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OUR DEEP SEA FISHERIES.

Among the important items of the Sundry Civil Appropriation Bill of the late Congress was one granting \$103,000 for the construction of a sea-going steamer for the use of the U. S. Fish Commission. The vessel is designed for purposes of deep sea exploration, and will be constructed under the supervision of Professor Baird.

A considerable amount of good work in this direction was done last summer with the little Fish Hawk during an interval of forced inaction in the work of fish hatching, for which she was specially designed. Taking advantage of spells of settled weather the Fish Hawk made three runs to the edge of the Gulf Stream, spending twelve hours on each occasion in deep sea work, but not daring to stay longer because of the unfitness of the little craft to endure rough weather. To do the work properly would require a properly equipped sea-going vessel, such as the appropriation provides for. Accordingly Mr. Copeland, naval constructor of the Lighthouse Board, has planned a vessel in which are embodied all the requirements of a staunch sea-going boat, as small as the service will permit, but able to do any work of the kind required, and at the same time fitted for the hydrographic service of either the Coast Survey or the Navy Department, when no longer needed by the Fish Commission. The proposed vessel will be about 200 feet keel.

The method of deep sea research proposed by Professor Baird will embrace determinations of temperature and the depths of currents; the collection of objects from the sea bottom and from the water at all depths, from the surface down; and the collections of samples of water at various depths for chemical and microscopical investigation. The temperature investigations, he thinks, will be of very great importance, as the distribution and migrations of fish are largely influenced by variations in the temperature of the water inhabited by them.

Among the problems to be solved by these investigations is the cause or occasion of the recent abandonment of the waters north of Cape Cod by the menhaden. Some 2,000 men in Maine were engaged in the menhaden fishery, and the capital invested by them approached \$2,000,000. The hopes of this industry depend upon the discovery of the cause of the change in the habit of these fish, and whether the change is likely to be permanent.

The disappearance of mackerel from the Gulf of St. Lawrence is instanced by Professor Baird as another problem, the solution of which requires the use of a sea-going vessel. If the Commission can determine the probability of a continued absence of the fish from the Gulf before the next convention is held to consider the value of the Canadian fisheries to the United States, the impending negotiations will be greatly simplified.

The Commission also hopes that by the thorough scientific study of the habits of our coast fishes, to be made possible by the new steamer, it may be possible to establish general principles by which the fishermen may know each year at what points to meet the incoming schools of mackerel and menhaden, and thus save weeks of fruitless search for them.

INDEX OF UNITED STATES PATENTS.

One of the most conspicuous, at the same time one of the most commendable, of the acts of the Forty-seventh Congress was the passage of House bill No. 5,066, appropriating \$10,000 to be expended under the direction of the Commissioner of Patents in the preparation of a classified abridgment of all the letters patent of the United States.

Such a work has long been needed, both in the Patent Office and out of it. Indeed for lack of it the efficiency of the Office has been materially diminished for many years; while an incalculable amount of wasted time and thought and money is traceable to the inability of inventors to discover what previous investigators have accomplished, or where they have failed, in the same lines of effort.

Last year more than 7,000 applications for patents, many of them representing, no doubt, years of patient investigation, were rejected for lack of novelty. A large part of the labor and cost which such reinventions entailed might have been saved, and many other more successful efforts might have been facilitated, had our inventors been furnished with the knowledge locked up in the Patent Office awaiting the key which is now provided for. And the 7,000 disappointed inventors represent probably but a small fraction of those who, during the past year, were engaged in more or less fruitless efforts to advance the useful arts.

This waste of intellectual energy and useless expenditure of means by a class which could least afford to spare them has been going on for a long generation. In his annual report for 1848 Commissioner Ewbank urged upon Congress the grave need of an index of patents, such as has now been tardily promised. At that time the number of rejected applications did not reach a thousand a year, yet the Commissioner could then justly say of the digest asked for:

"In a pecuniary point of view such a work is most desirable to this Office, to inventors, and the public at large. When made accessible to popular reference it will be the saving of millions. No State paper could surpass it in importance, nor in lasting value. Till it is done a majority of applicants for patents must continue to meet with some disappointment. The only safe rule with them is always to make themselves acquainted with what has been attempted before incurring any serious outlay. They should never presume that their devices have not entered other heads than their own until, by a searching inquiry on every hand, the pre-

sumption remains in their favor unimpaired. No better advice than this can be given them. But how are they to follow it? Nineteen-twentieths have few or no reliable sources of information within their reach, and not one in a hundred can afford the expenses of a visit to Washington and a residence there for the purpose of consulting the Office records and library."

For thirty years and more this grievous barrier has lain at the very threshold of invention—thirty years, during which the world has been revolutionized and the scope of human life increased enormously by the successful efforts of inventors. Who can estimate the evil which has directly and indirectly resulted from the long neglect to do justice to the Patent Office, to inventors, and still more to the general public, which, more than all the rest, is to be benefited by the work of the inventor and the highest efficiency of the patent system?

It is to be hoped that there will be no delay in the prosecution of the work of preparing and printing the digest which the new law provides for; and that, when printed, the work will be made easily accessible to every man who may wish to consult it.

THE BARGE SYSTEM ON THE MISSISSIPPI.

Mention was made in this paper recently of the sailing of a fleet of barges from St. Louis with over 10,000 tons of grain (20,847,900 pounds) for export by way of New Orleans. The fleet was towed by the steamer Oakland, which took, in addition to the eight grain barges, a capacious fuel barge. The largest tows last year were as follows: The Iron Mountain and barges left St. Louis, April 10, with 300,000 bushels of corn, or 16,800,000 pounds cargo. The same boat and barges, February 29, with 47,000 bushels of wheat and 210,228 bushels of corn, or 14,392,768 pounds. The D. Gilmore, July 17, with 178,000 bushels of wheat and 30,000 bushels of corn, or 13,860,000 pounds; and the Oakland, August 10, with 230,158 bushels of wheat.

The shipments from St. Louis by barges for European account last year reached a total of 15,717,664 bushels of wheat, corn, and rye. The shipments of the same sort in 1870 comprised only 66,000 bushels of wheat.

The prospect of an extension of the operations of the St. Louis and New Orleans barge line to Davenport, Iowa, next summer has led the *Democrat*, of the latter city, to investigate the progress and prospects of the barge system. It finds that at the close of 1880 there were four lines of towboats and barges engaged in transportation, aggregating 15 boats and 86 barges, with a total capacity in bushels of 4,690,000 and 4,200,000 per month to New Orleans. The boats and barges now building number 1 boat and 24 barges—of the latter, 22 having a capacity of 60,000 bushels each and 2 of 50,000 each, which will increase the total capacity to 6,000,000 bushels. There are now four established barge lines from St. Louis to New Orleans for the transportation of grain for export, and three of them are making the additions referred to above. The four rank as follows in present and building capacity: Mississippi Valley Transportation Company, 7 boats and 49 barges, with a total capacity of 2,520,000 bushels; St. Louis and New Orleans Transportation Company, 6 boats and 50 barges, with a total capacity of 2,550,000 bushels; the Anchor Line Company, with 2 boats and 12 barges, and a total capacity of 500,000 bushels; and the M. C. T. Company, with 1 boat and 9 barges, of 540,000 bushels capacity. The trips of the tows of these lines last year from St. Louis direct numbered 113, and these transported 5,913,272 bushels of wheat and 9,804,392 bushels of corn, including 45,000 bushels of rye. The number of barges to a tow would be about five, and the average cargo of each trip for the year 140,000 bushels.

All this vast trade has been made possible by the improvements of the channel of the Mississippi below New Orleans, particularly by the jetty system at the mouth of the river.

LARGE CRAFT ON THE LAKES.

When the Congressional committee had under consideration last winter the question of appropriation for the improvement of the harbor at Chicago, the *Inter-Ocean* of that city remarked that while eleven feet of water in Chicago River sufficed for the commerce of a few years ago, from fifteen to seventeen feet were needed now, to accommodate craft carrying from 50,000 to 70,000 bushels of grain.

Seven or eight years ago a craft of 600 tons was considered large on the lakes; now Chicago alone owns many that are twice and three times as large. A list printed in the paper mentioned gives the names, tonnage, and values of nearly fifty vessels ranging between 800 and 1,000 tons, and more than fifty having a capacity exceeding 1,000 tons. Of these fifteen propellers are rated between 1,500 and 2,000 tons, and one at 2,082 tons. The values of these vessels range between \$60,000 and \$125,000. At the same time there were on the stocks at the different lake ports forty vessels of 2,000 tons and over, several ranging between 2,500 and 2,800 tons.

One of the latter, having a carrying capacity of 80,000 bushels of grain, was lately launched at Cleveland. Its dimensions are given as follows: Keel, 255 feet; beam, 38 feet; hold, 20 feet. It is a propeller, employing two compound engines, the cylinders measuring 43 x 48 and 22 x 48 respectively. The two boilers are each 10 feet in diameter and 17 feet long.

Another vessel soon to be launched at Toledo measures as follows: Length of keel, 265 feet; length over all, 278 feet; breadth of beam, 38 feet 9 inches; hold, in shallowest place, 21 feet, in deepest place 24 feet 8 inches. She will be five