trivial to consider in the present state of our knowledge. Among such methods may be mentioned the mechanical effect of the action of the wind on the surface of the lake, the beating of the waves on the shore, condensation and evaporation at the surface, the heat generated by organisms in the water and by decaying matter. These and others doubtless all have their effects, but these effects must be small.[1] Moreover, they are more or less constant all the year round, and so cannot contribute appreciably to the changes from the cold of winter to the heat of summer and the subsequent cooling of the waters, which present the chief problems in dealing with the temperature conditions of lakes.

The more important factors which require to be dealt with are: (1) the influences of rivers and rain, (2) radiation, (3) conduction, (4) convection, and (5) wind.

(1) **Effect of Rivers and Rain.**—It is difficult to estimate the effect of rivers and streams entering a lake, both because of the rapid changes which the temperature of streams undergoes, and because of the difficulty in determining the bulk of water entering the lake. A shallow stream very quickly heats up when the sun shines upon it and upon the stones which form its bed, while in winter melting snows cool the waters of streams, even in mild weather, nearly to freezing point. In large and deep lakes, such as Loch Ness, rivers have no marked effect on the cycle of changes which takes place. They do, of course, affect the quantity of heat entering or leaving a lake, but they do not leave any distinct trace on the temperature distribution.

The effect of rainfall is also not directly traceable. Rain quiets the waves, and so retards to a small degree the mixing of the surface layers. As a rule, the rain-water is of a higher temperature than the surface-water, and so its direct effect is limited to the surface layers.

Sometimes, however, after rain-storms, or when snows are melting, the rivers entering a loch come down in spate, and their effect is distinctly traceable. Some smaller lakes become transformed into mere enlargements of the streams entering, and there is a wholesale transference of the waters towards the outlets. When it is remembered that lakes of the dimensions of Loch Ness rise sometimes five or even ten feet in a very short period, it will be seen that even in large lakes the effect of rivers and rain is not negligible. The behaviour of lakes during spates gives some information as to what becomes of water entering: if the river-water is of higher temperature than the surface-water, it remains on the surface and spreads over it; but if the river-water is colder than the surface-water, as is sometimes the case, it sinks until it reaches water of like temperature with itself, and there intrudes itself. In this way, during big spates,

[1] See paragraph on freezing of lakes as to effect of rapid evaporation (page 114).