

In temperate lakes it will generally appear in June, and sink deeper and deeper in the course of summer until it reaches its deepest point in autumn and then disappears during the cooling processes.

It appears from the researches in Mjösen, Wetter, and Ladoga that the "Sprungschicht" is at its deepest point, at about 20-30 m., in the beginning of September; the change in temperature may here amount to 3-5° C. Quite different phenomena have been observed by Wedderburn (1907a, p. 407; 1907b, p. 1) in Loch Ness.

I am inclined to believe that a great many northern temperate lakes, especially those of the tropical type, are most probably characterised by the deep-lying position of the "Sprungschicht," or, in other words, by the great thickness of the layer of water where the temperature is uniform. The reason is perhaps partly the small quantities of plankton in these northern temperate lakes, partly the effect of wind upon water-basins of an almost always very elongated form, though principally the mild winters in the western parts of the zone.

It is clear that the *currents* in these lakes are much stronger than in the polar lakes, a fact which is of very great importance for the migration of the plankton. The seiches have been studied by Holmsen (1898, p. 1) in Norwegian lakes, but especially by Chrystal (1905a, p. 599; 1905b, p. 637) and Chrystal and Wedderburn (1905, p. 823) in Scottish lakes.

Of the *vegetation* in the lakes and its arrangement in zones we know exceedingly little. The vegetation in the Scottish lakes was studied by G. West (1905, p. 967), that of the Faroes by Ostenfeld (1906, p. 62). From Iceland, Norway, and the northern parts of Sweden and Finland we have very little information. The vegetation in the lakes seems always to be very slight; we do not know to what depth the wholly submerged vegetation belts of *Characeæ* and *Fontinalis* penetrate; in the Scottish lakes it is commonly not great, according to West, on account of the dark, peaty water. A remarkable difference between the lakes in this and the following zone is that the *Potamogeton* belt is not very distinct; the belt of *Phragmites* and *Scirpus* so characteristic of the Baltic lakes is either weakly developed or quite absent. The low temperature, the shores as a rule steep and covered with rolling stones, the wave erosion, the slight detritus formation, the fact that the water is usually slightly transparent and the percentage of lime generally small, are all instrumental in causing the vegetation belts of the North European lakes to be weakly developed.

In localities where the transparency is greater, the percentage of lime in the water great, and where the shores are evenly sloping, we find lakes where the vegetation belts are as broad as those of the