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## **On the view that we cannot perceive movement and change: Lessons from Locke and Reid**

Christoph Hoerl

Abstract: According to the *snapshot view of temporal experience*, instances of movement and change cannot, strictly speaking, be objects of sensory perception. Perceptual consciousness instead consists of a succession of individual momentary experiences, none of which is itself an experience of movement or change. The snapshot view is often presented as an intuitively appealing view of the nature of temporal experience, even by philosophers who ultimately reject it. Yet, it is puzzling how this can be so, given that its central claim – that we can never just perceive things moving or changing – clearly flies in the face of our common sense view of the phenomenology of experience. In this paper, I offer a diagnosis of how it is possible that the deep conflict between the snapshot view and our phenomenological intuitions can sometimes go unnoticed. The materials for this diagnosis can, I think, be found in some passages in Thomas Reid's *Essays on the Intellectual Powers of Man*, in which he criticises John Locke's account of the origins of the idea of succession, as presented in chapter 14 of book II of *An Essay Concerning Human Understanding*. As I argue, a crucial aspect of Reid's criticisms can be seen to turn on the idea that Locke fails to distinguish between two quite different variants of the snapshot view, which I call the *memory theory* and the *mirroring theory* of temporal experience, respectively. It is the failure to distinguish between these two different variants of the snapshot view, I suggest, that can also make the snapshot view appear more compatible with our phenomenological intuitions than it in fact is.

## **On the view that we cannot perceive movement and change: Lessons from Locke and Reid**

The recent resurgence of interest in temporal aspects of consciousness has also led to a revival, in some quarters, of what is sometimes referred to as the *snapshot view of temporal experience*.<sup>1</sup> As the name indicates, the snapshot view takes our perceptual system to operate in a way that is akin to the way a cinematic camera works:<sup>2</sup> Just as a movie consists of a rapid succession of ‘still’ or ‘static’ images – individual ‘snapshots’ – perceptual consciousness, on the snapshot view, consists of a succession of individual experiences, none of which is itself an experience of succession. All we have when we are looking at a moving object, for instance, is a succession of discrete momentary perceptual experiences, each of which is an experience of the object at one location on its trajectory.<sup>3</sup> According to the snapshot view, in other words, we cannot, strictly speaking, *perceive* instances of movement and change. Rather, our ability to become aware of movement and change has to be explained in some other way.

Historically, one of the most explicit proponents of a snapshot view of temporal experience is Thomas Reid. Reid develops his defence of the snapshot view

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<sup>1</sup> Recent proponents of versions of such a view include Francis Crick and Christoph Koch (2003), Robin Le Poidevin (2007) and Philippe Chuard (2011).

<sup>2</sup> For this reason, Dainton (2010) also refers to it as the ‘cinematic view’ of temporal experience. Chuard (2011) also uses the term ‘temporal perceptual atomism’. Dainton (2010) discusses the main two theoretical rivals of the snapshot view under the titles ‘the retentional model’ and ‘the extensional model’. I will set these aside for the purposes of this paper.

<sup>3</sup> For the moment, I am bracketing cases of *motion blur*, which make a slightly more nuanced characterization of the snapshot theorist’s position necessary. I will return to this issue shortly.

in the fifth chapter of essay III of his *Essays on the Intellectual Powers of Man*, in the context of a criticism of some passages in chapter 14 of book II of John Locke's *An Essay Concerning Human Understanding*.<sup>4</sup> Aspects of Reid's critique of Locke are already quite familiar from the literature on temporal experience (see, e.g., section 2.3 of Dainton, 2010). In this paper, I want to argue that taking a fresh look at the debate between them can also help resolve what might otherwise appear to be a metaphilosophical puzzle. Proponents of the snapshot view sometimes write as though it was fairly easy to reconcile with our common sense intuitions about the phenomenology of temporal experience, or might even have phenomenology speaking in its favour.<sup>5</sup> Moreover, even philosophers opposed to the snapshot view sometimes present it as an intuitively appealing position, although they think it is ultimately to be rejected (see, e.g., Kelly, 2005, p. 141; Lee, 2014). Yet, the central theoretical commitment of the snapshot view – that we cannot literally perceive instances of movement and change – arguably just flies in the face of common sense. Little could seem to be more obvious than that we can often just *see* an object move,

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<sup>4</sup> The chapter in Reid's *Essay* in which he discusses Locke's account of temporal experience immediately precedes the one containing his well-known critique of Locke's account of personal identity.

<sup>5</sup> See, e.g., Chuard (2011, p. 11), who maintains that "the disagreement [between the snapshot view and rival views of temporal experience] is really over what best explains the phenomenological appearances, not over the appearances themselves." Reid himself is actually an important exception here. Otherwise famously the champion of common sense, he is explicit that the snapshot view he advocates constitutes an error theory regarding our everyday assumptions about the phenomenology of temporal experience.

for instance.<sup>6</sup> How then, is it possible for anyone to think that the snapshot view has intuitive appeal (even setting aside whether or not this is then also taken to be a good reason for endorsing it)?

So my question in what follows is not so much the question as to whether the snapshot theory is a plausible explanatory theory of temporal experience – though in fact I take it that it isn't, and what I say below lays out some of the arguments against the snapshot theory. The more specific question I will be mainly interested in is how, despite these arguments against it, the snapshot view can nevertheless initially appear to provide an intuitive picture of the nature of temporal experience. More to the point, as I already indicated, the main argument against the snapshot theory is a phenomenological one (rather than, say, one based on research in cognitive science). So, if this argument is any good, one would normally expect the falsity of the theory to be particularly obvious. The opponent to the snapshot theory therefore needs an explanation why this is not so. It is in the context of this issue, I believe, that taking another look at the debate between Reid and Locke can prove useful, because it provides the materials for a diagnosis of why the conflict between the snapshot view and our phenomenological intuitions may not always be evident. This is because it shows that the snapshot view can come in two quite distinct variants, oscillating between which will obscure this conflict.

My discussion is divided up into two main sections. In section 1, I provide an exposition of elements of Locke's account of temporal experience in chapter 14 of

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<sup>6</sup> As John Foster (1982, p. 255) puts it, "duration and change through time seem to be presented to us with the same phenomenological immediacy as homogeneity and variation of colour through space". As with other aspects of perception, there are of course certain limits to our capacity to see, e.g., movement. This is something that will become important in what follows.

book II of *An Essay Concerning Human Understanding*, and discuss Reid's charge that there is a crucial ambiguity at the heart of Locke's account. As I argue, Reid's criticism of Locke can be seen to turn on the idea that we need to distinguish between what I will call the *memory theory* and the *mirroring theory*, as two in fact quite distinct variants of the snapshot view of temporal experience, together with the idea that only the former makes for a viable explanatory theory. In section 2, I then argue that distinguishing between the memory theory and the mirroring theory is not just helpful in the context of providing an analysis of Reid's argument against Locke, but also in explaining how it is that the snapshot view of temporal experience can come to appear to be less in tension with our phenomenological intuitions than it actually is. Locke's writings can serve as a useful case study here too.

### 1. Locke, Reid, and two variants of the snapshot view

In chapter 14 of book II of *An Essay Concerning Human Understanding*, Locke considers a number of features of movement perception in order to arrive at an account of how it is possible for us to become aware of motion and succession.<sup>7</sup> His claim, in particular, is that certain limitations in our ability to perceive movement demonstrate that the idea of succession does not arise from sensation, but from reflection on what he calls the 'train of ideas' in our own minds.<sup>8</sup> As Locke puts it:

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<sup>7</sup> The broader context here is, of course, Locke's concept empiricism. As he would put it, Locke's question concerns the origins of our ideas of movement and succession. As we will see, though, his main focus in pursuing this idea is on detailing a number of different experiential situations, only some of which, according to Locke, give rise to these ideas. I therefore believe that it is also legitimate to construe his project in the way I am doing it here.

<sup>8</sup> Jacovides (2016, p. 187) calls this the 'narrow Lockean view', and it is arguably Locke's endorsement of this view in chapter 14 of book II of the *Essay* that allows Reid to interpret the remarks Locke makes

Thus, by reflecting on the appearance of various ideas one after another in our understanding, we get the notion of succession; which if anyone should think we did rather get from our observation of motion by our senses, he will perhaps be of my mind, when he considers that even motion produces in his mind an idea of succession no otherwise than as it produces there a continued train of distinguishable ideas. For a man, looking upon a body really moving, perceives yet no motion at all, unless that motion produces a constant train of successive ideas. (Locke, 1690, 2.14.6)<sup>9</sup>

One of the perceptual phenomena Locke thinks illustrates this last point is that of *motion blur* – e.g., the case of looking at an object which is rotating so fast that we cannot see the movement; instead, we only see a circular blur (ibid., 2.14.8). As Locke interprets this case, we do not perceive the motion of the object because each individual idea produced by the moving object is already an idea of the object in all of the different positions through which it rotates, and successive such ideas do not differ from one another. Thus, what the phenomenon of motion blur shows, for

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in this chapter in terms of the idea of a snapshot view of experience. As Jacovides also notes (ibid.), in chapter 7 of the same book of the *Essay*, Locke provides what appears to be a conflicting ‘broad view’, according to which the idea of succession “though suggested by our senses, [...] is more constantly offered to us by what passes in our minds” (Locke, 1690, 2.7.9). My focus in this paper will be exclusively on what might be identified as one particular strand of argument in favour of the narrow view in chapter 14 of book II.

<sup>9</sup> See also ibid. 2.14.16: “Whether these several ideas in a man’s mind be made by certain motions, I will not here dispute; but this I am sure, that they include no idea of motion in their appearance; and if a man had not the idea of motion otherwise, I think he would have none at all.”

Locke, is that, whilst each of the successive ideas produced in me when I observe an object in motion may be an idea as of the object at a number of different points on its trajectory, they are not thereby individually ideas of movement.<sup>10</sup> Locke infers from this that becoming aware of the movement of an object instead requires having a succession of qualitatively different such ideas, and being reflectively aware of that succession.<sup>11</sup>

It is this appeal to the notion of ‘reflection’, and the role it plays in Locke’s account of how we can become aware of instances of movement and change, that is the primary focus of Reid’s criticism of Locke in the fifth chapter of essay III of his *Essays on the Intellectual Powers of Man*. Locke, Reid thinks, fails to distinguish clearly between two quite different ways in which the notion of reflection might be

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<sup>10</sup> Yaffe (2011, p. 394) describes Locke’s thought here by saying that, long before the invention of photography, Locke hit upon the idea of perceptual experience possessing something akin to a shutter speed. In order for a photographic image to be created, the shutter of the camera needs to be open for a brief period of time, and this can result in a fast moving object figuring in the image at what are in fact several successive positions in its movement, thus creating a blurry image of the object. Locke can be seen to explain the phenomenon of perceptual motion blur by appealing to the thought that sensory perception similarly depends on mechanisms that sample what goes on over a brief interval of time. What are in fact successive events can therefore figure in it, but in such a way that that we can not discriminate them from one another temporally. (The point is taken up by Hume, 1739-40, 1.2.3.) Indeed, Locke thinks that individual ideas themselves take up time (Locke, 1690, 2.14.10), even though they are not themselves things of which we can discern successive temporal parts (ibid. 2.15.9). On this issue, see also Falkenstein (2013, p. 106). This aspect of Locke’s view contrasts with Reid’s claim that “the operation of [the senses] are confined to the present point in time, and there can be no succession in a point of time” (Reid 1785, p. 270). See also footnote 16, below.

<sup>11</sup> Locke (1690, 2.1.2) famously claims that all our ideas must stem from either sensation or reflection, or from a combination of both. What he thus takes the phenomenon of motion blur to show is that the idea of succession cannot stem from sensation alone, but requires reflection.



understood, and due to “this ambiguity his account [...] is darkened and perplexed” (Reid, 1785, p. 269). On one reading of Locke’s view, in line with his own characterization of reflection as “the *perception of the operations of our own minds* within us” (Locke, 1690, 2.1.4; emphasis in original), the term might simply be taken to refer to a form of introspection structurally similar to external perception. On this reading, though, accounting for our awareness of the succession of our own experiences should present as much of an explanatory problem as does accounting for our awareness of a succession of perceived external events, in Locke’s view. Indeed, the two problems would be structurally exactly parallel to each other. So we have made no progress in explaining how an awareness of succession is possible. As Gideon Yaffe puts a similar point:

Locke cannot simply point to the fact that the object of reflection – namely the succession of our ideas – is successive to explain reflection’s ability to provide us with the idea of succession. After all, motions, too, are successive, Locke thinks, but sensation is not, on those grounds, able to provide us with the idea of succession. (Yaffe, 2011, p. 400; see also p. 398)

So instead, Reid suggests that Locke must really be using the term ‘reflection’ in a different sense, when he says that it is the source of our awareness of succession. What he must really mean is in fact our capacity to *remember* our own past experiences. In other words, any awareness we have of how things unfold over time is instead based on the capacity to compare present perceptual experiences with remembered ones. As he puts it:

[S]peaking philosophically, it is only by the aid of memory that we discern motion, or any succession whatsoever. We see the present place of the body; we remember the successive advance it made to that place. The first can then only give us a conception of motion, when joined to the last. (Reid 1785, p. 271)

In effect, Reid thus proceeds as follows. He first ascribes to Locke a commitment to the snapshot view of temporal experience<sup>12</sup> – based on the latter’s claim that the idea of succession does not arise from sensation, but from reflection on the ‘train of ideas’

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<sup>12</sup> Whilst Locke could not, of course, use the camera as a metaphor, his account is not entirely free from appeals to technological metaphors. At one point he considers “whether it be not probable that our ideas do, whilst we are awake, succeed one another in our minds at certain distances; not much unlike the images in the inside of a lantern, turned round by the heat of a candle” (Locke, 1690, 2.14.9). The phrase is quoted by Laurence Sterne in *Tristram Shandy*, suggesting that lanterns of the relevant type were a fairly common sight at the time. In a 1929 article in *Mind*, Samuel Alexander speaks of coming across a Christmas tree decoration in the form of a hexagonal lantern, which was set into rotation by a candle at its base, and suggests that a lantern of this type must have been what Locke had in mind, adding that “[i]n philosophical and scientific places such as Manchester, Locke’s lantern [...] may be obtained [...] at toyshops for sixpence” (Alexander, 1929, p. 271). Perhaps an even better match for Locke’s description are so-called ‘trotting horse’ or ‘pacing horse’ lamps, coming originally from China. These are also typically hexagonal, but it is not the lamp itself that is set in rotation by the rising air from the candle, but a set of cut-out silhouettes mounted inside the candle, whose shadows are then successively projected onto the translucent sides of the lantern. As the sides are not fully transparent, the rotating silhouettes themselves can’t be seen, only their shadows, and as the set of silhouettes rotates in circular motion, but the six sides of the lamp are flat, each silhouette is only close and parallel to each side for a moment, when it casts the darkest and most well-defined shadow, after which the shadow becomes blurry again. On each of the sides, the effect is thus that of one shadow appearing and disappearing, and then another shadow appearing and disappearing, and so on.

in our own minds. And he then draws a contrast between two different versions of the snapshot view – corresponding to the two different ways of understanding the notion of ‘reflection’ that he distinguishes – only one of which, he claims, makes for a viable explanatory theory. On one way of understanding the snapshot view, connected with the first reading of Locke’s notion of ‘reflection’ that Reid considers, it amounts to what is we might call a *mirroring theory* of temporal experience.<sup>13</sup> On it, the fact that the train of ideas is itself successive, and changes in a way that mirrors the changes in the objects of perception, is meant to account for our awareness of succession. To put it another way, according to such a mirroring theory, our awareness of changes in the world around us is explained in terms of the idea that, as these changes happen, a changing sequence of ideas is produced in us, and this is what we become aware of through reflection.

As we have seen, the point Reid makes against such an account of temporal experience is that it is explanatorily vacuous. It faces the obvious problem (amongst others) that it seems to presuppose what it is trying to explain. In assuming that the idea that temporal features of the stream of experiences mirror temporal features of the world can be made to do explanatory work in accounting for my awareness of the

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<sup>13</sup> Lee (2014) uses the term ‘mirroring view’ to describe a somewhat similar idea. However, he takes this view to be an ingredient in certain extensionalist views of temporal experience. Extensionalism is typically understood to be a doctrine that tries to explain how there can be genuine perceptual awareness of instances of movement and change. By contrast, on the mirroring theory as conceived of here, the fact succession and change in the objects of perception is mirrored by succession and change in the stream of experiences is meant to explain how we can become aware of the former despite *not* being able to do so directly in perception. This is why the theory is to be thought of as an instance of the snapshot view of temporal experience.

latter, it seems to take my ability to become aware of the former for granted.<sup>14</sup> And it is not at all clear that it is any easier to account for my introspective awareness of temporal features of my own stream of experiences than it is to account for my awareness of temporal features of the world presented in experience. In fact, we have made no progress in explaining how an awareness of succession is possible.

Having thus rejected the mirroring theory, Reid advances a second, rival, understanding of the snapshot theory, corresponding to the second way of reading the notion of ‘reflection’ he distinguishes. On this understanding of the snapshot theory, it amounts to what is typically referred to as a *memory theory* of temporal experience. According to it, it is only because my present ideas are accompanied by memories of different ideas that I had earlier that I can become aware of movement and change.<sup>15</sup> As Reid says:

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<sup>14</sup> Compare here also Ruth Millikan’s critical discussion of what she calls the ‘passive picture theory’ of perception, and her charge that it produces “a façade of understanding that overlooks the need to give any account *at all* of the way the inner understander works, any *account* of the mechanics of inner representation” (Millikan, 2000, p. 112). What I am calling the mirroring theory of temporal experience is amongst the targets of Millikan’s criticism.

<sup>15</sup> Other proponents of a memory theory of temporal experience include Strong (1896, p. 155), who writes: “The lapse of time is [...] not directly experienced, but constructed after the event. [...] We never lift ourselves up out of the stream of time and view it as a stream except representatively, except through memory. To wish to apprehend succession, or change, or the lapse of time directly, and not through memory, is as foolish as to wish to apprehend the past directly, and not through memory”. What makes the memory theory, as I understand it, a version of the snapshot view, is precisely this denial of the idea that we can directly apprehend succession or change in perception. This also constitutes the difference from the retentional view of temporal experience, which builds a past-directed element into the nature of perceptual experience itself.

Reflection upon the train of ideas can be nothing but remembering it, and giving attention to what our memory testifies concerning it: for if we did not remember it, we could not have a thought about it. So that it is evident that this reflection includes remembrance, without which there could be no reflection on what is past, and consequently no idea of succession. (Reid 1785, p. 270)<sup>16</sup>

Reid is very clear – much more so than other proponents of a snapshot view – that his theory ultimately involves a rejection of our common sense view of the phenomenology of temporal experience. And I think getting right the sense in which snapshot theorists are, in general, committed to such a rejection of common sense turns crucially on bearing in mind the distinction, effectively highlighted by Reid,

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<sup>16</sup> The argument against Locke outlined on the preceding pages is probably best seen as just one of several routes by which Reid arrives at his memory theory. For instance, he also mentions the separate idea (perhaps motivated by an implicit commitment to presentism; though see Van Cleve, 2015, pp. 250f.) that “the operations of both [the senses and consciousness] are confined to the present point of time, and [that] there can be no succession in a point of time” (Reid 1785, p. 270). This idea plays an important role in his account of how the vulgar can be in error about this aspect of experience (as Reid supposes), common sense sometimes referring to an interval as present (“the present hour”), rather than operating with the strict philosophical notion of the present as an indivisible point. However, it should also be noted that this way of motivating the memory theory is in tension with claims Reid makes only moments later in the context of his discussion of Locke’s account of the origins of the idea of duration. There he writes: “[S]uppose a succession of as many ideas as you please, if none of these ideas have duration, nor any interval of duration be between one and another [...] there can be no interval of duration between the first and the last, how great soever their number might be. [...] Nothing indeed is more certain that every elementary part of duration must have duration, as every elementary part of extension must have extension” (ibid., 272).

between the mirroring theory and the memory theory, as two quite distinct variants of the snapshot view. As I want to show in what follows, this can again be brought out by considering aspects of Locke's account of temporal experience.

## 2. Locke on motion too slow to be perceived

It is not just the case of motion blur – of motion *too fast* to be perceived – that Locke appeals to in support of his view that our awareness of motion and change turns on our ability to reflect on our train of ideas. In support of this claim, he also cites the opposite case, namely that of motion *too slow* to be perceived. He writes:

[T]he reason, why motions very slow, though they are constant, are not perceived by us; because in their remove from one sensible part towards another, their change of distance is so slow, that it causes no new ideas in us, but a good while one after another: And so not causing a constant train of new ideas, to follow one another immediately in our minds, we have no perception of motion; which consisting in a constant succession, we cannot perceive that succession, without a constant succession of varying ideas arising from it.

(Locke, 1690, 2.14.7)

Locke gives as examples of things that are in fact constantly moving, but move too slowly for us to perceive their movement “the hands of clocks, [the] shadows of sundials” and the sun itself.<sup>17</sup> What he suggests in the passage quoted is that the reasons

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<sup>17</sup> As far as I could find out, clocks featuring a second hand only started to appear towards the end of the 17<sup>th</sup> century, and this phrase suggests that Locke may not have been familiar with them at the time of writing *An Essay Concerning Human Understanding*.

why we do not see objects like these move, even though they do move, has to do with a natural pace at which our ideas succeed each other. When we look at such objects, we still have a successive train of ideas,<sup>18</sup> but no new, qualitatively different, ideas of the position of the object are produced in us as that train advances, because we do not notice the small differences in the position of the object between one time and another. Thus, again, Locke concludes that an awareness of succession requires a succession of ideas, and more specifically, a succession of qualitatively different ideas, which we become aware of through reflection.

How exactly are we to understand this second argument Locke gives for his view? On one way of understanding Locke, his argument can again be seen to involve an appeal to what I referred to as a mirroring theory of temporal experience. That is to say, Locke can be seen to suggest that, when we look at the hour hand of a clock, for instance, there is no change in the successive experiences we undergo, and in this respect what he would call our ‘train of ideas’ actually seems to mirror a situation in which there is no change in the position of the hand, rather than one in which there is a change in position. As a result, we are not aware of the movement of the hand.

Earlier, we saw Reid criticising the mirroring theory on the grounds of explanatory vacuousness – it seems to presuppose an awareness of the very type it is trying to explain. However, quite apart from the problem that Reid raises, it is arguably also the case that using such a theory in the way just sketched to account for

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<sup>18</sup> On this, see, e.g. *ibid.*, 2.14.13. One other strand in Locke’s argument in which this idea plays a role is a rejection of the traditional view of time as the measure of motion. As he puts it at one point, “wherever a man is, with all things at rest about him, without perceiving any motion at all; if during this hour of quiet he has been thinking, he will perceive the various ideas of his own thoughts in his own mind, appearing one after another, and thereby observe and find succession where he could observe no motion” (*ibid.*, 2.14.6).

cases of motion too slow to be perceived simply gets it wrong about the phenomenology of our experiences – that’s unless we are quite radically mistaken about what our experiences are like.<sup>19</sup> Note that even Locke presumably has to admit that, if we look at the hour hand for long enough, eventually a new, qualitatively different idea will be produced in us. The hour hand may not produce any new idea in us between some time  $t_1$  and some time  $t_2$ , because it doesn’t advance enough within that interval. But surely at some point there must come a time  $t_3$  at which it does produce such a new idea, because it has moved through a sufficiently great distance. But then it seems that Locke would have to say that we do at least perceive the movement of the hand in the transition from  $t_2$  to  $t_3$ . In fact, at one point Locke himself seems to be aware that this is an implication of his theory. He writes:

[T]he constant and regular succession of ideas in a waking man, is, as it were, the measure and standard of all other successions. [W]here any motion or succession is so slow, as that it keeps not pace with the ideas in our minds, or the quickness in which they take their turns [...] there also the sense of a constant continued succession is lost, and we perceive it not, but with certain gaps of rest between. (Locke, 1690, 2.14.12)

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<sup>19</sup> There are occasional examples of philosophers who deny that there is a genuine difference between the case of the second hand and that of the hour hand. To Broad’s (1923, p. 351) claim that it is “clear that to see a second-hand *moving* is a quite different thing from ‘seeing’ that an hour-hand *has* moved” Plumer, for instance, responds: “[Broad] claims that he cannot see either the minute- or the hour-hand moving. [...] I suspect he did not look at them very long (who does?)” (Plumer, 1985, p. 28). Fara (2001), too, questions how deep the contrast goes, though see Phillips (2011) for critical discussion.



Here Locke seems to be aware that, on his own theory about what happens when we look at slow moving objects, it is not in fact true that we do not see those objects move. (Or at least ‘see’ them move in the same sense in which we ‘see’ the second hand move, which of course we don’t strictly speaking do either on the type of snapshot view Locke seems to advocate in the relevant passages.) Rather, if his theory is right, the difference between the case of, say, the hour hand and that of the second hand should be that we can only *intermittently* see the former moving (or perhaps see it as though it was only intermittently moving), whereas we can *constantly* see the latter moving. Yet, that is clearly not how it appears to us. Arguably, we take it that we can’t see the movement of the former *at all*. As Locke himself says elsewhere in the same section:

where the motion is so slow as not to supply a constant train of fresh ideas to the senses, as fast as the mind is capable of receiving new ones into it [...] there the sense of motion is lost; and the body, though it really moves, yet, not changing perceivable distance with some other bodies as fast as the ideas of our own minds do naturally follow one another in train, the thing seems to stand still; as is evident in the hands of clocks, and shadows of sun-dials, and other constant but slow motions, where, though, after certain intervals, we perceive, by the change of distance, that it hath moved, yet the motion itself we perceive not. (Locke, 1690, 2.14.12)

In the last sentence of this passage, Locke himself agrees that we do not see the motion of the hour hand. But, as we have seen, it is difficult to see how he can do so whilst adhering to a mirroring theory of temporal experience. Locke could, of course,

like Reid, adopt a memory theory of temporal experience instead, which, as I said, constitutes an alternative version of the snapshot view. However, as Reid recognized, this, too, would commit him to an error theory about our common sense view of the phenomenology of temporal experience. On such a view, it would of course be right to say that, in the case of the hour hand, all we can be aware of is that it *has moved*, in virtue of us seeing it in one position, whilst remembering it being in another. But the theory would have to say the same thing about the case of the second hand, which we ordinarily do think we can just see moving.

In other words, in so far as he can be interpreted as putting forward a version of a snapshot theory of temporal experience, Locke's discussion of movement perception can also serve to illustrate that snapshot theorists seem forced to choose between two versions of the snapshot view, both of which ultimately deny that there is a phenomenological difference, of the kind envisaged by common sense, between the case of the hour hand and that of the second hand. Yet, what I have also tried to show is that this error-theoretical consequence of the snapshot view can be obscured if, like Locke, we do not clearly distinguish between those two different versions of the snapshot view, i.e. the mirroring theory and the memory theory.<sup>20</sup> This is because

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<sup>20</sup> Compare here also Chuard (2011, p. 9f.):

At one end of the spectrum of possible atomist accounts [i.e., snapshot views of temporal experience], there is the more familiar suggestion that a subject's experiential awareness of temporal relations involves a succession of short (or instantaneous) purely sensory experiences, with each sensory experience in the succession simultaneously accompanied by phenomenologically salient memories of previous experiences in the succession. [...]

At the other end, we find the view that all there really is, is just a succession of short-lived or instantaneous sensory experiences: the subject has a sensory experience of an event,

the mirroring theory and the memory theory each involve a different way of denying the phenomenological contrast that common sense draws. If we try to account for temporal experience by appealing to the idea that the temporal structure of the “train of ideas” mirrors the temporal structure of what appears to be perceived, we will end up thinking of the phenomenology of the hour-hand case as a special case of the phenomenology of the second-hand case, as common sense construes it. That is, we will think of ourselves as perceiving the hour hand moving in much the same sense as we perceive the second hand moving, but doing so only intermittently, rather than constantly. If, by contrast, we conceive of all temporal experience as arising from a combination of perception and memory, like Reid does, we will end up assimilating the case of the second hand to the case of the hour hand, as common sense conceives of it. Thus, strictly speaking, we will have to say that we don’t really see the second hand move; rather, just like in the case of the hour hand, all we can tell is that it has moved.

### 3. Conclusion

It can sometimes feel as though the snapshot view provides a natural starting point for thinking about temporal aspects of perceptual awareness, even if it might perhaps turn out to be inadequate on further reflection. As Geoffrey Lee (2014, p. 2) writes, “many people do have an intuition that certain kinds of experience have a ‘series of

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and then another, and another. The phenomenology of temporal awareness is to be fully explained, on this view, as a result of the successive phenomenology of single experiences enjoyed in close succession.

What I have been suggesting, in effect, is that there is no ‘spectrum’ here, but just two very different and incompatible positions.

snapshots' structure: for example, it might seem as if an experience of a ball moving is really a series of snapshot experiences, each presenting the ball at a different location." My main question in this paper has been how this can be so, given that, as Lee also says (*ibid.*), "it should be an uncontroversial starting point that we *do* have temporal experience" in the sense of simply being able to perceive certain instances of movement and change, which is flat-out denied by the snapshot view.

As I have argued, one lesson we can learn from Locke's discussion of movement experience, guided by Reid's critique of it, is that the snapshot view can come in two different varieties – the memory theory and the mirroring theory – each of which can be made to fit with some of our phenomenological intuitions.<sup>21</sup> The memory theory can be made to fit with the intuition that there are some cases of movement or change that are too slow to be perceived, but in which we can still become aware of the movement or change by recalling how things used to be whilst perceiving them to be different now. The mirroring theory, on the other hand, can be made to fit the intuition that we can simply see certain cases of movement or change (or at least have some form of seemingly direct experiential awareness of them). It may therefore superficially look as though there is no deep conflict between the snapshot view and common sense. However, in each case, making the snapshot view fit one of the intuitions at issue in fact involves denying the other one. On closer inspection, therefore, it becomes clear that the snapshot view is deeply at odds with

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<sup>21</sup> In Hoerl (2017) I also argue that recognising the distinction between the memory theory and the mirroring theory, as two different guises the snapshot view can assume, and recognising that each of them involves a different picture of the nature of perceptual experience in general, is also important in the context of explaining just how the snapshot view differs from extensionalism and retentionalism, respectively.

what we ordinarily think when we think, for instance, that there are some things that we can simply see moving, and others that move too slowly for us to see them move.

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