

Thus two planetary masses come into existence. By repetitions of the same process, a complete series of planetary masses becomes scattered over the distance between the original periphery and the center; and at each occasion of planetary birth, all the older planets recede a certain distance farther from the center, and undergo a certain retardation in their orbital velocities. The different planetary masses, however, do not possess equal densities; they are not composed of such ingredients as to furnish, on cooling to a given temperature, the same proportion of solid, liquid, and gaseous constituents. Before planet making began, we may suppose the heavier constituents of the general mass had gravitated to the central regions; while the lighter constituents remained nearer the periphery. If so, the first planets separated would contain more of the substances which, at temperatures familiar to us, make gases and water. Similarly, the later planets disengaged would acquire a larger proportion of the substances which form solid rocks. In the case of the earth we may suppose the greater part was rock-making material, since the earth's specific gravity is so high; but watery stuff in sufficient amount to provide oceans and rains, went off with the rock material, and with these, the lighter stuff for an atmosphere. But in the case of Venus, most of the stuff was rock-material, if not the whole of it; while with Mercury it seems probable that little water-stuff was included. In the opposite direction, Saturn, Uranus, and Neptune must have received a large excess of water and atmospheric stuff. It is rational to suppose that their oceans have always covered the whole land, as ours does more than half. In fact, these bodies must be composed chiefly of water and atmosphere; as their specific gravities are low as water and cork.

So, in the history of our system, the work went on as long as the conditions existing permitted the central mass to detach rings. Meanwhile, the planetary masses entered severally on their separate careers. Each career was, in effect, a history of cooling. They did not proceed with equal pace, since some, with larger mass than others, had more heat to