thors, who made an analysis of the water. No especial phenomena were noted preceding or during the precipitation ' except an unusually black cloud and a heavy downpour of rain, accompanied by a darkness so dense as to necessitate the use of lamps for half an hour.' About sixty per cent. of the total residue (88 parts per million) was organic matter, largely soot. The chlorine content (19.144 parts per million) showed an unusual amount of sodium chloride. The residue contained traces of several metals, as calcium, iron, manganese, zinc and aluminum. The other constituents indicated ordinary rain. The situation and amount of fuel burned in the place, as well as the time of year, preclude accounting for the fluorescent black rain by local contamination such as observed in numerous cases by Augus Smith and Phipson and lately by Irwin, who examined the snowfall in Manchester (*J. S. C. In.*, 21, 533). While it is well known that unusual impurities in rain, snow, etc., often occur and the sources of contamination may be traced great distances, no opinion is hazarded as to the cause of this phenomenon. All such incidental observations deserve chronicling as did the ' blood rain ' reported (by Passerini) to have fallen at Florence in March of last year (*L'Orosi*, 24, 325) and the 'dust fall' in Europe the same month (reported by Hellmann and Meinardus).

C. B. Williams,
Secretary.

BLUE FOX TRAPPING ON THE PRIBILOF ISLANDS.

Science for January 26, 1900, contained an account of the method of trapping blue foxes employed on St. George Island of the Pribilof group and of the efforts, there and elsewhere, to render the blue fox polygamous by killing males only. Near the end of the article it was said 'The outcome of these experiments will be awaited with much interest, and if by a little artificial selection and environment a naturally monogamous animal can be rendered polygamous, the supply of blue fox furs will be materially increased.'

The experiment has been continued and, by the courtesy of the Treasury Department, some of the results are here given. From the fact that for the last four seasons all females taken in the traps have been released it might naturally be expected that there should now be a marked preponderance in the number of females. That such is not the case, however, is shown by the fact that during the trapping season of 1900–1901 there were taken 614 males and but 690 females, an excess of only 80 after four years of killing males only. A glance at the subjoined table giving the results of each year's trapping shows that not only has there been no increase in the proportion of females to males, but that in one year the number of males taken actually exceeded that of the females by 89.

Number of Foxes Taken on St. George Island.

	Males.	Females.	Total.	Excess of Females.
1897,	102	324	426	222
1898–9,	478	389	867	—89
1899–00,	468	487	955	19
1900–02,	614	690	1304	76

At first sight it might appear that there had been a noteworthy increase in the total number of foxes, but a large portion of this apparent gain is due to the effort that has been made to ascertain the number of foxes on St. George, and in the spring of 1901 trapping was carried on both at the 'fox house' and in other places after the close of the regular season. All these animals were marked and released, so that no fox was counted twice. That there has been some slight gain in the number of foxes seems probable, but a glance at the

table reveals the curious fact that the proportionate number of females has not increased.

The present system of trapping on St. George, under which all females were spared, was commenced by Agent Judge during the season of 1897–8. In that season 324 females and 102 males were branded and released. Undoubtedly there were more foxes on the island during that time than those which had been through the trap, but taking the foregoing figures as a basis, giving an increase of only two pups each year for every female, to allow for females which did not bear young, and releasing one male for every four trapped, we should have for the succeeding years the following results, presuming that the sexes are born in equal proportions, viz.,

Year.	Males.	Females.
1897–8,	102	324
1898–9,	106	648
1899–00,	188	1,296
1900–01,	371	2,592

thus showing that in four years the proportion of the sexes, in theory at least, ought to bear the relation to each other of one to seven, which it is believed is not sufficient to serve the purposes of breeding.

The rate of increase estimated for each breeding female in the above table is absurdly small. Litters of foxes have been stated by the natives to have been found having as many as twelve or thirteen young ones. But even at this small rate, it will be seen that there should be over 2,000 breeding females on the island at the close of the trapping season of 1900–01. The trapping last season, however, has shown that but 690 females were found on the island after months of trapping, and that the number of females was but little in excess of that of the males.

The experiment of the Semidi Propagating Company has been similar to that obtained on St. George. This company, about fifteen years ago leased the Semidi Islands and, obtaining several pairs of blue foxes from the Pribilof Islands, began operations. The foxes have been fed and cared for, all the females released, and a certain proportion of males, at first one male to seven females, and, later on, a larger proportion. But in spite of this the foxes on the Semidi Islands have not increased as was anticipated, their numbers being far below what they theoretically should be.

What becomes of the females released each year, and their natural increase, is a question. Some, of course, die of old age and disease. There is a possibility, too, that some few are carried away on the ice when the latter surrounds the island, but as natural infirmity and ice are agents which may be supposed to operate on both sexes alike, it will be hard to believe that proportionately they cause the loss of more females than males. It is more probable that the increase even at the rate mentioned did not occur. If not, the only explanation is that all females on the island did not bear young and that a considerable percentage of the young that were born did not reach maturity.

The reason why all the young do not reach maturity is probably that in some instances the extreme young are eaten by the adults. There also may be present on the islands the same cause which resulted in the death, in the National Zoological Park, where several pairs were deposited by the Semidi Company for experimental purposes, of the only litter of blue foxes born there that attained any growth whatever, namely, *Uncinaria*. It would seem that the provision, as far as possible, of a male consort for every breed-female, would in large measure provide against the eating of the young, if we are to believe that the male is instrumental in

providing food for the female. But the reason why there is apparently not the least increase in the number of females remains to be shown.

A different problem seems to be presented by the conditions found on St. Paul, thirty miles distant from St. George.

On St. Paul efforts were made by Mr. Judge last winter to localize the foxes by exposing seal carcasses as food in the stable at Northeast Point and at the watch-house at Half-way Point. His efforts, however, were not successful in bringing together foxes in any number sufficient to justify the adoption of the trapping methods used on St. George. The old method of trapping with steel traps, therefore, was resorted to, the killing being restricted to about two weeks' actual trapping. This catch amounted to 153 blues and 1 white.

The trapping on St. Paul disclosed the presence of about a dozen pelts of very inferior quality. Nearly all of these skins were taken on the reef adjacent to the village. This ground has always rendered a poor grade of skins, but this year the belief is that those skins are poorer than ever before.

So far no means have been arrived at which will assure the perpetuation of the species on St. Paul Island. In former years it was the practice to take foxes only on alternate years on St. Paul Island, the intervening year being closed to trapping. The numbers still decreasing, it was thought wise during the last two seasons to trap during a limited time each season, proceeding on the theory that, owing to the fewer number of seals taken, the food supply on the island was insufficient to provide for a larger number of foxes, and that it was better to trap the surplus than to allow it to die of starvation.

The food supply on the island last winter, however, was more than was necessary to support the fox herd, owing to the large number of dead arries cast up on its shores. The carcasses of these birds, Agent Judge states, were found in numbers uneaten the following spring. This unusual food supply undoubtedly served to defeat the efforts made to localize the foxes by artificial feeding, and to trap them in house traps. It may be, if these efforts are continued the winter of 1901–02, that better results will follow, but, unless some improved method of fox trapping or fox culture is devised for St. Paul, the practical extermination of the species on that island is threatened.

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F. A. Lucas.

SCIENTIFIC BOOKS.

RECENT BOOKS ON HYGIENE.

Principles of Sanitary Science and the Public Health. By William T. Sedgwick, Ph.D. 1st edition. New York, The Macmillan Company. 1902. 8mo. Pp. 368. Price, $3.00.

Water Supply (considered principally from a sanitary standpoint). By William P. Mason. 3d edition. New York, John Wiley & Sons. Pp. 448.

Bacteriological Examination of Water. By W. H. Horrocks, M.B.B.Sc., London, Assistant Professor of Military Hygiene in the Army Medical School, Netley. London, J. & A. Churchill; Philadelphia, P. Blakiston's Son & Co. 1901. Pp. 300.

Municipal Engineering and Sanitation. By M. M. Baker, Ph.B., C.E., Associate Editor of *Engineering News.* 1st edition. New York, The Macmillan Company. 1902. The Citizen's Library. 12mo. Pp. 318. Price, $1.25.

Sewage and the Bacterial Purification of Sewage. By Samuel Rideal, D.Sc. (London). New York, John Wiley & Sons. 1901. 8vo. Pp. 316. Price, $3.50.

Whatever Professor Sedgwick may write will always be read with pleasure and profit,