likely that the explanation will be found in the effect of sunlight on animals, both directly and indirectly, through their food. It is common knowledge now that the antirachitic vitamin is intimately related to sunshine.

The lynx and the fox feed on the rabbit, so it is not surprising that the numbers of these animals, too, vary in well marked eleven-year periods.

Another interesting little animals in this connection is the lemming, which lives in the Arctic regions. Periodically it attains vast numbers, and it migrates usually from the mountains to the lowlands, often even into the sea. Such migrations occur contemporaneously throughout Norway, Sweden and Northern Canada, and probably throughout the whole Arctic regions.

"The spectacle of processions of lemmings ecstatically throwing themselves over the ends of railway bridges, and falling to an apparently useless death beneath,the sea strewn with dead lemmings like leaves on the ground after a storm; lemmings making a bee-line across crowded traffic oblivious to danger; all these things are bound to make people talk," Mr. Elton says. "The lemming-years are cu such conspicuous phenomena that it is safe to assume that all which have occurred since about 1860 have been recorded. Lemming-years in Norway have the status of great floods."

By studying their records it is found that their frequency is about three and one-half years, not eleven years asin the case of rabbits. Close examination of meteorological data shows that climate too fluctuates in three and one-half year periods, particularly in Arctic regions. The cause of this short period fluctuation is not known.

In the same way as the fox and lynx benefit by years of large rabbit numbers, so in lemming-years large numbers of short-eared owls collect to feed on them, and peregrine falcons, which in normal years do not visit Norway, collect in large numbers to feed on the owls. In Greenland Arctic foxes tire of ptarmigan in lemming-years and so allow it to breed and attain large numbers in the year following the lemming-year. Then the Arctic fox decides that he likes ptarmigan after all and down go the ptarmigan numbers.

DIPHTHERIA DANGER HIGH IN ISOLATED COMMUNITIES

Isolated communities such as Nome are in particular danger from epidemics of diphtheria, not only because medical supplies may be far off and hard to get, as in the present instance, but also because isolated populations apparently tend to become more susceptible than those in thickly settledregions. Dr. J. A. Doull, of the Johns Hopkins School of Hygine and Public Health, points out certain peculiarities in the behavior of the disease that makes it an especial menane to lonely places.

As everybody knows, diphtheria is peculiarly a disease of children, Dr. Doull says. Its greatest incidence is among children three years old. After that age ohe number of children contracting the disease fall off rapidly; there seems to be a gradual upbuilding of immunity, beginning very early in life. Little is known of the means by which this immunity is acquired, but apparently we are always getting slight infections, and by throwing them off we store up enough natural antitoxin in our own blood to prevent a serious attack.

These slight infections are kept in circulation in settled regions, for there are always diphtheria "carriers" about; but in isolated places they may never occur at all, and the opportunity for building natural resistance will be correspondingly absent. Then when a really serious infection is introduced it spreads rapidly among a highly susceptible population.

Dr. Doull cites a case somewhat analogous to that of Nome, which was studied by Dr. A. J. Metclafe, an Australian physician, only a year or so ago. Off the north coast of Australia, in the Torres strait, there is a bit of land called Thursday Island. The population is largely a mixture of Malays and Asiatics, with surviving native elements. Dr. Metcalfe used the Schick test on a large number of children in the schools, ranging between the ages of six and fifteen, and found that nearly 97 per cent. of them were susceptibleto diphtheria. With this nearly complete susceptibility Dr. Doull contrasts the figures obtained in Baltimore, which has been more thoroughly surveyed for diphtherie statistics than any other city in the United States. Here 93 per cent of the children one year of age were shown to be susceptible; but at six years the susceptibility had fallen off to 69 per cent., and at fifteen to 27 per cent. Figures for the semi-isolated conditions of rural life in American stand intermedidate between those for crowded cities and those for this highly isolated island.

Another fact mentioned by Dr. Doull which supports this apparent relation between crowding of populations and the development of immunity to diphtheria, is the high rate of natural immunity found in asylums and similar institutions for the care of children.

A further suggestion developed in the discussion was the possibility of the development of an especially virulent type of the disease in isolated and highly susceptible communities, which might be more dangerous and difficult to combat if brought back to more thickly settled communities. It is a well known fact that a strain of disease germs gains in virulence upon being "put through" several successive non-immune persons or animals, and this suggests a possible danger from the present Nome epidemic.

TABLOID BOOK REVIEW

EXPERIMENTAL VEGETATION: THE RELATION OF CLIMAXES TO CLIMATES: By Frederic E. Clements and John E. Weaver. 172 pages; 15 plates. Washington: The Carnegie Institution of Washington. (Publ. No. 355) 1924.

THE PHYTOMETER METHOD IN ECOLOGY: THE PLANT AND COMMUNITY AS INSTRUMENTS. By Frederick E. Clemetns and Glenn W. Goldsmith. 106 pages; 11plates. Washington: The Carnegie Institution of Washington. (Publ. No. 356) 1924.

These two books are valuable additions to the literature of ecology that is being built up by Clements and his associates who have for years been at work on the western grasslands. They mark a distinct advance in the development of quantitative and physiological methods in this branch of botany. The method of using plants themselves as instruments for the measurement of ecological factors while not strictly new is here taken seriously and treated thoroughly; so that the phytometer method may fairly be said to date from this publication.
