A PECULIAR TYPE OF DISTRIBUTION OCCURRING AMONG SOME DIPTERA-NEMATOCERA IN JAPAN AND NORTH AMERICA AND A HYPOTHESIS OF ITS ORIGIN.

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Among some Diptera-Nematocera recently discovered in Japan, chiefly by Alexander and Kitakami, there is a series of genera, such as given below, which are otherwise known to occur only in North America.

Blepharoceridae—*Philorus, Bibiocephala, Curupira.*

Ptychopteridae—*Bittacomorphella.*

Fungivoridae—*Diomonus.*

Besides these genera, *Deuterophlebia* (Deuterophlebiidae) is also a genus worthy of mention, which occurs, so far as known to science, only in the Western United States, Japan, and Central Asia. Such a type of discontinuous distribution is also shown by other insects, although the known examples are still few in number.

These Nematoceran families were (1) phylogenetically as equally well differentiated in the beginning of the Tertiary Period as at present, and all these families are represented by actual fossils as early as the Eocene Epoch; (2) and ecologically the Blepharoceridae are strictly confined to mountain streams (larvae and pupae) or their surrounding areas (imagines). The genera of the other families mentioned above are also found exclusively in the same places as are the Blepharocerid flies, although their earlier stages are not aquatic. In other words, these insects are ecologically very confined ("Stenobiotop") and their distributional power is thus very restricted.

Explanations of this type of distribution can not be carried out so far as the "Pendulationstheorie" (Simroth) or the "Reliktentheorie" is concerned. However an explanation may be possible if the "Verschiebungstheorie" (Wegener) is applied. The following data on which the present explanation is based are taken from A. Wegener: Die Entestehung der Kontinente und Ozeane, 3, Auflage, 1922, and W. Köppen and A. Wegener: Die Klimate der geologischen Vorzeit, 1924.

In the Tertiary Period, Eastern Asia and North America were completely continuous, and in the Eocene and Oligocene Epochs

the distance between them was much nearer than at present. The north pole was then in Alaska and during the Miocene and Pliocene Epochs it moved gradually to the northeast reaching the extremity of its movement in this direction at the beginning of the Quaternary Period. At this time Hokkaido was situated at about 30° N. in latitude. Those insects developed during the Eocene and Oligocene Epochs in North America were gradually distributed to the west, and this migration might have been accelerated by the ascension of the latitude in North America and the descension of the same in Eastern Asia. To the west of Japan, which was then still continuous with the continent, there was a vast desert until the beginning of the Quaternary Period, and the distribution of the insects in question was thus interrupted beyond the eastern coast (including Japan) of the Asiatic Continent, and only a restricted number of them succeeded in reaching as far as Central Asia through Southern China and the Himalayan districts. *Deuterophlebia* and *Epiophlebia* (Odonata: Epiophlebiidae) may surely belong to this type of distribution. In the Quaternary Period, glaciation visited North America about five times, and at its maximum was extended from the southeastern part of Alaska, all of Canada, and as far south as the middle of the United States (Nebraska, Kansas, Missouri, Indiana, Ohio, and Pennsylvania). At that time the stream-fauna was undoubtedly driven southwards and was destroyed in the frozen districts. However, this fauna has now recovered and reaches northward as far as New England and a part of Canada, thus forming this peculiar type of discontinuous distribution.

Amalus haemorrhous Hbst. in Massachusetts.—The first appearance of this small European weevil in North America is recorded from Syracuse in the New York List, but without any date. A specimen was taken by sweeping in Sherborn, Mass., on June 5, 1932; its identity was established through the kindness of Mr. H. C. Fall. I now find a smaller and darker specimen in my box which was taken by sweeping at Hopkinton, Mass., on June 27, 1926.—C. A. Frost, Framingham, Mass.