

If you ask what else the gravels and clays can tell us that we may read for ourselves, I can mention then besides the arctic leda and saxicava shells, and the Hudson Bay fish of Green's Creek, belonging to the flood period referred to, the leaves and woods and mammalian bones of the more ancient rivers to which I have referred as generally buried out of sight by the boulder clays and the leda clays. The upper courses of all these ancient streams were necessarily higher, and in many places the debris which filled them must have been since exposed; sometimes accidentally, as in connection with coal mining in Pennsylvania; in wells and borings, for coal oil, or salt, or other minerals. Exposures may exist where our eyes have not learned to read them. As you know, a milder climate than the present preceded the cold period and its flood phenomena. So it was on the Pacific Coast, in Greenland, and generally in northern America and Europe during the middle and later tertia.

River gravels of pliocene age ante-dating the present mammalian creation—the genus *homo* only excepted—have been abundantly exposed and identified in the auriferous gravels of the Pacific Coast. They are filled up river valleys like ours, which have been re-excavated by natural operations, and sifted by men in quest of gold with a thoroughness no other quest could ever have accomplished. During the years 1869, 1870, 1871, it was my lot to be engaged in their study, in connection with the Geological Survey of California. Leaves, wood, mammalian bones and human relics, consisting of implements and bones were industriously collected. The plant life was thoroughly studied, and reported on by Leo Lesquereux who stands at the head of the vegetable biologists. Their pliocene age has been established, and the facts have been accessible to all men in published form—have lain, in fact, in the public libraries of Ottawa for a dozen years. An article in the *Overland Monthly*, written by myself about 1873, which described a prolific find of mortars and pestles in a mountain of basalt covered gravel, with a precision not to be escaped from, had a wide popular circulation and has slept on the shelves of a hundred libraries.

To generous Louis Agassiz, and to the circumstance of his visiting the Pacific Coast at that time, the world is indebted for the machinery