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Collective and extended knowledge

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As individuals we know things. The epistemological investigation of knowledge then naturally starts from the assumption that knowledge is some state of an individual's mind with the most common assumption being that knowledge is a species of belief—the justified and true. This individualistic epistemic approach has then been criticised along the following two fronts. First, it has been argued that knowledge can be collectively achieved, and this requires recognizing that an individual's knowing things can depend on a collective knowing things (Hardwig, 1985, 1991; Hutchins, 1995). Second it has been argued that belief is not merely an individual matter because belief can extend beyond an individual's 'skull and skin' (Carter et al., 2018; Clark & Chalmers, 1998; Menary, 2010). Knowledge can be collective and belief can be extended, and on the supposition that knowledge is a species of belief, it follows that there can be collective belief and extended knowledge too.[1] Thus both epistemic and metaphysical challenges have been raised to the individualistic assumptions common in epistemology.

This paper hopes to show a connection between these two criticisms of individualistic epistemology. More precisely, it hopes to rehearse a claim previously made that an adequate account of collective knowledge requires a certain non-individualistic conception of knowledge. And this same non-individualistic conception also offers a basis for arguing that knowledge is extended. However, the non-individualistic conception of knowledge in operation here is one that is largely compatible with an individualist approach to epistemology; it involves no more than a commonplace shift in epistemological perspective. Thus, it is proposed that an account can be given of both collective and extended knowledge that does not undermine the individualist epistemological paradigm. Some shift in epistemic theory is required but not the radical shift away from epistemological individualism that has been canvassed.

The paper proceeds as follows. It starts with the recognition that some knowledge is collectively held, and the question this raises is what explains an individual's possession of this collective knowledge? Section one rehearses arguments for a previous answer, (Faulkner, 2006, 2011, 2018). Collective knowledge, it will be claimed in this section, is best understood in terms that roughly

equate to Popper's (1972) idea of objective knowledge. An individual's possession of collective knowledge simply requires the right relations to something that is objective knowledge. We can thereby talk of collective knowledge without having to make any reference to a collective knower. This proposal then receives support from the argument that belief is extended because this argument, it will be claimed, requires an objective conception of knowledge. To show this, sections two and three then outline Clark & Chalmers' (1998) much discussed argument and show how it can conclude only when knowledge is conceived objectively. The conclusion then situates this objective conception of knowledge with respect to individualistic epistemology.

1 | COLLECTIVE KNOWLEDGE

As individuals we know things, but it is also true that many things we individually know, others know too. Many things are collectively known. Moreover, some things that are collectively known could only be collectively known. Science furnishes lots of examples insofar as much scientific work is necessarily collaborative. But the necessity of an epistemic division of labour is not restricted to science and a nice illustration of it can be found in Hutchins' (1995) description of navigation aboard the *USS Palau* before the invention of GPS technology. As he describes it, navigation on a port approach involved the eight-man Navigation Team fixing the ship's position every three minutes. The bearing recorder consults the maps, chooses the landmarks, and communicates these to the pelorus operators on deck who take the necessary bearings. The plotter then marks these lines of position on the map, fixes the boat's position and checks its correctness by comparing the depth reading given by the charts with that recorded by the fathom operator. Communication with the engine room then allows the ship's future position to be reckoned, and on this basis the bearing recorder judges the next set of landmarks and the fix-cycle repeats. At the end of one fix cycle the Head of Navigation knows that the ship is at such and such precise location. This will also be collectively known in the minimal sense that the Captain, to whom the Head of Navigation communicates, and other members of the Navigation team, will know this too. But this knowledge could also only be collectively known since its being known, at that time, required the fix cycle to be executed and a team working collaboratively was needed to do this.

This is then a *core case* of collective knowledge in the sense that the following two things are true of it. First, a specific kind of evidence or argument is needed for the knowledge sought. In this case, the knowledge of the ship's precise position, at that time, required various angular and depth measurements and consequent calculations. Second, the required evidence or argument can then only be generated by individuals working together, or collectively. In this navigation case, this is simply because the measurements need to be taken near simultaneously; in science, where most knowledge is also core collective in this sense, the need for collaboration is more often based on complexity, with experiments frequently requiring a range of scientific expertise.[2]

These core cases of collective knowledge then offer an epistemological basis for introducing collective notions into epistemology. Specifically, they do so because—once it is recognized that knowledge can require a body of evidence and argument *and* it is recognized that no one individual could produce or articulate this—there seems to be no explanation of how we individually get to possess knowledge in these core cases without some collective reference.[3]

To focus this issue, consider what is required for individual knowledge in these core cases, and specifically consider what is required for the Captain of the *USS Palau* to know that p—that the ship is at such and such precise location. Given that the Captain gets to know p through being told this by the Head of Navigation, an initial line of enquiry might ask what justifies testimonial uptake in this case. With respect to this question, there might be appeal to the Captain's empirical

reasons for thinking the Head of Navigation's testimony to p is true, his entitlement to accept this testimony, the assurance offered by the Head of Navigation, or the reliability of the Captain when it comes to testimonial uptake. However, whatever it is that justifies testimonial uptake, this cannot be what grounds the Captain's knowledge that p since this knowledge, at this time, requires the various angular and depth measurements and consequent calculations that the Navigation Team made. So irrespective of what is said about testimonial uptake, any account of the Captain's knowledge must see this knowledge as somehow grounded on this set of measurements and calculations.

One idea, then, is that testimony functions to transmit warrant (Burge, 1993; Dummett, 1989; McDowell, 1994). Through understanding and believing testimony to p, an audience thereby acquires a belief that inherits whatever warrant the speaker had for it. It is important to note that the relevant warrant here is what Burge (1993, p. 486) calls the "extended body of justification" rather than the audience's "own proprietary justification". The latter will be composed of any entitlements and reasons the audience might have. The former is this plus whatever warrant is transmitted. What distinguishes *testimonial knowledge* is that it is knowledge based on this extended body of justification.

> If the recipient depends on interlocution for knowledge, the recipient's knowledge depends on the source's having knowledge as well. … The recipient's own proprietary entitlement to rely on interlocution is insufficient by itself to underwrite the knowledge. … [It] is incomplete and implicitly refers back, anaphorically, to fuller justification or entitlement. … [It is] *the extended body of justification* that underwrites the recipient's knowledge. (Burge, 1993, p. 486)

No doubt Burge would allow that an argument to the truth of p from the fact of testimony to p, which could form part of an audience's proprietary justification, could be sufficient for *inductive* knowledge. So the point is that testimonial knowledge is unique in that it is based on an extended body of justification. For an audience to *testimonially know* that p on the basis of testimony to p, the extended body of justification transmitted down the testimonial chain then needs to be knowledge supporting.[4] This condition is satisfied in the Navigation case: the warrant the Head of Navigation had for p was based on his knowledge of the needed measurements and calculations, since this information is all recorded in the ship's Navigation Logbook which he has access to, so his testimony to p transmits this warrant, and so knowledge, to the Captain. Since the Head of Navigation knows that p only insofar as he is a member of the collective that is the Navigation Team, which together made the measurements and did the various calculations all recorded in the Logbook, one might say that Captain got to know that p because the collective that is the Navigation Department, and for whom the Head of Navigation speaks, knows that p. In general, testimonial knowledge requires the source know what is testimonially presented; it is just that in the core collective cases the source seems to be a collective which knows.

So, to recap, core cases of collective knowledge both raise the question of how to explain an individual's possession of collective knowledge and establish that any explanation must involve some collective reference. It has then been proposed that this reference should be to *collectives knowing* things.

Now there might be other reasons for introducing collective knowers, but appeal to collective knowers faces a problem when it comes to answering the key epistemological question, which is how an individual acquires knowledge in these core cases. The problem is that just as cases can be given where an audience acquires testimonial knowledge from a speaker who doesn't know or

even when there is no speaker in the chain who knows, so a case can be given where an audience acquires testimonial knowledge from a piece of collective testimony when there seems to be no collective that knows.[5] Thus consider Bird's (2014) case of the dead scientist. Dr. N discovers that p and publishes his discovery in the *Journal of X-ology*. This can be considered a core collective case insofar as (i) the knowledge that p requires a certain body of evidence and argument, which is articulated by Dr. N in this journal article. And (ii) this articulation stands as knowledge supporting only insofar as it has been through the peer review process involved in *Journal of X-ology* publishing this article. Unfortunately, however, Dr. N's publication is ignored and Dr. N, along with the scientists who peer reviewed his work, subsequently die. As such, there is no individual, or set of individuals, who either know that p or believe that p. Nevertheless, Bird (2014, p. 57) contends,

> Dr. N's contribution to knowledge did not cease with his death. Rather his discovery is a contribution to what is known in wider science in virtue of its publication and remains known thanks to the accessibility of that publication.… For the system to know something, what is in people's heads is not important; what is important is the availability of the information known.

This description of the case, I think, is essentially correct; that is, it is correct to say that there is *collective knowledge*, and that there is collective knowledge because the knowledge supporting justification printed in the *Journal of X-ology* is still available. Whether it is correct to further say that the collective, or "the system", knows that p is moot. Since no member of the collective, which did include Dr. N and the journal referees, knows that p, it hinges on the plausibility of saying that nevertheless the collective still knows that p. Maybe this can be said, but the point is that this further claim is not epistemologically required.

To elaborate this point: suppose, sometime later, that a scientist reads Dr. N's article in the *Journal of X-ology*. And suppose that she understands this article sufficiently to grasp that p, even though she does not understand the detail of the arguments contained in the article, it not being her field of expertise. On the basis of this testimonial encounter, it seems that this scientist could get to know that p, and to know that p *testimonially*. While it is possible to explain this in terms of the collective knowing that p and warrant being transmitted from one epistemic subject to another, it seems better to simply explain this fact in terms of this scientist's relation to Dr. N's article. This seems better because this is a core collective case, and it follows that the scientist's knowledge that p requires the support of the evidence and argument the article articulates. Thus, rather than think of the extended body of justification as something that gets transmitted down a testimonial chain, testimonial uptake should be thought of as the vehicle that enables an individual's belief to be supported by an extended body of justification considered in abstract; that is, abstracted from any other individual or collective belief (see Faulkner, 2006; Miller, 2015). On this proposal, the reader who gets to testimonially know that p on the basis of Dr. N's article does so because reading this article enables the reader to form a belief supported by the extended body of justification that determined that p was collectively known when Dr. N and the referees were still alive, and which continues to determine that it remains a piece of collective knowledge. One could say, simply, that the reader gets to know that p because it is *collective knowledge* that p, but where *collective knowledge* does not require any individual or collective knower. What the collective knowledge that p does require, at least for these core collective cases, is (1) that p *be supported by an appropriate knowledge-supporting extended body of justification*; (2) that some individual or collective has *access* to, or can at least *locate*, this body of justification; and (3)

that some individual or collective can *recognize that extended body of justification is knowledge supporting*. For example, there is collective knowledge of the precise location of the *USS Palau* given that (1) the appropriate measurements and calculations have been made and (2) can be accessed in the Navigation Logbook and (3) recognized as what they are. While more needs to be said here (and for this see Faulkner, 2018), enough has been said for present purposes, which is to build a connection between collective and extended knowledge.

2 | AN ARGUMENT FOR BELIEF BEING EXTENDED

Clark and Chalmers (1998) focus on belief rather than knowledge. The argument that belief is extended is then based on the case of Otto and his notebook. It starts with Inga, an ordinary believer, and her desire to visit the Museum of Modern Art (MoMA), which she recalls is on 53rd Street. This belief—that MoMA is on 53rd Street—was dispositional until recalled. By contrast, Otto, who has Alzheimers, has trouble recalling addresses and similar facts, so to manage this condition he keeps a notebook. When Otto decides to visit MoMA, he consults this notebook, finds the address and so heads over to 53rd Street. Comparing Otto with Inga, (Clark & Chalmers, 1998, p. 13) observe that "the notebook plays for Otto the same role that memory plays for Inga. The information in the notebook functions just like the information constituting an ordinary dispositional belief; it just happens that this information lies beyond the skin". Otto "consults the notebook" in the same way that Inga "consulted her memory" (Clark & Chalmers, 1998, p. 13). Given that there is no relevant functional difference here, there should be parity in what we say about these cases. So we should conclude that both Inga and Otto have the dispositional belief that MoMA is on 53rd Street.

The question is then, when do beliefs extend in this way? That is, what makes Otto's relation to his notebook special? Beliefs cannot always extend with every use of technology, else there would be 'cognitive bloat'. Here Clark and Chalmers (1998) propose what have become known, following (Clark, 2008, p. 45), as the "trust and glue" conditions.

> First, the notebook is a constant in Otto's life—in cases where the information in the notebook would be relevant, he will rarely take action without consulting it. Second, the information in the notebook is directly available without difficulty. Third, upon retrieving the information from the notebook he automatically endorses it. Fourth, the information in the notebook has been consciously endorsed at some point in the past, and indeed is there as a consequence of this endorsement. (Clark & Chalmers, 1998, p. 17)

By virtue of satisfying these conditions, Otto's notebook is seamlessly integrated into his cognitive life. This is a phenomenological claim.[6] And it underwrites the proposed functional equivalence: it ensures that Otto's notebook is incorporated into his cognitive system, rather than merely used by him (see Clark, 2010a, p. 84). Given that Otto's use of the notebook satisfies these 'trust and glue' conditions, Otto's dispositional beliefs extend to include the information in the notebook. Thus, just as Inga had the dispositional belief that MoMA is on 53rd Street prior to recalling this fact, so Otto had a dispositional belief with the same content prior to reading his notebook.

To consider the case of Otto and his notebook further, suppose Otto's consultation of his notebook was prompted by a third party asking him where MoMA is. Otto pauses, "wait a minute, let

me check", and consults his notebook. A natural way of characterizing this case, from the third party's perspective, is that Otto doesn't know the answer the question, but can find out the answer; that is, he doesn't know where MoMA is but is in a position where he can find out where MoMA is. Characterised in this way Otto would seem to be functioning as a "non-knowledgeable conduit" (Burge, 2013, p. 255) for the knowledge presented in the book consulted. But, of course, the book Otto consults is *his notebook*. And for simplicity, suppose that Otto penned his notebook entry on the basis of knowing first-hand that MoMA is on 53rd Street (i.e. suppose the fourth 'trust and glue' condition satisfied). As such, at the time he is addressed by the third party, Otto doesn't have an *occurrent belief* as to the location of MoMA but whether he nevertheless *knows* this location, at this time—and so whether he has a *dispositional belief* as to the location of MoMA—would then seem to hinge on the functioning of his memory. At this juncture, Clark and Chalmers' case is under-specified, and can be elaborated in one of two ways.[7]

Possibility one: consultation of the notebook *prompts recall*, which is to say that upon consulting his notebook Otto retrieves his belief that MoMA is on 53rd Street from (biological) memory. Maybe consultation of the notebook prompts Otto to recall standing in front of MoMA looking at its address, or maybe it just prompts recall of the fact that MoMA is on 53rd Street. Either way Otto's present belief that MoMA is on 53rd Street and his past belief that MoMA is on 53rd Street are one and the same belief. It might be that Otto's present occurrent belief would not have occurred without the prompting provided. But, following Martin and Deutschers' (1966) discussion of remembering, this does not imply that the present belief is not recalled since prompting can reawaken memory. In Martin and Deutschers' (1966, p. 185) terms, what is needed is for the present belief to be an instance of recall is that Otto's previous visit to MoMA be "operative in producing the state (or successive set of states) in him which is finally operative in producing the representation, in the circumstances in which he is prompted". The first possibility is that this is so, and this is thereby a case of remembering. It is then unproblematic that Otto thereby knew the location of MoMA at the time he was questioned, and thereby unproblematic that he had the dispositional belief that MoMA is on 53rd Street; it is just that, at that time, the address temporarily eluded him. And this is quite ordinary: we often need prompts to recall things.

Possibility two: consultation of the notebook doesn't prompt recall. In this case, Otto confronts the testimony in his notebook, which is the testimony of his earlier self, as a third party would do, namely as a piece of testimony. This piece of testimony, what his notebook tells him, allows him to know the location of MoMA, and so tell the third party its location. But he only got to know this location himself when he consulted his notebook. Something he previously knew, when he wrote this entry, he forgot and then had to relearn.[8]

With respect to these two possibilities, were the first possibility realised, it would be true throughout that Otto knows the location of MoMA. As such, there would be no problem in supposing that Otto *has* a dispositional belief as to its location. Recall can require prompting, and the same might be true of Inga, since this is typical of dispositional belief. However, were the second possibility realised, Otto would have forgotten what he once knew. As such, there would equally be no problem in supposing that Otto *lacks* any dispositional belief about MoMA's address. His forgetting ensures that there is no such belief. It follows that once the case is fully and properly specified, it turns out that either Otto is a typical believer, or he is no believer at all.

Clark and Chalmers might object to the second elaboration of their case: doesn't it presuppose that the realizers of memories are narrowly psychological, what Martin and Deutscher call 'memory traces', and thereby that these realizers are not extended to include such things as notebooks? Thus, Carter and Kallestrup (2016) propose that Otto's notebook be conceived as containing 'extracranial traces' and as thereby containing Otto's dispositional beliefs. So, this objection continues,

possibility two simply fails to entertain the idea that "[f]or Otto, his notebook plays the role usually played by biological memory" (Clark & Chalmers, 1998, p. 12) since this is the idea that Otto's 'notebook traces' play the same functional role as Inga's 'memory traces'. This objection—that possibility two simply begs the question—can then be substantiated to the extent that Clark and Chalmers are correct to say that there is no relevant difference between Otto and Inga.

In this way, the debate has proceeded. Clark and Chalmers (1998, pp. 14–5) contend that "an opponent has to show that Otto's and Inga's cases differ in some important and relevant respect. But in what deep respect are these cases different?" They then consider a series of differences between Otto and Inga and reject them all as superficial. For example, Otto can only access the location of MoMA perceptually, by looking at his notebook, but Inga has introspective access to this information. However, this difference, they contend, cannot be a deep difference—introspective access to the content of a dispositional belief cannot be necessary for realizing it—because one can imagine a "Terminator" where information that is recalled from memory is displayed in its visual-field (Clark & Chalmers, 1998, p. 16). Candidate deep differences have then been proposed, and Clark has responded with counter-examples where the property meant to instantiate the 'deep difference' is lacking but where dispositional belief is still realized.[9]

The problem is that this gets the dialectic wrong. the case for belief being extended starts from the claim of functional equivalence. So the issue is whether Clark and Chalmers are correct to advance the initial claim that there is no relevant difference between Otto and Inga.[10] The fact that the case of Otto and his notebook is underspecified then undermines this initial claim; it might be that there is no relevant difference, or it might be that there is a relevant difference, it just depends on the full and proper description of the case. To fully specify the case, as noted, what needs to be asked is whether Otto's consultation of his notebook prompts recall. And there are, as described, two ways of then filling out the details. With these details filled out, it turns out that either Otto is a typical believer, like Inga, or he is no believer at all. To assert that the case of Otto, articulated along the lines of possibility two, exhibits recall just because Otto references a notebook entry is already to presume the similarity between Otto and Inga has been established. The case of Otto, once fully specified, thereby offers no motivation for introducing the idea that belief is extended in the first place.

Nevertheless, Clark and Chalmers' supposed objection of begging the question can be pressed in a different direction. There is an equivocation in talk of memory. We *recollect* facts like the address of MoMA, and we *remember* such facts, where we use 'remember' when a recollection instantiates knowledge. Considered as recollection, memory is a psychological relation to past belief and experience. It is this psychological relation that is present in possibility one, when consultation of his notebook does prompt Otto to recollect that MoMA is on 53rd Street. In this case, the notebook is causally implicated in making a mental connection to the past, but the realizer of this connection is the recollection, which is a paradigmatically mental item. And in case two, there is no recall: Otto has simply forgotten the location of MoMA. Thus, with memory construed as recollection, there is no more reason, in case two, to regard Otto as recollecting where MoMA is than there is to regard him as having a dispositional belief to this effect.

However, things are different when the discussion of Otto's memory shifts to talk of his remembering or not. In this case, there might be something to Clark and Chalmers' anticipated objection that to presume an 'intra-cranial' view of memory would be to 'beg the question'. And this is because there is arguably something problematic in presuming that states of knowledge are narrowly psychological, such that an entry in Otto's notebook cannot be a state of knowledge. Thus, it could be proposed, even if Otto's case is as specified in possibility two, that Otto knew the address of MoMA all along. He knew it, irrespective of whether there was any recall when he consulted

his notebook, because his notebook is a repository of his knowledge, and he enjoys a special relation to his notebook. I elaborate this proposal next; it takes us back to the objective conception of knowledge with which section 1 finished.

3 | EXTENDED KNOWLEDGE

Knowledge is the kind of thing that can exist in notebooks, and so outside the 'skull and skin'. Thus consider the Head of Navigation at the end of one fix-cycle. At this point he knows that p—that the ship is at such and such precise location—and he knows this because the members of the Navigation Department have collected various pieces of information—the angular and depth measurements—that have enabled the calculation of p. These pieces of information along with the accompanying calculations—plot lines on the chart etc.—are recorded in the ship's Navigation Logbook. The Navigation Team's job is both piloting the ship *and* maintaining this Logbook, which documents the ship's passage. The purpose of taking the measurements and making the calculations every fix-cycle is *to work out* where the ship is, and so where it is going, which is to say, *its purpose is thereby acquiring knowledge of these facts*. So the Navigation Log entries are known, and are presented as such. So, assuming the measurements and calculations have been properly made, the Head of Navigation knows that p, and that p can be known by anyone, the Captain, say, or some future accident investigator, who inspects the Navigation Log. The Log is a repository of knowledge, and is thereby an example of collective knowledge. Were the *USS Palau* to have an accident that wiped out its crew, the ships passage would still be collectively known, and so could be individually possessed by some accident investigator, *all the while* the notebook was preserved (and was accessible and was recognized for what it is).[11]

Insofar as consultation of his notebook doesn't prompt Otto to recall, his relation to his notebook is comparable to the Captain or accident investigator's relation to the Navigation Logbook. In both cases each consults a repository of knowledge (and one might add: in both cases this repository is the result of an epistemic division of labour).[12] This knowledge is there in Otto's notebook for him to access in the same way that it is there in the Navigation Log for the Captain to access. Only in Otto's case it is knowledge that he has some special relation to. The question is then what this special relation amounts to and what difference it makes.

The first thing to observe about Otto's relation to the entries in his notebook is that, like the Captain's relation to the entries in the Navigation Logbook, it is sufficient to support the acquisition of testimonial knowledge. Were Otto, or the Captain, not to already individually know that p, they could get to know that p through reading this in the notebook or Logbook. The knowledge that is contained in these repositories then becomes a matter of individual belief, and since it is itself knowledge, it could become a matter of individual knowledge as well. Now what it is that is epistemically required for the uptake of testimonially presented knowledge is moot, but Clark and Chalmers' (1998, p. 17) 'trust and glue' conditions present one view: it is enough that Otto "automatically endorses"—one could say 'trusts'—the notebook presentations. It might be argued that trust is not enough. Thus, Carter and Kallestrup (2018, p. 53) argue that Otto needs to rationally endorse the reliability of the notebook. Similarly, Record and Miller (2018) argue that the uptake of knowledge requires responsibility and not mere trust.[13] But given Otto's impoverished memory, it is questionable how he might satisfy these more demanding conditions; so assuming we do allow Otto knowledge of the whereabouts of MoMA, this is a reason for taking trust to be sufficient for knowledge uptake. However, there is also space to argue that Otto could satisfy these more demanding conditions; for example, as Brogaard (2014, p. 48)

observes, it is plausible that Otto is sensitive to the unique feature of his notebook, its particular discolourations, smudges, the ink colours used etc., which mark the notebook as his own. So it is thereby plausible to claim that his acceptance of the notebook entries is based on this recognition. But whatever the requirement proposed for the uptake of testimonially presented knowledge, given the assumption that we do allow Otto knowledge of the whereabouts of MoMA, Otto's relation to his notebook satisfies this requirement. Given that this condition is satisfied, the knowledge contained in Otto's notebook is also something he can individually possess, just as the Captain can similarly know the precise passage of his ship through consulting the Navigation Logbook.

However, second, Otto's relation to his notebook is more special that the Captain's relation to the Navigation Logbook. While it is true that both relations are such as to satisfy any requirement on knowledge uptake, Otto's relation is further characterised by the other three 'trust and glue' conditions, which might appropriately be called the 'glue conditions', and most importantly by the fourth condition that "information in the notebook has been consciously endorsed at some point in the past, and indeed is there as a consequence of this endorsement" (Clark & Chalmers, 1998, p. 17). That is, Otto's knowing that MoMA is on 53rd Street at time t_3, and his knowing this fact when he wrote the entry in his notebook at time t_1, are not two independent cases of knowing, even though there is no recall connecting times t_3 and t_1. This is because Otto's knowledge, gained at t_1, was *preserved as knowledge throughout* this time interval in his notebook. That is, the following are arguably true of this case:

1. At time t_1, Otto knew that p (that MoMA is on 53rd Street, say).
2. At later time t_3, Otto knew that p
3. The knowledge that p was preserved throughout this time interval t_1 to t_3.
4. There is a causal connection between Otto's knowing that p at t_1 and his knowing that p at t_3.
5. This causal connection is appropriate, or non-deviant.

However, taken together claims (1) to (5) would seem to state the conditions on what it is for a subject to remember some fact.[14]

With respect to these claims, (1), (2) and (4) are uncontentious: remembering requires that one's present knowledge that p be a causal consequence of one's past knowing that p. Claim (3) is the idea that knowledge can be preserved through existing independently of the knowing subject, where this follows from the argument given in section one. The issue is claim (5). *If* (5) is allowed, it follows that Otto remembers that p. Thus, Clark and Chalmers' (1998, p. 13) proposal that "the notebook plays for Otto the same role that memory plays for Inga" can be re-imagined as the claim that the causal chain that involves Otto's notebook is non-deviant. Now this claim, which is to say (5), if it is to be plausible at all, is only plausible to the extent that the focus is knowledge rather than belief. And that is because what makes the claim plausible is the fact that we talk about knowledge in an objective way and, so I've argued above, should allow that knowledge can exist outside the boundaries of 'skull and skin'. It can do so because it can exist as product, such as the positional calculations entered in the Navigational Logbook, and also, it is suggested, the entries in Otto's notebook. So it might be proposed: insofar as Otto's notebook is a repository of knowledge that he bears a special relation to, this notebook can 'extend' his knowledge. But what is extended here is not Otto's psychological states. Rather it is Otto's knowledge that is extended, given that his notebook is itself a repository of knowledge considered independently of him. His satisfaction of the 'trust and glue' conditions then determines both that he acquires knowledge on reading notebook entry, and, so is the proposal, that a suitable causal connection exists between this

instance of knowledge uptake and the knowledge he had when he originally wrote the notebook entry.

Thus, the case of Otto and his notebook can present an argument that memory is extended—provided the focus remains remembering, or instances of knowing by way of memory, rather than the psychological relation of recollection. And if one wants to restrict "remembering" to the present realization of past knowledge mediated by memory traces, one could say that Otto has an *extended memory* of p, or *e-remembers* that p, where a subject has an extended memory that p, or e-remembers that p if and only if the subject has access to the information that p, and the access is such that the 'trust and glue' are satisfied.[15] But to claim that Otto remembers where MoMA is—or e-remembers this, if one prefers—is not to suggest, as Clark and Chalmers do, that the objects which can thus 'extend' our memory are the realizers of psychological states. Considering things psychologically, Otto forgets since he has Alzheimer's. Rather, it is to propose that our memories, *qua* knowledge, can exist independently of us, and this independence allows for a causal connection to the past that deserves to be called 'remembering' insofar as it is knowledge sustaining.[16]

4 | OBJECTIVE KNOWLEDGE

Many significant epistemological achievements are collectively produced. Working together as a collective, we get to know things that we could not know alone. Starting from this fact, section one asked what is then required for an individual to know one of these collectively produced results. The right epistemological account, it was proposed, should appeal to the idea of independently existing bodies of justification that our individual beliefs then stand in the right relations to, where these relations are testimonially forged. Talk of independently existing justification might sound odd, but it shouldn't. After all, it is an epistemological common-place to differentiate between the *justification of a proposition* and the *justification of a belief*. For example, consider the familiar case of adultery where a husband believes that his wife is having an affair on the testimony of a "notoriously untrustworthy gossip" (Ginet, 1975, p. 32). The right thing to say about this case, given that the husband has ample evidence of his wife's affair, is that his belief is *unjustified*, because it is based on gossip, but *justifiable*, given the evidence he has. This claim then distinguishes the justification of the husband's belief from the justification the husband has for the proposition believed. To focus on the justification of a proposition is then to consider the relation of this proposition to a body of justification abstract from the question of belief.

That epistemology should study the justification of propositions—focusing on the data and arguments that can be marshalled in their support—rather than the justification of belief is also Popper's (1972) controversial contention. Thus, Popper draws a parallel distinction between *subjective* and *objective* conceptions of knowledge. I do not want to rely too heavily on the details of Popper's conception of objective knowledge, since it has come in for some trenchant criticism.[17] However, at a basic and less controversial level, Popper's distinction between the subjective and objective senses of knowledge can be taken as a distinction between knowledge as a *state* of some subject and knowledge as a *product*. As a state of some subject, knowledge is ordinarily, though not always, taken to entail belief.[18] But as a product, knowledge can be conceived independently of any knowing, or believing, subject. It is a concern with knowledge as a product, for instance, that is demonstrated when we talk about current debates in physics, the state of mathematical theory, or the best explanation of some phenomenon. The focus here is a set of propositions and what justification there is for them. And this is the focus that is

needed if sense is to be made of how individually we know things that have been collectively worked out.

This same focus, section three argued, then makes sense of Clark amd Chalmers' (1998) case of Otto and his notebook. Clark and Chalmers argue that this case shows that belief is extended, and that the entries in Otto's notebook should be considered to be his dispositional beliefs. However, this contention is based on a failure to fully specify what is going on when Otto consults his notebook. Consultation either results in recollection being prompted, in which case the recollection is a dispositional belief but not extended; or Otto confronts the notebook as a piece of testimony and relearns something he knew previously, in which case there is no candidate dispositional belief. However, recognizing the objective sense of knowledge allows us to identify a continuity to these episodes of learning, forgetting, relearning, and forgetting. Knowledge, in the objective sense, persists and given Otto's special relation to this knowledge, as detailed by the 'trust and glue' conditions, it is plausible to claim that the entries in Otto's notebook extend his knowledge. Thus knowledge can be both collective and extended and this is because, as Popper says, knowledge is our creation and in being created enjoys a certain independence from us. To recognise this, entails a shift in epistemological perspective, but this shift does not undermine epistemological individualism.

ENDNOTES

[1] And for argument that collective knowledge can be extended see Tollefsen (2006).

[2] See Hardwig (1985, 1991), and Knorr-Cetina (1999).

[3] Note: the question pursued here is epistemological: how to explain an individual's acquiring knowledge in these core cases? There are also metaphysical questions concerning the nature of collectives, and consideration of these metaphysical questions will supply different reasons for introducing collectives as believers. See Gilbert (1989), List & Pettit (2011), Tollefsen (2007), and Tuomela (2013). But these further questions and other reasons are not the concern here, which is merely this epistemological question.

[4] Thus Burge (1993, n.24, p. 486) notes that testimonial knowledge requires "there must be knowledge in the chain". And in the *Postscript* to this paper, Burge (2013, p. 255) clarifies that "knowledge must reside in the chain of communicators that leads up to a report, if the recipient is to obtain knowledge from the report".

[5] For the individual cases see Lackey (1999) and Graham (2006) respectively. For further discussion see Faulkner (2018) and Wright (2016).

[6] "[A]s far as our conscious awareness is concerned, the tool itself fades into the background, becoming transparent in skilled use", (Clark, 2003, p. 45). See also Pritchard (2018).

[7] The following two ways of elaborating the case are also suggested by Carter & Kallestrup (2016).

[8] Brogaard (2014) argues this possibility is the case: small behavioural differences between Otto and Inga show that he doesn't remember MoMA's address, he "merely remembers where to look to find the information about the location" (Brogaard, 2014, p. 50).

[9] For example, Adams and Aizawa (2010) argue Inga is more likely to recall items recently encountered, not so Otto. Clark (2008) responds that a Martian who didn't exhibit this priming effect would still have dispositional beliefs. Rupert (2004) argues that Inga's non-occurrent beliefs are integrated into her cognitive system. Clark (2010b) responds that: a being whose brain had detachable modules would still have dispositional beliefs. And for further differences see the next footnote.

[10] Here it should be noted the functional equivalence is merely behavioural: both Otto and Inga find their way to MoMA. And this is consistent with many differences. E.g. as observed Inga has introspective access to her memory, whereas Otto does not have such access to his notebook entries. Introspection then names more than a way of accessing information; it plays a justificatory role, see Smithies (2018). And is associated with first person authority, which is something that Otto lacks, see Preston (2010). And Inga's memories are open to blending and interference whereas Otto's notebook entries are not, see Sutton (2012). Moreover, there are also fine-grained behavioural differences, e.g. Otto will need to consult his notebook more than once if getting to MoMA takes longer than the span of his working short term memory, see Brogaard (2014).

[11] Compare Popper's discussions of the place of libraries, see Popper (1967, pp. 107–8).
[12] The division of labour in the notebook case is admittedly minimal, resting on no more than the psychological disconnection created by Otto's Alzheimers. But it is easy to elaborate the case so the epistemic division of labour is more substantial; e.g. at different times Otto notes different facts about MoMA, and at a later time draws these all together.
[13] The options here being just the debate between non-reductive and reductive views over what justified testimonial uptake, see Faulkner (2011).
[14] See Bernecker (2010), and compare Carter & Kallestrup (2016).
[15] Compare Rupert (2004, p. 319)
[16] Farkas (2015) reaches the same conclusion—that knowledge but not belief is extended—from different premises.
[17] See Cohen (1980), Currie (1978) and O'Hear (1980), but see Faulkner (2006).
[18] This entailment being first denied by Radford (1966), and this denial systematically argued by Williamson (2000).

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