the volume and velocity of the current, (*b*) on the size, shape, and specific gravity of the sediment, and (*c*) partly on the chemical composition of the water. (*a*) According to the calculation of Hopkins,[185] the capacity of transport increases as the sixth power of the velocity of the current; thus the motive power of the current is increased 64 times by the doubling of the velocity, 729 times by trebling, and 4096 times by quadrupling it. If a stream which, in its ordinary state, can just move pebbles weighing an ounce, has its velocity doubled by a flood, it can then sweep forward stones weighing 4 lb. Mr. David Stevenson[186] gives the subjoined table of the power of transport of different velocities of river currents:

In. per Second.		Mile per Hour.	
3	=	0·170	will just begin to work on fine clay.
6	=	0·340	will lift fine sand.
8	=	0·4545	will lift sand as coarse as linseed.
12	=	0·6819	will sweep along fine gravel.
24	=	1·3638	will roll along rounded pebbles 1 inch in diameter.
36	=	2·045	will sweep along slippery angular stones of the size of an egg.

It is not the surface velocity, nor even the mean velocity, of a river which can be taken as the measure of its power of transport, but the bottom velocity—that is, the rate at which the stream overcomes the friction of its channel. (*b*) The average specific gravity of the stones in a river ranges between two and three times that of pure fresh water; hence these stones when borne along by the river lose from a half to a third of their weight in air. Huge blocks which could not be moved by the same amount of energy applied to them on dry ground, are swept along when they have found their way into a strong river-

[185] Q. J. Geol. Soc. viii. p. xxvii.

[186] "Canal and River Engineering," p. 315. See also Thoulet, "Ann. des Mines," 1884, p. 507.