the importance of further search after evidences of ingulfment.

Regarding the age of the caldera, it would be premature to offer any opinion, beyond the vague and general statement, that it is certainly many thousands of years old. There is abundant reason to hope, however, that further examination will throw some light on this question. We cannot, indeed, expect to reach any estimate of its age in terms of years and centuries; and our hope must be confined to that of fixing its relative age in terms of the geological calendar. Viewed in that relation, it may be said with equal confidence that its age is not great. C. E. DUTTON.

THE FISH-CULTURAL STATION AT GLOUCESTER, MASS.

WE are informed that it is the intention of Professor Baird, the U. S. commissioner of fisheries, now that methods and apparatus for hatching successfully the buoyant eggs of the cod, halibut, and other marine species have been devised, to prosecute the work on as extensive a scale as the means at the command of the commissioner will permit.

Gloucester, being the centre of the cod and halibut fisheries, furnishes unusual facilities for procuring an abundant supply of eggs within easy and convenient reach of the station, and has therefore been selected as the most advantageous location, for the extensive fish-cultural work with the marine species, now projected by the U. S. commissioner. The commission steamer, the Fish Hawk, thoroughly equipped for hatching-work, has been ordered to Gloucester, and will take her position in the outer harbor, at some convenient point where the anchorage is safe, the water pure and free from sediment, and of sufficient density to insure the buoyancy of the eggs during incubation.

All the usual methods for collecting eggs will be resorted to, and, in addition, it is expected to interest the fishermen themselves in the work of collecting by paying a reasonable price for impregnated eggs delivered at the station. Experimental investigations will also be made to determine the practicability of forwarding impregnated eggs from Gloucester to Wood's Holl and other stations to be hatched. The species which will chiefly engage the attention of the experts of the commission are the cod, halibut, haddock, herring, and the mackerel.

The results of the work with the halibut will be watched with special interest, both by fish-culturists and by those who are engaged in the fisheries. This fish is even more prolific than the cod-fish. Once in extraordinary abundance in Massachusetts and Ipswich bays, it has, within the memory of man, been almost exterminated in the area referred to. Have the conditions changed so as to determine the migration of the species to more congenial waters, or has man, by his direct agency in the fisheries, effected the extermination, over a given area, of a marine species of such marvellous fecundity? This is a question to which the work of the commission promises, in a few years, to furnish a satisfactory answer.

GREELY'S THREE YEARS OF ARCTIC SERVICE.

THE name and fame of Lieut. A. W. Greely of the U. S. army now belong to the history of geographical research and of undaunted heroism. The pages of this journal have so often referred to his arctic explorations that it would be superfluous to review again the thrilling incidents of his perilous voyage. The scientific world is well aware that he was sent by the U. S. government as the leader of an expedition which was to co-operate with many kindred parties in the observation of physical phenomena in the extreme north; that this arduous enterprise was not for the gratification of personal or national pride by extending the coast-lines of the northern chart, or by carrying the flag a little nearer to the pole than it had ever been borne before; that it was not for the purpose of adding renown to the army, or glory to the explorers, but to help in solving important problems in terrestrial physics by a series of exact, patient, long-continued, and carefully recorded observations in the ice-bound regions of the north.

As long ago as 1875, Lieutenant Weyprecht of the Austrian navy, who had won experience and distinction in arctic researches, succeeded in calling the attention of the civilized world to the idea that future voyages should not be planned with reference to the increase of our knowledge of geographical boundaries, but rather to the ascertainment of scientific facts, by contemporaneous observations in well-chosen stations at the north, under the concerted actions of the most experienced men and the most enlightened governments. As a result of the acceptance of this idea, fourteen stations were established by eleven co-operating nations; namely, Austria, Denmark, France, Germany, Great Britain, Holland, Norway, Russia, Sweden, and the United States. Many astronomical observatories in different parts of the globe lent their aid to the project, so that the number of

Three years of arctic service. An account of the Lady Franklin Bay expedition of 1881-84, and the attainment of the farthest north. By ADOLPHUS W. GREELY. 2 vols. New York, *Scribner*, 1886, 8°.