

# SCIENCE

EDITORIAL COMMITTEE: S. NEWCOMB, Mathematics; R. S. WOODWARD, Mechanics; E. C. PICKERING, Astronomy; T. C. MENDENHALL, Physics; R. H. THURSTON, Engineering; IRA REMSEN, Chemistry; J. LE CONTE, Geology; W. M. DAVIS, Physiography; O. C. MARSH, Paleontology; W. K. BROOKS, C. HART MERRIAM, Zoology; S. H. SCUDDER, Entomology; C. E. BESSEY, N. L. BRITTON, Botany; HENRY F. OSBORN, General Biology; C. S. MINOT, Embryology, Histology; H. P. BOWDITCH, Physiology; J. S. BILLINGS, Hygiene; J. McKEEN CATTELL, Psychology; DANIEL G. BRINTON, J. W. POWELL, Anthropology.

FRIDAY, NOVEMBER 26, 1897.

## CONTENTS:

<i>Results of the Bering Sea Conferences</i> .....	781
<i>The Psychology of the Personal Equation</i> : TRUMAN HENRY SAFFORD.....	784
<i>The Progress and Achievements of Hygiene</i> : GEORGE M. KOBER.....	789
<i>Contribution to our Knowledge of Micro-organisms and Sterilizing Processes in the Canning Industries</i> : S. C. PRESCOTT, W. LYMAN UNDERWOOD.....	800
<i>American Ornithologists' Union</i> : JNO. H. SAGE.....	802
<i>Current Notes on Anthropology</i> :—	
<i>The Aboriginal Art of Ecuador; The Berbers of Morocco</i> : D. G. BRINTON.....	803
<i>Notes on Inorganic Chemistry</i> : J. L. H.....	804
<i>Scientific Notes and News</i> .....	805
<i>University and Educational News</i> .....	808
<i>Discussion and Correspondence</i> :—	
<i>The Mesa Encantada</i> : WILLIAM LIBBEY. <i>Observations on the 'Principle of Identity'</i> : EDWARD F. BUCHNER.....	809
<i>Scientific Literature</i> :—	
<i>Sorauer on the Physiology of Plants</i> : GEORGE F. ATKINSON. <i>Mach's Contribution to the Analysis of Sensations</i> : EDGAR A. SINGER, JR.....	810
<i>Societies and Academies</i> :—	
<i>Entomological Society of Washington</i> : L. O. HOWARD. <i>Biological Society of Washington</i> : F. A. LUCAS. <i>Geological Society of Washington</i> : W. F. MORSELL. <i>The New York Academy of Sciences, Section of Geology</i> : RICHARD E. DODGE. <i>Boston Society of Natural History</i> : SAMUEL HENSHAW.....	813
<i>New Books</i> .....	816

MSS. intended for publication and books, etc., intended for review should be sent to the responsible editor, Prof. J. McKeen Cattell, Garrison-on-Hudson, N. Y.

## RESULTS OF THE BERING SEA CONFERENCES.

THE Fur-Seal Conferences recently held at Washington by representatives of the governments of Great Britain, Russia, Japan and the United States are noteworthy in several respects. The high character and fitness of the delegates, the rapidity with which the negotiations were carried to a successful conclusion, and the essential agreement reached on the principal points under discussion, are matters for international congratulation. It will be remembered that Great Britain declined to take part in a joint conference in which Russia and Japan were to be represented. This led to the holding of two distinct conferences—the first with Russia and Japan; the second with Great Britain and Canada. In the first there were few if any points of dispute, and an agreement was promptly reached whereby the governments of the United States, Russia and Japan pledged themselves to desist from pelagic sealing for a period of one year, pending subsequent negotiations.

In the second conference the conditions were entirely different, the matters under discussion between Great Britain and the

United States having been the subject of international controversy for a number of years. It will be remembered that both countries have been represented at the Pribilof Islands by experts during the past seven years, and that the members of the original Bering Sea Commission of 1891 (Professor T. C. Mendenhall and Dr. C. Hart Merriam for the United States; Sir George Baden Powell and Dr. George M. Dawson for Great Britain) failed to agree on the facts of seal life at the islands. It will be remembered also that in subsequent years the reports of the experts representing the two countries differed materially as to the condition of the rookeries and habits of the seals. These facts, in connection with the hostile attitude of the press of the contending countries and the anxiety over the outcome felt by both governments, give to the findings of the conference an interest and importance quite out of proportion to the real weight of the points at issue.

Great Britain was represented by Professor D'Arcy W. Thompson, of Dundee; Canada, by Mr. James M. Macoun, of the Canadian Geological Survey; the United States, by Dr. David Starr Jordan, President of Stanford University, and the Honorable Charles S. Hamlin, formerly Assistant Secretary of the Treasury. The conference was notable for its brief duration (the sittings occupying only seven days) and for the essential accord of the scientific experts respecting the numbers, condition and habits of the fur seals.

The case was one where naturalists of reputation, who had personally studied the fur seals at the islands, were called upon to

make a joint report on matters that had been in controversy for many years, that had led to strained relations between the governments concerned, and respecting which diverse opinions prevailed among the people and the press. The important fact must not be overlooked that the people and the press of Great Britain and Canada have not up to the present time understood the real facts in the case, and that in combating the attitude of the United States they have done so largely through misinformation. It is important to bear in mind, therefore, that the British and Canadian experts in signing the joint report are liable to incur the displeasure of their countrymen, who may regard the report as a concession to the United States. The greatest credit is due them for making a straightforward statement of fact, irrespective of public prejudice.

The delegates had no power to recommend remedial legislation, their duty being to submit a joint report on the facts on which they could agree as to the condition and habits of the fur seals. With these facts before them, it is hoped that the two governments will find little difficulty in framing measures necessary for the permanent protection and preservation of the seal herd. That such measures involve the ultimate cessation or limitation of pelagic sealing is a fair inference from the report of the expert delegates. That Canada, having no rookeries of her own and consequently no opportunity to profit by the sealing industry except as carried on in the open sea, will voluntarily relinquish pelagic sealing without some offset or concession on our part, can hardly be expected. The

friendly attitude of the two governments as shown by recent events leads to the hope that the whole matter may be amicably adjusted. In any event, the complete agreement of the naturalists taking part in the conference may be regarded as a triumph for science.

The essential features of the propositions agreed upon are as follows :

That since 1884 the Pribilof herd has declined from year to year until at present the number of seals is not more than one-fifth to one-third as great as formerly, although the number of breeding females in 1896 and 1897 was between 160,000 and 130,000. It is also agreed that there has been a notable decrease since 1896, although the exact amount of this loss could not be determined. The existence of a high death rate among the young from natural causes is acknowledged and the conclusion reached that not more than one-half or one-third reach the age of three years.

To those who are acquainted with the various reports on the subject the latter figure will seem nearest the mark, and the evident inference would be that if the death rate in nature is so great any addition to it by such causes as pelagic sealing, with the consequent starvation of thousands of young, is bound to reduce the seal herd. The methods of driving and killing as practised on the islands, it is stated, call for no comment, and it is admitted that land killing as now carried on does no harm.

This is one of the points on which the press of both England and the United States has been more or less confused and, in spite of all that has been written on the

fur seal during the past few years, there seems to be a vague suspicion that after all land killing may have had something to do with the decrease of the herd. This matter was fully discussed in the preliminary report of 1896, where it was very clearly shown that as the fur seal is polygamous and the harems even now, when the number of females has been greatly reduced, contained on an average thirty females to one male, it is evident that, the birth rate being equal, there is a vast superfluity of males.

It is acknowledged that the catch at sea contains a marked excess of females, and this is a most gratifying admission to those who have read the statements made by the sealers, in which the number of males taken was frequently reported to be as great as that of the females and sometimes even greater, a remarkable state of affairs when it is remembered that, owing to the killing of young males on land and the fact that the nursing females are compelled to go to sea in search of food at a time when the males are on shore, the females are bound to be greatly in the majority.

On the other hand, it is pointed out that not all these females are nursing or pregnant, for the reason that many adult seals have lost their pups through the natural causes, while a certain percentage is bound to consist of yearling and two-year-old females.

The conclusion that excessive pelagic sealing has led to a decrease in the herd is coupled with the axiomatic statement that a small number of females, less than the annual increment of breeders, might be taken without producing actual decrease.

As this annual increment is at the best small and as for ten years there has been a steady loss, it seems apparent enough that the number that might be taken with safety has been very much exceeded.

It is conceded that pelagic sealing has of late fallen off in a greater ratio than the herd, thus producing a tendency toward equilibrium in numbers. This simply means that over 60,000 seals were taken in 1895; 43,000 in 1896, and 26,000 in 1897, so that the pelagic catch has fallen off one-half in three years, although the herd has not diminished by one-half in the same time.

It is to be feared that before any equilibrium could be reached but a small portion of even the present number would be left, and this leads naturally to the next point agreed upon, which is that in estimating the future conditions of the herd the reduction in the number of pups caused by the pelagic catches of 1894 and 1895 must be taken into consideration.

For example, not less than 20,000 pups, half of them females, perished of starvation in 1895, owing to the death of their mothers from pelagic sealing. Not only did the portion of this number that would have survived fail to appear on the rookeries in 1897, but the number of births will be naturally lessened by just that number in 1898 and the progeny of these in turn fail to appear in 1900. Thus, as the natural decrease will go on, while the natural increase has been cut off, effects of pelagic sealing will be felt up to 1900, even should it be stopped at once.

The final conclusion is that the herd is not in danger of actual extermination so

long as its haunts on land are protected and the protected zone about the islands is maintained, and that both land and sea killing now yield an inconsiderable profit. The seal herd is in fact very far from actual extermination, although the point of commercial extermination, or that where the returns are wholly incommensurate with the amount of capital invested, has been nearly reached. But for the prompt action of the United States in 1869 this point would have been reached years ago, while but for its care of the islands ever since practical extermination would not be far off.

The example of the Southern fur-seal illustrates the rapidity with which commercial extermination may be effected, while the fate of the fur seals on the Farallones, Guadalupe and Juan Fernandez shows how readily actual extermination may take place. The Pribilof Islands are not, like those of the Antarctic, difficult of access, and their abandonment by this government would lead to the actual extirpation of the fur seals within a very few years. On the other hand, with proper protection the fur-seal herd can, with but little care and cost, be made an important source of revenue so long as fashion may decree the wearing of seal-skin sacques.

#### *THE PSYCHOLOGY OF THE PERSONAL EQUATION.*

IN the present paper the writer proposes to maintain the thesis that the personal equations of astronomers are mainly controlled by known laws of experimental psychology and hopes to assist his professional brethren in making use of the researches of the psychologists in such a manner that they shall avoid groundless hypotheses