

ART. XXII.—*Note to Article I, on the Quaternary of the New Haven Region*; by J. D. DANA.

As my statement in regard to the essential independence of the Connecticut valley glacier, and others, in the Glacial era may be misunderstood, I would draw attention to the meaning of the words "under the Continental glacier" in the note to page 2,—in which it is implied that such glaciers are but the inferior portions of the great Continental glacier. I hold that, while the very large valleys of the land, like those of the Connecticut and Hudson, had great influence in determining the direction of the movement in these valleys, especially that along the axis of each, the whole movement must have been more or less modified by the movement of the great northern ice-mass; and that the counteracting influence of a valley depended not only on its depth and extent, but also on its direction and slope. The smaller transverse valleys caused no modification of the general glacier movement; but large transverse valleys gave to the ice in the middle of the channel their own course almost unmodified: if not when the great ice-mass had its maximum thickness, at least afterward when it had become thinner and had lost some of its motion.

I may allude to one other example, as I believe it is, of a partly independent glacier—that of the St. Lawrence valley; for the scratches on its rocks correspond mainly with its course, the prevailing direction, according to Dr. Dawson, being north-east. It should be said that these scratches are attributed by Dr. Dawson to *icebergs* in the Glacial era, which are supposed to have moved southwestward up the valley, the land being profoundly submerged for the purpose, so as to allow of a discharge of the ocean over the continent in that direction; and the fact that boulders were transported *up* the valley is given as evidence in favor of this view. But, as in the case of the

Connecticut valley, icebergs could not have gathered up stones in the bottom of the valley for transportation; and, further, as the era following the Glacial—the Champlain era—was an era without question of submergence to a depth of at least 500 feet along the St. Lawrence valley, there should have been icebergs succeeding to the great St. Lawrence glacier and made from it before its final melting; and such icebergs may well have been driven up the river, then a broad arm of the sea, and thus have distributed southwestward the stones which had been gathered below by the glacier in the Glacial era, besides accomplishing all else that can rightly be attributed to icebergs.