436   NEWTON TO PEPYS 12/23/1693

Sir

I take it to be the same case whether a man, to throw two sixes have one throw wth twelve dyes or two throws with six, but I reccon it an easier task to throw with six dyes one six at one throw then two sixes at two throws. Were James to have twice as many throws as Peter & as often as he throws a six to win half as much as Peter doth by the like throws, & by consequence were James to win as much at every two such throws as Peter doth at every one such throw, & half as much at every such single throw their cases would be equal. But this is not the case of the wager. As the wager is stated Peter must win as often as he throws a six but James may often throw a six & yet win nothing because he can never win upon one six alone. If Peter flings a six (for instance) four times in eight throws he must certainly win four times, but James upon equal luck may throw a six eight times in sixteen throws & yet win nothing. For as the Question in the wager is stated he wins not upon every single throw with a six as Peter doth, but only upon every two throws wherein he throws at least two sixes. And therefore if he flings but one six in the two first throws & but one in the two next & but one in the two next & so on to sixteen throws, he wins nothing at all tho he throws a six twice as often as Peter doth, & by consequence have equal luck with Peter upon ye dyes. Mr Smith being sensible of this disadvantage would put such a sense upon ye Question that James may in some cases have some advantage of a single six, but this I was not satisfied in because it seemed to me contrary to ye words of ye Question. He represents that it was their meaning when they laid the wager that James could do twice as much wth 12 dyes as Peter with six, wch is true if all ye chances of sixes be considered, but in ye wager all ye chances are not considered. It requires that B (here called James) throw two sixes wth twelve dyes at once or (wch is all one) wth six dyes at twice. One six is not considered. Tis a loosing cast, & this gives A (here called Peter) the advantage. In what proportion A has ye advantage, I computed in my last. If there be any thing else, pray command

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Your most humble & most
obedient Servant
Is. NEWTON
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Cambridge
Decemb. 23. 1693.