

from slipping further down the hill, whilst others are driven in outside of it, to keep it from being pushed back or away from the slip, whilst it is kept from falling forward or on to the slip by the next log above overlapping it. (Fig. 8.)

Great curves in the slip are avoided as much as possible, but where, in consequence of such, the outer side of the curve is subjected to greater wear through the concussion of the logs against it, there are in the first instance 2 or 3 laid above each other (Fig. 9), as well as being made to overlap to a greater length, viz., 20 to 30 feet, than is necessary where the slip is comparatively straight. In the latter case, the placing of the logs against each other is often sufficient, but then the thickest end of the log is always placed down the hill, and a shear is cut into the upper end of the log as well as into the lower one.

To place several logs above each other, holes are made through the ends, and stakes 3 to 4 inches in diameter driven through; and where the concussion from the descending logs is very great, another log, earth, or snow are added to the stakes driven in, as support of the sides.

Junctions of slips coming from different sides of a hill must always be strengthened by overlapping to a greater extent, and by placing several logs above each other.

The logs used for the sides of the slips are part of the timber to be removed, and the building of a slip consequently always commences above, where the timber lies.

Logs are sent down the slip with the thick or thin end first, whichever is most convenient. With the thin end down, the wood travels faster; but those required for the building of it are sent with the thick end foremost, if it can be done without much labour, and the ends which are sent down foremost are always rounded off a little.

The breaking up of a slip is done after all the timber is down, and commences also from above, so as to use the rest of the slip for the removal of these logs also. It follows from this that the greater the quantity of timber to be removed at one time from one spot, the cheaper the transport.

Logs are never started from above until the arrival of the preceding log, and the slip being clear below, is announced from there by the blowing of a horn to those above, as the descending logs travel with such a force and rapidity that they would destroy everything which offered any resistance; and where the latter is sufficiently great, as would be the case if it dashed against another log lying on the slip, both would be shattered into pieces.

The logs are either made to run out on a horizontal or slightly ascending portion of the slip, or on an open plain, like the bottom of a valley, or against the opposite side of the hill.

Nearly all the timber thus brought down from the higher hills is transported further by floating. Floating of timber.
On the small mountain streams near Rippoldsau, in which there is but very little water, this can only be managed by constructing locks, which retain considerable quantities of water at certain points of the stream until required. Water locks. These locks are constructed by laying four long and thick logs right across the bottom of the stream, so that their ends extend into either bank for about 3 to 4 feet. These logs are fastened together by stakes, as the logs are fastened together on the timber slips. Into these logs strong square uprights are let in, which rest above against other long logs, generally four in number, which are placed across the stream about 8 to 10 feet above those at the bottom of it, having also to extend into either bank of the stream, and serve at the same time as a bridge across it. Before the uprights strong timbers or planks are fastened tightly, which have also to extend 3 to 4 feet into either bank of the stream.

Where the nature of the banks is such as not to afford sufficient support to the timbers, the latter has to be got up artificially, either by masonry or by forming a large framework out of logs, which is filled up with stones. (Fig. 10.)

In the centre of the lock one or two gates are provided for the passage of the rafts by having two or three of the uprights provided with mortices, into which square pieces of timber are laid, tenon like, and are kept into their places by the pressure of the water, thus closing the gate.

In one of the uprights the mortices have to be open on the side looking up stream and twice as deep as the closed mortice in the other post, so as to allow the timbers to be pushed out of the closed mortice. By means of this arrangement the timbers closing the gate or gates are easily removed with a strong crowbar, or a beam, and with these or a boathook hauled into the sides.

Where the volume of water is very great sluices are also constructed at the side of the gate so as to expedite the letting off of the water.

The gates and sluices are usually thrown open one to two hours before the raft arrives, so that not more than two and a half to three feet of water is left in them for the passage of the raft, which, travelling on water supplied by locks above, soon overtakes this water also, as it travels faster than the latter, and has to be checked and even sometimes stopped to let the water get ahead of it again.

For the lifting or raising of the raft, three spars are fixed slanting through the raft, and well secured with ropes or withes. They are made 10 to 12 feet long, and chosen from the butt end of Scotch fir, if procurable.

In the case of stoppage of the raft being caused by one of them, it is quickly loosened by the cutting of the ropes or withes with which it is tied, and if the spar breaks, spare ones are carried on the raft to replace it. The latter are built at suitable places in the streams, where the timber is previously collected.

Floating is carried on during March, April, and May, but chiefly in April. The size of the raft varies, as a matter of course, according to the size of the stream; and whilst on the smaller ones three or four men are placed to guide them, on the larger ones, which are sometimes 16 feet broad, and reach a length of 2,000 feet, 16 or 18 men are placed.

Wherever necessary, logs are also placed on the sides of the stream or across the bottom of it so Improvement of streams.
as to prevent the bed being washed out or becoming very uneven, besides allowing also the rafts to pass over them much more evenly than over the rocks alone. They are fastened by wooden spikes both vertically and horizontally.