

THE FORMS OF WATER.

No. VI.—Architecture of Lake Ice.

WE have thus made ourselves acquainted with the beautiful snow-flowers self-constructed by the molecules of water in calm cold air. Do the molecules show this architectural power when ordinary water is frozen? What, for example, is the structure of the ice over which we skate in winter? Quite as wonderful as the flowers of the snow. The observation is rare, if not new, but I have seen in water slowly freezing six-rayed ice-stars formed, and floating free on the surface. A six-rayed star moreover, is typical of the construction of all our lake ice. It is built up of such forms wonderfully interlaced.

Take a slab of lake ice and place it in the path of a concentrated sunbeam. Watch the track of the beam through the ice. Part of the beam is stopped, part of it goes through; the former produces internal liquefaction, the latter has no effect whatever upon the ice. But the liquefaction is not uniformly diffused. From separate spots of the ice little shining points are seen to sparkle forth. Every one of those points is surrounded by a beautiful liquid flower with six petals.

Ice and water are so optically alike that unless the light fall properly upon these flowers you cannot see them. But what is the central spot? A vacuum. Ice swims on water because, bulk for bulk it is lighter than water; so that when ice is melted it shrinks in size. Can the liquid flowers then occupy the whole space of the ice melted? Plainly no. A little empty space is formed with the flowers, and this space, or rather its surface, shines in the sun with the lustre of burnished silver.

In all cases the flowers are formed parallel to the surface of freezing. They are formed when the sun shines upon the ice of every lake; sometimes in myriads, and so small as to require a magnifying glass to see them. They are always attainable, but their beauty is often marred by internal defects of the ice. Even one portion of the same piece of ice may show them exquisitely, while a second portion shows them imperfectly.

Here we have a reversal of the process of crystallization. The searching solar beam is delicate enough to take the molecules down without deranging the order of their architecture. Try the experiment for yourself with a pocket-lens on a sunny day. You will not find the flowers confused; they all lie parallel to the surface of freezing. In this exquisite way every bit of the ice over which our skaters glide in winter is put together.

I said that a portion of the sunbeam was stopped by the ice and liquefied it. What is this portion? The dark heat of the sun. The great body of the light waves and even a portion of the