http://www.geology.19thcenturyscience.org/books/1869-Miller-Sketchbook/README.htm



woods of natural birch and alder were cut down for the manufacture of barrels, and floated in rafts along the rivers to the sea. And my opportunities of observing these rafts, as they shot along the more rapid reaches of our mountain streams, or swept over their shallower ledges, grazing the bottom as they passed, naturally led me to inquire into their operations upon the beds of the streams adown which they were floated. Let us advert to some of these. When a large raft of wood, floated down a rapid river, grates heavily over some shallow bank of gravel and pebbles resting on the rock beneath, it communicates motion, not of the *rolling* but of the *lurching* character, to the flatter stones with which it comes in contact. It slides ponderously over them; and they with a speed diminished in ratio from that of the moving power in proportion to the degree of friction below or around, slide over the stones or rock immediately beneath. And thus, to borrow my terminology from our Scotch law courts, they are converted at once into *scratchers* and *scratchees*. They are scratched by the grating, sand-armed raft, which of course moves quicker than they move; and they scratch, in turn, the solid mass or embedded fragment along which they are launched. Further, if the gravelly shoals of the stream have, as is not uncommon in the shallows of our Highland rivers, their thickly-set patches of pearl mussels, many of these could scarce miss being crushed and broken; and we would find not a few of their fragments, if much subjected to the friction of the rafting process, rounded at their edges, and mayhap scratched and polished like the stones. Nor is it difficult to conceive of a yet further consequence of the process. A vast number of rafts dropping down some river from day to day and year to year, and always grating along the same ledges of sandstone, trap, or shale, would at length very considerably wear them down; and the materials of the waste, more or less argillaceous, according to the quality of the rock, would be depo-