28. Special interest attached to molar dimensions.

And we cannot but be struck by the fact that only those dimensions which we call molar appear to be the abode of living and conscious beings. The cosmical world has, so far as we know, no inhabitant which can behold it in the same way as man beholds this planet, and the same obtains so far as we are acquainted with the molecular world. So far as our knowledge goes and is likely ever to reach, a special importance or dignity will therefore always belong to molar dimensions and masses. The process by which we try to picture to ourselves in tracings and models, constructed in molar dimensions, the behaviour and appearance of cosmical as well as molecular masses will always recommend itself, not only as the most practical, but likewise as the most interesting and plausible, for only by this procedure do these unreachable worlds become amenable to direct observation and to the processes of experiment in the physical laboratory. It seems *prima facie* that the wealth of phenomena and the variety of different kinds of motion decrease as we ascend into the cosmical, or as we descend into the molecular world, giving way in the former to essentially uniform, though to many times multiplied modes of motion, and disappearing in

l'univers sont indépendantes de ses dimensions absolues, comme elles le sont, du mouvement absolu, qu'il peut avoir dans l'espace; et nous ne pouvons observer et connaître que des rapports." This is easily seen. For if in the formula $f=\frac{m.m'}{r^n}$, the dimensions be all multiplied by K, we get the new formula $F=K^{6-n}\times\frac{m.m'}{r^n}$, and the acceleration of a body moving round a centre like the sun would be $\frac{F}{K^3m'}=K^{3-n}\times\frac{m}{r^n}$, which is only K times the acceleration $\frac{m}{r^n}$, if $n=2$. In another passage Laplace repeats the above statement in slightly different words: "L'univers réduit successivement jusqu'au plus petit espace imaginable, offrirait toujours les mêmes apparences à ses observateurs" (p. 440). That this would not apply to molecular attractions or repulsions is evident.