feldspar to a hydrous alumina silicate is the cause. This finest of sediment falls on incipient freezing (Brewer, 1883). Very thin particles, like scales of mica, sink slowly, because the rate is that of particles (of the same density) having a diameter equal to the thickness of the scales. They are hence widely scattered by transporting waters.

Transportation assorts in proportion to size and specific gravity. — In accordance with the ratio of transportation to velocity, it is found, supposing the material to be alike in specific gravity, that a current of 4 miles an hour will carry along stones $2\frac{1}{3}$ inches in diameter; of 2 miles, pebbles of 0·6 inch in diameter; of $\frac{2}{3}$ mile, fine sand about 0·064 inch in diameter; of $\frac{1}{3}$ mile, fine earth or clay, the particles 0·016 inch in diameter. Consequently, materials will be arranged over the bottom by velocity of flow, the coarser dropping first, the finer at greater or less distances beyond, and the finest floating on to other places of deposition.

Again, sands of like size but varying specific gravity will be assorted on the same principle, iron sands (G = 5) being left behind where the current is only sufficient to carry on garnet sand and other lighter kinds; and garnet sand (G = 3·6), where the quartz sand (G = 2·6) is still kept in movement, so that several sorts of deposits may form by varying rates of flow. If gold dust (G = 18 to 20) were in the waters, it would drop long before the iron sand. The principle is used in ordinary gold washings.

In drawing inferences as to rate of flow during deposition from the fineness or coarseness of deposits, there is need of caution, because flowing waters do not "scour" at the rates mentioned, unless the materials are quite loose. Very slight compacting at surfaces will hold the sands and earth down. Let any causes stir up the bottom, then the principle works well; and in these modern times steamers up and down rivers, bays, and coasts, often occasion that stirring which favors scour, to the benefit of navigation. Professor Verrill has remarked that the shells broken up by fishes over the ocean's bottom make loose material easy of transportation by the Gulf Stream.

An important exception to this relation between size of particles and hydraulic value, noticed and made the subject of special investigations by E. W. Hilgard, arises from the tendency of the finer kinds of sediment in fresh water, if the water is not absolutely quiet, to agglomerate their particles, when not over 1 mm. in diameter, into larger particles, or to *flocculate*, as he terms the process, and so take the hydraulic value of coarser sediments. He shows that fine river deposits consist largely of such *flocculated* particles, and that the fitness of soils for tillage depends largely on the porous condition thus derived.

Some characteristics of water. — (*a*) A cubic foot of pure water at 62° F. weighs 436,495 grains, which equals 62·355 pounds, or nearly 1000 ounces avoirdupois = 28,315 grams. The soluble impurities of ordinary river water are 0·000186 of their weight. (Murray.)

Under a pressure of 1 atmosphere, water boils at 212° F. = 100° C.; and under 45 atmospheres, at 510·6° F. = 265·9° C.