grows a trifle higher and firmer. The surface inside the flange is perfectly smooth and bright, and gradually freezes together into a cake. During the warmer hours of the day a good deal of these soft ice-wreaths melts away, so that by evening there remains little more than the firm nucleus, though it too is softened; but then comes the night-frost and begins to consolidate it again. Thus each of these disks of ice acquires a certain depth, varying from one-half to two-thirds of its diameter. The bigger ones used often to get aground, even in places where our ferry-boat did not touch the bottom. Frequently, upon striking against pieces of drift-wood or getting into an eddy, they would split to pieces; but the pieces soon showed a decided tendency each to resume the regular rounded shape. Some of the larger disks had cracks across the middle, showing that they were composed of two or more smaller disks, which had come into collision with each other. The natives were all unanimous in declaring that this soft drift-ice is formed at the bottom of the river, and that during the coldest part of the night it rises and coagulates together into lumps. But the tiny ice crystals and laminæ consist of perfectly pure ice; one would think that, if they were formed on the muddy bottom, they would be rather discoloured. Their characteristic shapes prove, on the other hand, that they are not fragments of the superficial ice which has congealed during the preceding night; indeed the current was still a hindrance to the formation of such ice. Possibly the seat of their origin is the stratum of water intermediate between the bottom of the river and its surface. The fact of these disks not being mixed with mud and sand is of course no proof that they cannot be formed at the bottom of the river; for, supposing they did contain such, they would be unable to rise to the surface until they had got rid of them. Upon poking the bottom of the river in the morning with a punting-pole, we found that it was as hard as a stone, just as though it actually were cased with ice. Later on in the day, however, it became soft, as it generally was; that is to say, the bottom ice had then been liberated and risen to the surface. As we lay anchored by the bank, we could easily observe how at sunrise the quantity of drift-ice on the river used suddenly to augment in quantity; meanwhile the grating, rustling sounds increased in intensity, and the drift-ice used to collide with the ferry-boat with greater force. That was the time of day when the blocks of ice were solider; but by midday they used to get so soft that it was easily possible to thrust a punting-pole right through them without altering their shape. A few of the disks remained hard all day, but these were formed in a different manner from the majority, in that their nucleus consisted of a compact sheet of ice which had become somewhere loosened from the river side, and then got adrift; yet the edges of even these harder disks were equally provided with the soft snow-white flange. The natives assert, that the drift-ice quickens the river's velocity; but this is not very likely. Theoretically, the drift-ice ought to move a trifle faster than the surface water, because the disks, owing to the depth of their immersion, are also carried along by those strata of the stream which are least retarded through the friction of the bottom or the friction of the atmosphere, although

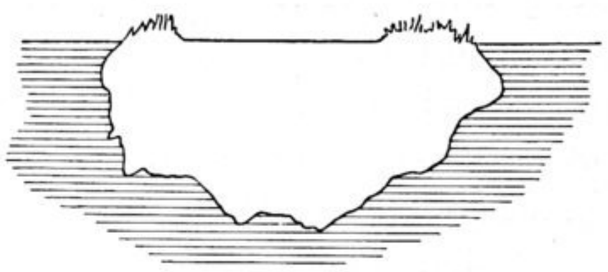

Fig. 130. VERTICAL SECTION OF A PIECE OF DRIFT-ICE.