

by the Rhine to be equal to 92·3 tons per square mile, that of the Rhone at Avignon 232 tons, that of the Danube 72·7 tons, and that of the Mississippi 120 tons. He supposes that on an average over the whole world there may be every year dissolved by rain about 100 tons of rocky matter per English square mile of surface.<sup>130</sup>

If the average proportion of mineral matter in solution in river-water be taken as only 2 parts in every 10,000 by weight, then it is obvious that in every 5000 years the rivers of the globe must carry to the sea their own weight of dissolved rock.

ii. Mechanical.—The mechanical work of rivers is threefold:—(1) to transport mud, sand, gravel, or blocks of stone from higher to lower levels; (2) to use these loose materials in eroding their channels; and (3) to deposit these materials where possible, and thus to make new geological formations.<sup>131</sup>

1. *Transporting Power.*<sup>132</sup>—One of the distinctions of river-water, as compared with that of springs, is that, as a rule, it is less transparent, in other words, contains more or less mineral matter in suspension.<sup>133</sup> A sudden heavy shower, or a season of wet weather, suffices to render turbid a river which was previously clear. The mud is washed into the main streams by rain and brooks, but is partly produced by the abrasion of the water-channels through the operations of the streams themselves. The channels of the mountain-tributaries of a river are choked with large fragments of rock disengaged from cliffs and crags on either

<sup>130</sup> Addresses, Liverpool Geol. Soc. 1876 and 1884.

<sup>131</sup> On the behavior of rivers, consult Dausse, "Études relatives aux inondations," Paris, 1872.

<sup>132</sup> See Login, *Nature*, i. pp. 629, 654; ii. p. 72.

<sup>133</sup> The brown color of river or estuary water is not always due to mud. In the Southampton water it is caused in summer by the presence of protozoa (*Peredinium fuscum*). A. Angell, *Brit. Assoc.* 1882, Sects. p. 589.