

credit: Italy, 58 per cent., Spain, 40 per cent., France but 20 per cent., Mexico, 33 per cent. and South America, 31 per cent. India, China and Africa all make creditable gains, but Australasia appears to be at a standstill.

The changed political conditions in Europe are reflected in the fact that Turkey appears in the list for the first time and in the considerable gains in the Balkan states. On the other hand, the inroads of despotism are evident in the significant entry "Suspend," after not a few noted and promising names in the official staffs of the Russian universities.

It is inevitable that omissions, errors and inequalities of standard will creep into such a work, where the editor so necessarily is dependent upon voluntary assistance. The American section seems especially to have needed critical revision, for it contains numerous antiquated entries, inequalities in representation, and some positive errors. The Rockefeller Institute is, for example, credited to Chicago! One also misses in this new edition, the very helpful subject index of specialists of the earlier editions. The size of the volume would have been somewhat increased thereby, but the increased cost would have been more than compensated for by the greater usefulness of the work to the specialist seeking the names of his fellow-workers. The citation of specialty in connection with the alphabetical index of names would be a welcome addition to the work. In spite of these minor defects, however, the work will be exceedingly useful to every biologist and naturalist who seeks information regarding the organization and personnel of the various departments of the biological sciences throughout the learned world.

CHARLES ATWOOD KOFOID

UNIVERSITY OF CALIFORNIA

*THE PRIBILOF FUR SEAL HERD AND THE PROSPECTS FOR ITS INCREASE*¹

AFTER more than twenty years of active operation, the pelagic sealing industry has been brought to an end, as the result of a

¹Read at the forty-first annual meeting of the American Fisheries Society, October 3, 1911.

convention which has been signed by representatives of the United States, Great Britain, Russia and Japan, and ratified by the Senate of the United States.

The contracting parties have agreed to prohibit their vessels from engaging in pelagic sealing and to close their ports against all vessels connected in any way with the operations of pelagic sealing. It is not necessary in this connection to go into the details of the seventeen articles of the convention, which is to continue in force for a period of fifteen years from December 15, 1911.

The total loss of seals from the North Pacific herds through pelagic sealing since its inception may be placed at about three millions. As a large proportion of this catch consisted of females, the disastrous effect upon the breeding stock of the Pribilof and Commander Islands will be readily appreciated.

The fur-seal industry, both at sea and on land, was for many years the subject of almost continuous international controversy, and the Pribilof herd especially has been studied long and carefully by commissions selected chiefly from the ranks of British and American naturalists.

The facts respecting the fur seal's habits, migrations, food, breeding, growth, age, numbers, anatomy, enemies, etc., etc., as arrived at by the commissions appointed to study the subject in general, afloat and ashore, can not reasonably be questioned. They are based upon prolonged inquiry by representatives of the two countries most interested, and have been mutually accepted only after the keenest possible criticism from both sides.

The natural history of the fur seal is now better understood in detail than that of any other wild mammal. These investigations, commenced about twenty years ago, have yielded much new information, and, with the cessation of pelagic sealing, we are now ready to apply scientific methods to the rehabilitation of the small herd remaining on the Pribilofs with full confidence as to the result.

The polygamous habit of the fur seal is the principal fact with which we have to deal in considering any scheme of management of

this animal upon its natural breeding grounds. Each mature male controls from 1 to 100 females, the average number of females in the harems, into which the rookeries are divided being about thirty. The surplus of male seals naturally resulting from the polygamous nature of the fur seal is large, and the most of it has always been available for commercial purposes.

The male seals are thus of two distinct classes: the adults in possession of the breeding grounds, and the immature males located entirely away from such grounds. The latter do not acquire the size and courage to fight their way among the large breeding animals until about seven years old, although otherwise mature at the age of four years.

During the breeding season the mature males are in possession of the harems, where they maintain their positions by sheer fighting ability. Their courage is such that they do not give way even before men armed with heavy clubs, and it is dangerous for men to attempt to enter the rookeries at this time. When the males seize each other with their powerful jaws they frequently tear rents in their thick hides. In a quarrel for the possession of a female, the latter may be frightfully lacerated, and is sometimes killed. Fighting may be seen anywhere in the rookeries and many of the very young seals are trampled to death.

The destruction of young through the fighting of the bulls is of serious extent even when large numbers of surplus males are annually killed for marketable skins. It must have been vastly more serious, prior to the utilization of seal skins by man.

It is the belief of naturalists who have studied the fur seal on its native islands that the furious fighting of the males upon the breeding grounds actually constituted nature's check to the unlimited increase of the race. It could have been nothing else, although the worm parasite (*Uncinaria*) of the sand areas must be considered to some extent in this connection.

Prior to the discovery of the Pribilofs the breeding grounds were undoubtedly overflowed

at times by such hords of mature males that an important proportion of the young of the year, and many adult females, were destroyed.

There can be no doubt that the annual reduction of the male surplus for commercial purposes since the discovery of the islands has greatly lessened the breeding-time turmoil of the rookeries, and that proportionately larger numbers of young survive the perils of infancy.

Now that pelagic sealing, so wasteful of the adult female life, has been suppressed, we may expect an annual expansion of our shrunken breeding grounds.

The male stock on the islands should be watched with care and its numbers kept within safe bounds. A sudden increase of fighting males in the rookeries at a time when the stock of females has reached the lowest limit in the history of the island would greatly endanger the newly born young.

Here we may take up a matter of importance to this society. A resolution was introduced in the House of Representatives on August 12 to provide for the suspension of all seal killing on the Pribilofs for a period of fifteen years. This resolution may come up for consideration when Congress convenes. Its passage would be unwise in many ways, but chiefly in the danger of a rapid increase in fighting male seals which it would bring about. While a cessation of land killing for a season or two might cause no serious trouble, the fifteen-year period specified is not only too long, but positively dangerous, as the Bureau of Fisheries would be powerless to apply the necessary remedy for the evil of overcrowding by males when it becomes serious.

The criticism of the administration of the seal islands which called forth the above resolution of August 12, 1911, was made by men who have not been on the islands for twenty years and who can not appreciate the recent detailed investigations. Severe criticisms have also been made by men who have not been there at all, and whose opinions upon the subject are of little value.

Plans have been considered for reducing the loss through the hook-worm *Uncinaria*. The

breeding grounds of the Pribilofs are located largely upon rocky ground or upon firm soil and have sufficient slope as a rule to prevent the accumulation of sand. There are small sand patches within the limits of several rookeries which are infested with the parasite *Uncinaria*. This hook-worm is one of the contributing causes to heavy annual losses among the young seals born on sandy areas. The *Uncinaria* parasite was doubtless a greater source of danger in former years than at present. It was, like the fighting of the males, a natural check upon the unlimited expansion of the seal herd, but not so potent. The topography of some of the rookeries is such that an extension of their limits would force the breeding females to occupy unfavorable sandy areas. This source of danger to young seals can be eliminated, if sandy ground is covered with rock, or fenced in so that breeding seals can not occupy it.

In conclusion it may be stated that with our present knowledge of the life history of the fur seal, there is no reason why our valuable herd should not only rapidly increase in size, but, under wise management, *actually exceed in numbers* the great herd occupying the Pribilof Islands at the time of their discovery.

The principal thing in the management of the rookeries will, however, be the limiting of the number of the adult males allowed to enter the rookeries.

Notwithstanding the fact that during recent years a very large proportion of the surplus males has been killed for profit, our annual photographic records show that there has always been, with the exception of one or two seasons, a sufficient surplus of idle males adjacent to each rookery. Such animals force their way in as soon as they acquire the weight and the courage necessary for them to do so. All claims that we have killed too many of the surplus males can easily be disproved by the photographic records of the Bureau of Fisheries.

C. H. TOWNSEND,
*Member of the Advisory Board
of the Fur Seal Service*

BOTANICAL NOTES

FURTHER STUDIES OF THE COCONUT

IN a recent paper¹ O. F. Cook publishes the results of his further studies of the coconut. It will be remembered that some years ago he published his first considerable paper on this tree, in which he showed among other things that the name is coconut, as spelled above, and not cocoanut, the dictionary makers to the contrary, notwithstanding. The particular purpose of the present paper appears to be to prove the American origin of this tree, and this the author seems to have done most conclusively. The conclusions may be summarized as follows:

All palms that are related to the coconut (about 200 species, of 20 genera) are American, with possibly one exception. All species of the genus *Cocos* are South American. The most nearly related species are natives of the interior valleys and plateaus of the Andes, where the coconut also thrives, remote from the sea. Neither structure nor habits of the coconut tree indicate that it originated on the seacoast. Moreover, it is not able to maintain itself under littoral conditions without the assistance of man, and is always crowded out by other vegetation after human care is withdrawn.

"The dissemination of the coco palm along tropical coasts is to be ascribed to primitive man." "The theory that it has been disseminated by ocean currents is gratuitous, unproved and improbable." The long-accepted theory as to the essentially littoral habitat of the coconut must be abandoned in favor of one quite the opposite. "The unusually large, heavy seed and the thick, fibrous husk are to be considered as adaptations for protecting the embryo, assisting in germination, and establishing the young plants in the dry climates of interior localities, the only conditions where this palm could be expected to maintain its existence in a wild state."

"PECK'S REPORTS"

ANOTHER of the well-known reports of the state botanist of New York came to hand a
¹ Contrib. U. S. National Herbarium, Vol. 14, Pt. 2.