matter of depth, also, the large preponderance of answers in favor of shallow streams may mean, not so much that the Unios greatly prefer shallow water, as that they are more readily found and gathered there. The frequent allusions to "hard" or calcareous water seem to confirm the general impression that streams of this kind are favorable to the development of molluscan shells, both in size and in abundance, and the greater proportion of calcareous matter in the water tends to induce the prolific secretion of the pearls.

A Florida writer states that the best *Unio* growth is found in lakes with outlets, the water pure and fresh; but adds that it is sometimes sulphurous. A Texas pearler (Colorado, Concho, San Saba, and Llano rivers) refers to the water as becoming slightly alkaline in dry times; and another Texas pearler (Colorado and Llano) makes a similar statement. A New York pearler (De Grasse River and Plum Brook) mentions the water as brown or black—the clear, brown water of the hemlock districts, familiar in northern New York.

The general conclusions most clearly brought out may perhaps be summed up as follows: The shells are most abundant in swift and clear water where the bottom

is sandy or gravelly and the country rock calcareous. While still numerous in many streams, they have greatly diminished within a few years past, wherever the pearl-hunting enterprise has extended, and are at some points nearly exterminated. The pearls found are few, and those of marketable value represent the destruction of thousands of shells for every one obtained. No use is made of this often beautiful material, which is simply thrown away and lost; although for buttons and ornamental articles it would be admirable. The methods of gathering the shells and extracting the pearls are the simplest and most primitive, and the activity of a few seasons generally exhausts the beds.

This state of affairs is one that calls loudly for reform. The wealth of Unios that filled our rivers is rapidly being destroyed by ignorant and wasteful methods of pearl-hunting; and either some form of protection is important, or, if that be not possible, a wide diffusion of information as to better methods, and particularly the introduction of tools used in Germany for opening Unios far enough to see if there are pearls contained without destroying the animal, which may then be returned to the water.

PEARL-HUNTING AS AN OCCUPATION.

As to the principal occupations of the pearl-hunters, or pearlers, as they are called, this was answered by 64 papers. Of these, 13 say merely that their occupations are various, or that people of all callings are included. The remaining 51 papers state more or less definitely as follows: Farmers and farm-hands, 23; laborers, 12; fishermen, 8; and as making pearl-hunting a regular business, 7. Three papers speak of loafers, and one or two each specify as follows: Stockmen, hunters, trappers, tradesmen, roustabouts, boys, and negroes, and the Maryland paper, oystermen. The term "laborers" as used in those answers probably means, in most cases, farm-laborers, as stated in a few instances; and the indication is that two-thirds of the pearl-hunting is done by agricultural people who search the streams when not otherwise occupied, "in off times," as two or three of the writers say. Fishermen are naturally much in preponderance, who gather the mussels for bait.

METHODS OF EXTRACTING PEARLS.

The inquiry as to the mode of extracting the pearls when found received 72 answers. A large proportion of these are general, merely saying "by hand," "with the fingers," etc., but about one-third give more or less description of the process. When the shell has been opened, the pearls, if loose and near the edge, may be readily seen, and sometimes even drop out. These are, of course, easily taken out with the thumb and finger, or, if small, with tweezers, or on the point of a knife. If more embedded in the mantle and gills, they are detected by feeling for them, passing or rubbing the thumb or finger along and around each valve and about the region of the hinge. The pearls may then be pressed or squeezed out "like the seed of a cherry"; but if attached to the shell, must be removed with a pair of nippers. Care is required in opening, not to scratch or injure the pearl. A very few describe different methods; thus one Arkansas pearler speaks of breaking the shells, and a Florida pearler tells of piling the mussels in a dry place to decay, the Oriental method of opening the true pearl-oyster and finding the pearls in the emptied shells later. This method is evidently practicable only where little or no "pearl hunting" is generally carried on, and the pile of shells would not be liable to inspection and search by other parties than the original gatherers.

TREATMENT OF PEARLS WHEN FOUND.

Concerning the treatment of pearls when found, definite answers were received in 52 papers, which, in some respects, show considerable diversity of usage. The pearls are first thoroughly washed to remove all adhering animal matter, and two papers speak of using alcohol to complete the cleansing. After this the essential point in keeping or carrying them is to prevent injury to the surface from friction, and the majority of those who describe what is done tell of wrapping in cotton, or soft paper, cloth, flannel, or silk. Several speak of drying them, or keeping them dry. But others would keep them in a liquid, six specifying a bottle of water and one sweet oil or coal oil. Several speak of putting them into a bottle, but with no account of its contents, or whether even dry, though an Indiana paper mentions cotton in a bottle, and hence, in the cases just referred to, it is impossible to judge as to what is the probable meaning. Two papers mention keeping pearls in starch, and one "in Irish potato." The effect of sunlight is curiously alluded to by two papers, one stating that pearls should be kept from it, and the other that they should be kept in it.

Six Tennessee papers make interesting references to "peeling" dull and unpromising pearls, merely saying that this is sometimes done "with a sharp knife," and a nice pearl obtained thereby. Alcohol, whiting, chamois leather, etc., are mentioned as employed to produce a good surface of luster. Two other papers allude to polishing or cleaning pearls, one specifying that it is done "with Irish potato." Two papers say nothing under this head, save that there is no way to improve nature.

DESTRUCTION OF THE MOLLUSKS.

As to what, if any, use or disposal is made of the shells after being examined for pearls and the animals destroyed, the papers give a painful record of the utter waste of an enormous amount of material valuable for many purposes in the arts. The question is answered in 74 papers, with a melancholy uniformity. In only 12 of them is there any suggestion of utilization of the shells, and in only 1 of the use of the animals other than as fish-bait, manure, or food for hogs. Twenty-six answers say simply that there is no use made of them, or that they are "wasted" or "thrown away"; 9 say that they are thrown in the water, and 6 add that the fish eat them and also the muskrats and tortoises; 7 speak of their being used for fish bait; 6 for feeding hogs, and 2 for manure. Several merely say that they are left on the banks or shoals for rats, minks, and crows to dispose of.

An Iowa pearler states that the shells are utilized for button-making, and that some people use the animal for soup. The actual use of the shells for buttons is also referred to by two pearlmen, and their possible value for that purpose is noted in four other papers, though they are not so used as yet. One says that a few are polished for ornamental purposes, and another makes a similar statement, adding that they are also used to pave garden walks and burned for lime. This latter use, for lime, is referred to also by three Tennessee papers as actual or possible, and one says that they might be "ground to cement," and one Wisconsin writer notes that some are ground up for poultry.

AS A FOOD PRODUCT.

There would seem to be a strong presumption that the mound-builders must have used the Unios quite largely for food, as we know that the later Indian tribes did, as will be referred to further on. They naturally were thus led to the finding of pearls,

and accumulated large stores of them in the course of time. The ancient tribes of Brazil have left shell heaps along rivers tributary to the Amazon, composed of fresh-water shells of that region (*Hyria* and *Castalia*); and though no such stores of pearls have been found, yet the shells themselves have been much employed as ornaments among these people; so they also were in the United States.

When it is remembered that the native tribes of both North and South America made large use of the river mussels as an article of food, it seems extraordinary that only one instance of any attempt so to utilize them should appear in these accounts; although Canadian lumbermen catch them by allowing bushes to drag after their rafts in shallow streams, using the mollusk for food. They could, perhaps, often save life, if explorers or hunters knew of their existence; while the shells, which are so capable of being wrought and polished into an immense variety of beautiful objects of ornamental art, should command a remunerative price, instead of being thrown away and wasted. The small ones are often as brilliant as an opal in color.

UTILIZATION OF UNIO SHELLS FOR BUTTONS.

Several references, from time to time, have been made to the valuable possibilities of the abundant shells of the *Unios* for various purposes of manufacture, and some few instances noted of their being polished as ornaments or cut into buttons. It is highly interesting to learn that this latter use has at last attracted attention and is developing into an important industry. A correspondent of the *St. Paul (Minn.) Dispatch*, under date of November 13, 1897, gives an extended account of the shell-button manufacture at Muscatine, Iowa, where already a number of factories are in operation. No dates are specified; but the statement is made that it was begun within a few years past by Mr. Boepple, a German, who recognized the possibilities of such an industry and established a factory at Muscatine, soon employing 200 operatives, besides a number of outside people gathering shells from the Mississippi River at that point. The enterprise proved profitable, even under an unfavorable tariff, and several other factories were established; but since the recent protective legislation has gone into effect the business is increasing largely. Eleven or twelve factories are now in operation, running 300 saws and employing 1,500 people. One of these was working on double time to fill orders for 20,000 gross of buttons for the "holiday trade" of 1897. The business is already an important element in the prosperity of the town; and as the supply of shells is enormous, it is expected to increase in extent. Other works exist also in Iowa. There are also eastern factories referred to that cut the shells into "blanks," i. e., unfinished disks, and send them to Muscatine to be polished and perforated.

The shells have been gathered by men and boys wading in the shallow water and working from boats in the deeper parts with rakes provided with a wire net or basket. Now, however, steam dredging is to be employed. One such boat has been built and another is under construction. The dredge will take up a ton of shells in an hour, and the steam will be used to cook the animals and clean the shells—a process now slowly conducted in small furnaces. As the gathering can not be carried on in winter, when the river is frozen, prices rise in autumn. Several species are capable of being used, of which two are particularly mentioned; these are "nigger-head" shells, which have risen with the approach of winter from 35 cents per 100 to 70 cents, and "sand" shells have advanced correspondingly from \$1 to \$2 per 100.

PRESENT ABUNDANCE OF FRESH-WATER MUSSELS.

Out of 83 papers which respond to this inquiry 7 describe the shells as at present very abundant; 36 as plentiful; 25 as scarce, and 3 as absolutely exterminated; 28 papers refer to the fact of diminished and diminishing numbers within a few years past, some of them with great emphasis. Three of the Tennessee papers estimate the numbers as reduced to about one-tenth of what they were ten years ago, and the same general fact is stated, of former abundance and present rarity, and attributed to the pearl-hunting destruction of a few years past. Several papers say that the shells are now scarce in small streams and the shallower parts of larger ones, while still abundant in deep water and where the currents are strong.

NATURAL ENEMIES.

In regard to natural enemies, 84 papers are varied and interesting, and in some respects quite contradictory. The chief natural enemy of the Unios appears to be the muskrat; 65 papers refer to it, 26 reporting large destruction from this cause, 38 in some degree, and one denying any. Hogs come next, and are referred to in 47 papers. Of these, 7 hold them responsible for large destruction; 35 for some, or a little, and 5 assert that there is none. Of other animals, raccoons are stated, in 13 papers, to destroy some shells; mink in 5; mud turtles in 3; crawfish in 2; aquatic birds in 2; and cattle, by trampling, in 3. All the animal depredators deal only or chiefly with Unios that are either young, small-sized, or soft-shelled, and hence not largely pearl-bearing. The only exception to this general rule is the statement in one paper that many pearls have been found where shells had been taken ashore by muskrats and left to open in the sun.

INJURIES DUE TO PHYSICAL CAUSES.

With regard to physical causes of injury, the most serious, no doubt, is found in freshets. Of 31 papers that refer to these, 17 report great destruction thereby; 13 say "some" or "a little," and 1 denies that there is any. Some papers say that their injury is small, and that they only shift the beds and redistribute them; but a number describe the burying of beds by the washing down and caving in of banks in flood-time, or the stranding of great quantities of young shells when the water subsides. Two papers that do not mention freshets should doubtless be included here, however, as they speak of destruction caused to the shells by "covering with mud," and by "change of bars." On the other hand, low water and droughts are reported as seriously harmful in 5 papers, and drift ice in 3. Two papers allude to disease as a cause of injury, and 3 to boring parasites.

EXTERMINATION OF THE MOLLUSKS.

The question as to exhaustion of the mussel-beds, its causes and its rapidity, has called forth a very suggestive body of replies in 57 papers; the remaining third make no response, or none that is at all definite; 9 papers report extermination of the shells, either actual or imminent, within a very few years past; 20 speak of rapid diminution in their numbers; 16 of decrease as noticed and in progress; 8 are uncertain or report little or no change; 6 describe them as abundant or "inexhaustible," and 4 refer to partial recovery or replenishment after reduction. In 45 out of 59 papers, therefore, approximately three-fourths, the process of exhaustion is recorded, at times already

complete. Of these, 26 state the cause as pearl-hunting, mainly or wholly, and 10 refer to other agencies, one or two each to high or low water, deposits of sand or mud, ice, boats, hogs, and rats. Of 7 answers from Wisconsin, where so many pearls of remarkable beauty were found in the early "nineties," 5 report the shells as nearly or entirely exhausted, and 2 refer to rapid reduction, due to ignorant and careless persons taking the small and young shells as well as those more likely to contain pearls.

A Tennessee paper alludes to the same reckless habit, and estimates the shells remaining as about 5 per cent only of the number in former years. The destruction of young shells is also mentioned in Indiana. In New York it is stated that a good pearl-fisher can "clean out" a bed of 500 shells in a day. The Ohio paper speaks of hundreds being opened daily. In Iowa one states that the river will be exhausted in two years. Of those that speak of little change, several remark that not much is known or done in regard to pearls at their localities. Of the probability of recovery, one, Tennessee, says that the beds are cleared out about every two years and renewed in four; one that they exhaust yearly and bed again in one or two years; another that the shells return every year, but in less numbers, and a Texas paper reports that many beds that had been worked out are recovering, through the growth of the young shells that were left unmolested.

NATURAL AND ARTIFICIAL REPLENISHMENT OF FRESH-WATER MUSSELS.

The inquiry as to whether exhausted beds recover, and in what time, is closely connected with the preceding one. It is unanswered in 22 of the papers, and 7 others report no knowledge or opinion on the subject; 64 replies are given, of which several are indefinite or conjectural. Out of about 60 papers, therefore, or two-thirds of the whole, the following data are taken: 16 report the belief that the beds are replenished from year to year; 4, in one or two years; 3, in two or three years, and 4, in four years; 4 name periods between four and eight years, and 6 between eight and twelve years; 1 gives twenty years, 1 gives twenty-five, and 2 estimate the recovery as requiring a century or more; 3 papers say that many years are necessary; 5 say "a few," or "soon"; 2 report no exhaustion as noticed, and 6 report no recovery; 4 papers are indefinite or uncertain. Two of the papers that give estimated dates for recovery do so with an expression of doubt ("if at all," "if ever") as to whether it really occurs.

The Tennessee paper before referred to says that the shells return each year, but in less numbers. As it is customary, more or less, to leave the young and small shells, the questions are resolved largely into two, viz, how far they have been carefully spared, and how long it takes them to attain their growth. This probably differs in different species, as is intimated in some of the answers, and it may also be influenced by various external conditions. The Tennessee paper estimates the recovery as slow, from the fact—previously brought out very markedly—that the young shells are those that are most exposed to all natural enemies and accidents. The New York paper, which thinks that there is no recovery, states that few young shells are found. A Texas pearler says that young shells are found in two years, but contain no pearls. One (mentioned under the last head) says that many beds are recovering by the growth of the young that were left before. On the other hand, in Indiana, one states that when a bed has been worked out, plenty are found the next season, and an Iowa pearler reports young shells abundant everywhere. One Tennessee answer probably gives a very fair average statement, to the effect that the beds recover somewhat every season, and would perhaps recover entirely in a few years if not molested.

NATIONAL AND STATE PROTECTION.

The concluding inquiry, as to whether State protection of the beds is desirable or necessary, is answered with more or less definiteness in 73 papers, and, as might be expected on such a subject, with much diversity; 46 of the responses see no need or advantage from protection and 23 favor it. One or two fail to understand the purpose of the question clearly, and some hold that while not necessary now it may be so in the future. Two or three say that it would be difficult or impracticable. Of those that do not favor protection two (Michigan and New York) think it not desirable to preserve the Unios, the latter curiously remarking, "The water would be purer without them." And one Tennessee fisherman seems to hold a similar view, saying that protection is not desirable, though it is necessary to the preservation of the shells. Another Tennessee pearler, failing to appreciate the question involved, opposes protection, "because pearls bring in a great deal of money, and the mussels are of no use." Two or three think that the shells are inexhaustible and in no danger of extinction. Of those that favor the suggestion, an Indiana pearler says it would be well if no shells were taken for five years. The Ohio paper advocates it "if the mussels are to be preserved." A Tennessee paper alludes to the value of the shells for pearl buttons as a reason for protection, and two other Tennessee papers advocate a limitation as to not opening young shells.

The whole question is curiously suggestive of the similar conditions in respect to forestry and lumbering—the apparently inexhaustible natural supply; the reckless prodigality and waste of such resources by man; the rapid diminution and impending extinction, which it would require years of labor to restore; the foresight and remonstrance of the few, and the indifference or opposition of the many, as to any limitation or protection designed to preserve the natural resources; and the ease with which they could be preserved by a few simple and intelligent modes of management, once established and made familiar to the people; and the pressing importance of some such action.

APPROXIMATE YIELDS OF PEARLS.

Only a few approximate figures can be given. The total production of pearls may be summed up as follows: In the 1856 excitement \$50,000, worth to-day at least four times that amount; in the 1868 excitement \$50,000 worth; in the 1889 Wisconsin excitement perhaps \$300,000 worth; the Tennessee fisheries \$100,000; Kentucky \$20,000; Texas \$20,000; Arkansas produced single pearls in the past year of a total value of \$35,000, some selling for over \$1,000 apiece, and many for over \$100 and \$200.

The great importance to a rural population of obtaining ready money easily by pearling can not be overestimated, the pearlery being aided in the payment of taxes, interest, and for such things as only money will buy; and the protection of the pearling interests is, therefore, very desirable, as the industry, if properly regulated, yields a product which can always be sold for cash.

NEW YORK CITY.