

1 Introduction

It's recently been argued that focusing on the lives of women philosophers is counterproductive if our goal is to see them *as philosophers* (Gordon-Roth & Kendrick, 2019). Fortunately, the temptation of biography is easy to resist in the case of Mary Shepherd, who did some excellent philosophy but otherwise had an unremarkable life.¹ What we need to know can be summed up very quickly. Shepherd was born into a well-off Scottish family on December 31, 1777. She was educated at home and became interested in philosophy at a young age. In her twenties, she was involved in the Edinburgh intellectual scene. At thirty she married, changed her name from Mary Primrose to Mary Shepherd, and moved to London. There, she hosted a salon,² published several works of philosophy, and died just after her sixty-ninth birthday.

Shepherd's work had some readership during her lifetime,³ but it never became part of the canon and has come back into the conversation only recently.⁴ Resurgence of interest in Shepherd's work derives from recent efforts to recover the work of early modern women, along with the intrinsic interest of Shepherd's system and its convergences with some work in contemporary metaphysics.⁵

Shepherd published two books, *Essay upon the Relation of Cause and Effect* (*ERCE*) (Shepherd, 1824) and *Essays on the Perception of an External Universe* (*EPEU*) (Shepherd, 1827). The first was published anonymously; the second was published under her own name and listed her on the title page as the author of the *ERCE* as well. Three of her essays appeared in periodicals: "Observations by Lady Mary Shepherd on the 'First Lines of the Human Mind,'" in *Parriana* (Shepherd, 1828a); "On the Causes of Single and Erect Vision," in *The Philosophical Magazine and Kaleidoscope* (Shepherd, 1828b);⁶ and "Lady Mary Shepherd's Metaphysics" (LMSM) in *Fraser's Magazine* (Shepherd, 1832). The *ERCE*, the *EPEU*, and LMSM are reprinted in facsimile in

¹ For more biographical information, see Brandreth (1886) or McRobert (2000a).

² Prominent guests included Charles Babbage, the inventor of two early computers, the Difference Engine and the Analytical Engine; the poets Elizabeth Barrett Browning and Samuel Coleridge; the economists Thomas Malthus and David Ricardo; the scientist and popularizer Mary Somerville; and the philosopher William Whewell (Brandreth, 1886, 4, 188; see also Martineau, 1877, 370–371). Babbage and Whewell in particular were close friends. Some of Shepherd's correspondence with Babbage is available in (McRobert, 2002).

³ See, for example, Blakey (1850) and Fearn (1820) for contemporary discussions of her work.

⁴ Recent work on Shepherd includes Atherton (1996, 2005), Bolton (2011, 2017, 2019), Boyle (2017, 2018, 2020a, 2021), Fantl (2016), Fasko (2021), Folescu (2021), Graham (2017), Landy (2020a, 2020b), LoLordo (2019, 2020), McRobert (1999), Paoletti (2011b), Rickless (2018), Tanner (2022), and Wilson (forthcoming).

⁵ See Fantl (2016) and Wilson (forthcoming).

⁶ This essay is an expanded version of the final essay in the *EPEU*.

McRobert (2000b). McRobert (2000b) also contains two anonymous 1819 works, *Enquiry Respecting the Relation of Cause and Effect* and *A Theory of the Earth*, which she attributes to Shepherd. However, Boyle (2020b) makes a convincing case against Shepherd’s authorship of these works.⁷ In addition, Boyle (2018) contains selections from all of Shepherd’s works, arranged thematically. Complete versions of the *EPEU* and *LMSM* can be found in LoLordo (2020), and Garrett (forthcoming a) will include the *ERCE* and the other short pieces.

The *Essay upon the Relation of Cause and Effect*, which was written in response to an ongoing debate concerning Hume’s theory of causation,⁸ puts forward an original metaphysics and epistemology of causation. It is intended to show that we really do know much of what we ordinarily take ourselves to know. For instance, we really do know that everything that begins to exist has a cause, that like objects have like qualities, and that like causes have like effects.

Shepherd’s goal in the *ERCE* is to explain how we acquire such knowledge. Her defense of human knowledge in this book is aimed primarily at Humeans, and she asserts that her anti-Humean conclusions “are the only true foundations of scientific research, of practical knowledge, and of belief in a creating and presiding Deity” (*ERCE* 194). In other words, Shepherd claims that her theory of causation is the only one that can serve the needs of science, everyday life, and religion. However, as we’ll see in Section 5.3, Shepherd’s theological conclusions are not quite as orthodox as her rhetoric might initially suggest.

I discuss Shepherd’s theory of causation and some of its implications in Section 2, starting in Section 2.1 with the principle that everything that begins to exist must have a cause. In Section 2.2, I consider two implications of this principle: that cause and effect are simultaneous, and that all causation is the union of multiple objects. In Section 2.3, I examine Shepherd’s second main principle of causation, that like causes must have like effects. In Section 2.4, I look at Shepherd’s claim that mathematics, like physics, depends on the principle that like causes have like effects. In fact, she argues, mathematics properly understood is a branch of physics – and both concern necessary truths.

⁷ Jennifer McRobert also suggests that the anonymous 1857 *Philosophy of Theism* is by Shepherd (McRobert, unpublished), but to my knowledge no other scholar has endorsed this.

⁸ Shepherd refers to “a dispute which nearly lost the mathematical chair in one of our universities to the present possessor of it” (*ERCE* 5). She is referring to John Leslie, who endorsed Hume’s theory of causation in passing in his *An Experimental Inquiry Into the Nature and Propagation of Heat* (Leslie, 1804). The dispute continued with interventions from Dugald Stewart (*A Short Statement of some Important Facts relative to the late Election of a Mathematical Professor in the University of Edinburgh* (in vol. 7 of Stewart (1829)) and Thomas Brown (1806, 1835). See Paoletti (2011a) and Bow (2013) for more on the Leslie affair and subsequent debate.

Shepherd's second work, the *EPEU*, is closely related to the *ERCE*. In the Preface to the *EPEU*, she explains that “[t]he conclusions . . . deduced . . . in the former *Essay* are the instruments employed in conducting the argument in this” one (*EPEU* 29/xii), and that “the subjects of the two *Essays* are capable of being considered independently, yet of throwing a mutual light upon each other” (*EPEU* 30/xiv–xv). They are supposed to illuminate each other because Shepherd's account of knowledge of the external world relies on her theory of causation, while at the same time her account of knowledge of the external world yields an account of the nature of the external world that deepens our understanding of causation.

The *EPEU* has two parts. The first part, the *Essay on the Academical or Sceptical Philosophy, as applied by Mr. Hume to the Perception of External Existence*, is aimed at refuting Hume's claim in *Treatise* that reason cannot give rise to belief in the continued, independent existence of external objects.⁹ Shepherd's attempted refutation consists in explaining how reason *can* give rise to that belief. Indeed, she explains, all cognitively normal human beings have in fact arrived at belief in a continued, external, independent world through a process of “latent” reasoning (*EPEU* 37/14). Shepherd's aim is simply to make that reasoning explicit. In so doing, she is writing in opposition not just to Hume but also to Thomas Reid and Dugald Stewart, who claimed that something like natural instinct is what gives rise to our belief in continued, external, independent objects. I discuss Shepherd's account of knowledge of the external world in Section 3.1, the associated theory of vision in Section 3.2, and her account of the limits of our knowledge of the external world in Section 3.3.

Shepherd's argument for the existence of an external world uses as a premise the principle that everything that begins to exist must have a cause. She also uses a pair of structurally similar arguments to show that God exists and to show that a continuing self, independent of its particular sensations, exists. She further claims that, just as all cognitively normal human beings use reasoning to gain knowledge of the existence of a continuing, independent, external world, they use structurally similar reasoning to gain knowledge of the existence of a continuing self.¹⁰

⁹ See *Treatise* 1.4.2 (Hume, 2001). I cite this work by book, part, and section number, as is standard.

¹⁰ It's interesting to note that she does *not* say that all cognitively normal human beings use similar reasoning to know that God exists. I presume this is because she recognizes the existence of atheists. However, it's an interesting question what she thinks the difference is. Does she think that the argument for the existence of God simply does not occur to everyone, while the arguments for the existence of the self and the external world do? If so, why? Alternately, does she think that the argument for the existence of God does not compel belief in the way the arguments for the existence of the self and the external world do? If so, again, why?

I discuss Shepherd's argument for knowledge of a continuing self in Section 4.1, followed by her views on the mind–body relationship (Section 4.2), animal minds and organization (Section 4.3), life after death (Section 4.4), and the individuation of minds (Section 4.5). In Section 5, I discuss Shepherd's account of religion, including her views on miracles and the laws of nature (Section 5.1), as well as the existence of God (Section 5.2) and the nature of divine creation (Section 5.3). In Section 6, I conclude by examining Shepherd's description of her metaphysics as a “modified Berkeleyian theory” – a description that may initially strike readers as strange, given her opposition to idealism, but turns out to be entirely appropriate given the way in which Shepherd's metaphysics makes God the ground of the world.

Shepherd's short works pick up on themes from the *EPEU*, and my discussion of them is intertwined with discussion of those themes. In “On the Causes of Single and Erect Vision” (Shepherd, 1828c), Shepherd attempts to answer two questions that Reid had recently discussed in the *Inquiry* (Reid, 1764). First, since we see with two eyes at once, why don't we see everything double? Second, since objects are “painted” upside down on the retina, why don't we see everything upside down?

Another 1828 piece, “Observations by Lady Mary Shepherd on the ‘First Lines of the Human Mind’” (Shepherd, 1828a), seems to have been in some sense accidental. Shepherd had written a set of brief remarks on the philosopher John Fearn's *First Lines of the Human Mind* (Fearn, 1820). She says that these remarks were intended as a private communication. Nevertheless, Fearn had them published, along with his reply.

The last piece Shepherd published, “Lady Mary Shepherd's Metaphysics,” is a continuation of her debate with John Fearn. It contains a detailed critique of Fearn's views. In addition, it also contains a short overview of her own metaphysics. This overview adds significantly to the *EPEU*, in two ways: it develops the contrast between sentient and insentient nature significantly, and it expands upon the *EPEU*'s brief remarks on unperceived motion and makes them central to the account of matter. Thus, LMSM is crucial for understanding the nature of Shepherd's materialism. Both Shepherd's account of unperceived motion and the differences between LMSM and Shepherd's earlier works deserve further attention in the secondary literature.

2 Causation

Shepherd's views on causation are striking and original. They are the first part of her system that most readers come across. As Wilson (forthcoming) shows, they resonate with contemporary discussions of causation in interesting ways. They play a foundational role in her system. And, because they are framed as a reply

to Hume’s inductive skepticism, they are very easy to integrate into existing courses in early modern philosophy. Perhaps for these reasons, Shepherd’s views on causation have received far more attention in the secondary literature than any other aspect of her philosophy.

Shepherd’s arguments about causation, induction, and necessary connection rely on two principles that have been given the following names in the secondary literature:

The Causal Principle: every thing that begins to exist must have a cause.

For instance, “*there is no object which begins to exist, but must owe its existence to some cause*” (ERCE 36); “*it is a contradiction to suppose things to BEGIN of themselves*” (EPEU 100/170).

The Causal Likeness Principle: like causes must have like effects.

For instance, “*like Causes, must generate like Effects*” (ERCE 194); “*Like effects must have like causes*” (EPEU 71/99). In both principles, the “must” is the must of metaphysical necessity.¹¹

Shepherd insists that both principles can be known on the basis of reason, and indeed that all cognitively normal human beings actually do know them on the basis of reason. In arguing that the Causal Principle and the Causal Likeness Principle are known by reason, she is fighting a war on two different fronts. On one hand, she’s opposing Hume, who held that objects can come into existence without a cause and that belief in the Uniformity Principle – which Shepherd’s Causal Likeness Principle is a version of – derives from the imagination.¹² On the other hand, she’s arguing against Thomas Reid and Dugald Stewart, who held, in opposition to Hume, that similar principles are known by common sense or natural instinct.

2.1 The Causal Principle and How We Know It

The Causal Principle is supposed to play an important role in scientific reasoning as well as everyday reasoning. It is also supposed to be the foundation of our knowledge of the existence of God. This makes it crucial that we understand exactly what the Causal Principle amounts to and what is supposed to justify belief in it. Fortunately, both issues have received a great deal of attention, at least relative to the general state of Shepherd studies.

¹¹ In numerous places, Shepherd insists that even God cannot violate the Causal Likeness Principle. I’ll discuss the implications of this claim, and its relevance for our understanding of laws of nature, in Section 2.4.

¹² Shepherd realizes that Hume only explicitly states that something can come into existence without a cause in the *Treatise*. However, she thinks that he is “tacitly” committed to this in the *Enquiry* as well, since he there denies “*every foundation whatever, for supposing any cause necessary for any effect*” (ERCE 19).

Shepherd insists that “reason, not fancy and ‘custom’, lead us to the knowledge, That everything which begins to exist must have a Cause” (*ERCE* 27). The claim that reason yields knowledge of the Causal Principle suggests that Shepherd owes us a demonstration of the Causal Principle. Her claim that she is refuting Hume also suggests that she owes us a demonstration of the Causal Principle. For if she offers no demonstration of the Causal Principle, isn’t she just begging the question against Hume?

Jeremy Fantl reads Shepherd as giving a *reductio* of the Causal Principle, and there is some textual evidence for this reading. For instance, Shepherd says that

The idea is very soon learned, *that it is a contradiction to suppose things to BEGIN of themselves*; for this idea is occasioned by the impression, (the observation,) that the *beginning* of every thing is but a change of that which is already in existence, and so is not the same idea, (the same quality,) as the *beginning of being*, which is independent of previous being and its changes. The two ideas are therefore *contrary* to each other; and the meanest understanding perceives them to be so, as easily as it perceives that white is not black, &c. Changes therefore require beings already in existence, of which they are the affections or qualities. (*EPEU* 100/170)

On Fantl’s view, the *reductio* fails (Fantl, 2016, 98). He suggests that the argument is supposed to be bolstered by the thesis that causes and effects are synchronous, but this is difficult to accept. Shepherd tells us that the Causal Principle and the synchronicity of cause and effect are related – but the relationship she points out is that the Causal Principle implies that cause and effect are synchronous, not the other way around (*ERCE* 38).

More recently, M. Folescu has argued that Shepherd is not *trying* to provide a conclusive or demonstrative argument for the Causal Principle (Folescu, 2021; see also Bolton, 2017). Rather, Folescu argues, Shepherd is simply trying to get her readers into a position where they can see that it is self-evident, thereby returning them to the epistemic state they were in before reading Hume. Hume had argued that the Causal Principle not only fails to be self-evident, it also fails to be evident in virtue of anything else: “every demonstration, which has been produced for the necessity of a cause, is fallacious and sophistical” (*Treatise* 1.3.3.5). This argument was aimed at John Locke and Samuel Clarke, who used the necessity of a cause as a premise in their versions of the cosmological argument.¹³ Shepherd defends Locke and Clarke, as part of her

¹³ For Locke, see *Essay* 4.10.3 (Locke, 1979). For Clarke, see *A Demonstration of the Being and Attributes of God* §1 (Clarke, 1998, 8).

larger project of defending the cosmological argument.¹⁴ Far from begging the question, she thinks, Locke and Clarke saw that the Causal Principle is self-evident. Denying it is “too ridiculous . . . to consider formally”: “the mind of man” is “forced to look upon all things which begin to exist as *dependent* QUALITIES” (*ERCE* 37). Despite Hume, we simply cannot help believing the Causal Principle. And in addition, we are entitled to believe the Causal Principle.

Thus Folescu (2021) characterizes the Causal Principle as “basic, foundational and, more importantly, self-evident and thus justified in other ways than by demonstration” – namely, “via intuition” (Folescu, 2021, 2). Nevertheless, Folescu argues, reasoning about the Causal Principle and other self-evident truths “can help their self-evidence shine through” (Folescu, 2021, 2). Such reasoning includes “providing indirect, non-justificatory proofs; providing extrinsic reasons for adopting them (for instance, assessing their fruitfulness for expanding a science); and assessing their relations to other foundational non-provable principles” (Folescu, 2021, 2).

Some textual evidence supports reading the Causal Principle as self-evident, in the sense of being known by intuition. Shepherd says that perceptions must have a cause distinct from themselves, for “otherwise they would each in their turn ‘BEGIN their own existences’ . . . which . . . is . . . an intuitive contradiction” (*EPEU* 37/14). She may have something like the Lockean sense of intuition in mind here. (It’s worth emphasizing that Locke is the only one of her predecessors she ever explicitly allies herself with.¹⁵) For Locke, “Intuition . . . is the clearest, and most certain [kind of Knowledge], that humane Frailty is capable of” (*Essay* 4.2.1; Locke, 1979).

It’s helpful to see how this reading situates Shepherd in relation to Hume and Reid. How we see the dialectic here depends largely on where we think the burden of proof lies. In the face of a broad consensus that the Causal Principle or something like it is self-evident, Hume argued that any such principle requires demonstration. His argument for this relied on the Separability Principle as a premise.¹⁶

The Separability Principle is a key part of Hume’s overarching theory of cognition. Now, as Bolton (2019) and Landy (2020a) argue, Shepherd does not accept either the Separability Principle or the larger theory of cognition it is part of.¹⁷ Thus, she does not feel the need to engage with the details of Hume’s argument against

¹⁴ We’ll see in Section 5.3 that Shepherd’s version of the cosmological argument has some surprising implications, due to her unorthodox understanding of the relationship between cause and effect.

¹⁵ LoLordo (2019, 9).

¹⁶ That is, the principle that the “separation . . . of the idea of a cause, from that of a beginning of existence, is plainly possible for the imagination, and consequently the *actual* separation of these objects . . . implies no contradiction” (*Treatise* 1.3.3.3).

¹⁷ Shepherd’s own theory of cognition – which is presented in fragments but seems to me to constitute a systematic whole – deserves further attention in the secondary literature.

reasoned knowledge of the Causal Principle. The dialectic is best understood not as Shepherd begging the question against Hume, but as Shepherd and Hume offering two competing theories of cognition. The choice between them should be made holistically, on the grounds of empirical adequacy and explanatory success (Bolton, 2019).

This eliminates the worry that Shepherd is begging the question. It also enables us to grasp an important point about Shepherd's goals and methodology. Throughout the *ERCE* and in the early chapters of the *EPEU*, Shepherd presents her view as a point-by-point refutation of Hume. However, this presentation is misleading. Ultimately, Shepherd is not trying to engage with Hume on his own terms. Rather, she is trying to provide a better alternative – a metaphysics and epistemology that fits the way the world is and the epistemic needs of science, religion, and everyday life.

One might worry that if Shepherd understands the Causal Principle as a self-evident truth, she is very close to Reid. But Shepherd takes herself to be an *opponent* of Reid! However, Folescu (2021) makes a strong case that Shepherd simply misunderstands the status Reid assigns to the Causal Principle and other deliverances of “common sense.” If so, Shepherd is in good company: most of Reid's early readers misunderstood him in precisely this way, thinking of common sense as opposed to reason rather than constitutive of it. In fact, Reid's principles of common sense, properly understood, are not merely things we cannot help believing but things we are entitled to believe, things we count as rational in virtue of believing. According to what I see as the emerging consensus, this is precisely the status Shepherd assigns to the Causal Principle.

2.2 Cause and Effect are Simultaneous and All Causation is the Union of Multiple Objects

The Causal Principle has a number of important implications. Here, I'll discuss what I see as the two most important. First, the Causal Principle is supposed to imply that all causation requires the union of multiple objects: “The junction of two or more qualities or objects is wanted to every new creation of a new quality” (*ERCE* 187). Shepherd does not explain why the Causal Principle implies that all causation requires the union of multiple objects, but one way to see how it works is by *reductio*. Assume that a single cause can bring about an effect without mixing with anything else. Then at any given moment of its existence, it should already have brought about its effect. But this is absurd, since things that exist now can be causes of later effects.

Second, the Causal Principle is supposed to imply that cause and effect are synchronous (*ERCE* 38).¹⁸ Shepherd insists that “although an object, in order to act as a Cause, must be in Being antecedently to such action; yet when it *acts as a Cause*, its *Effects* are *synchronous with that action*” (*ERCE* 49–50). Again, a *reductio* is helpful. Assume that two objects are mixed and that the effect is held in suspense for some period of time. Why didn’t the effect come into existence immediately, at the same moment the cause came into existence? There must, Shepherd thinks, be some further cause that explains why the effect came into existence when it did and not a moment later or a moment earlier.

The basic picture here is that causation is mixture. Contra Hume and his Separability Principle, cause and effect are not distinct entities. Rather, the “*union*” of two objects “is the proximate Cause of, and is *one* with the Effect” (*ERCE* 187). For instance, “the *union of Fire and Wood*” causes – in other words, constitutes – “combustion” (*ERCE* 57). The union of fire and flesh burns the child, that is, constitutes a burn (*EPEU* 160/317–318). The union of bread and digestive system nourishes us, that is, constitutes nourishment (*EPEU* 81/125).

I say that for Shepherd, cause and effect are not distinct entities. At certain points, Shepherd makes a stronger claim: “Cause and Effect . . . are but different words for the same *Essence*” (*ERCE* 57), “the proximate Cause . . . is *one* with the Effect” (*ERCE* 187). Some scholars thus read Shepherd as thinking that cause and effect are truly identical. Some evidence for this reading is provided by Shepherd’s characterization of causation as multiplication: “To represent the relation of cause and effect, as, *A followed by B* is a *false* view of the matter; cause and effect might be represented rather, as $A \cdot B = C$, therefore *C* is *included* in the *mixture* of the objects called *cause*” (*EPEU* 146/281).

However, there are also good reasons to deny that Shepherd thinks that cause and effect are identical. The claim that cause and effect are identical is stronger than Shepherd needs, and indeed so strong that it causes serious problems for Shepherd. As we’ll see in Section 5.3, Shepherd thinks that God is the cause of the world. However, given her clear opposition to atheism, I think it is unlikely that she would be willing to accept the Spinozistic conclusion that God and the world are *identical*. Moreover, as we’ll see in Section 4.4, Shepherd thinks that it is epistemically possible for the mind to be united with something other than an organic body to produce the conscious self. In other words, she is committed to the possibility of one and the same effect – the conscious self whose immortality we care about – having two different causes, the mixture of mind

¹⁸ See Landy (2020a) for an account of why this does not imply that everything happens at the same time, as opponents of simultaneous causation tend to suggest.

with a persisting organic body or the mixture of mind with some other kind of body. Again, this seems to rule out any commitment to the identity of cause and effect. Instead, Shepherd must think that effects bear some slightly weaker atemporal dependence relation to their causes.

While some scholars read Shepherd as holding that cause and effect are identical, others ascribe to her a somewhat weaker view. Martha Bolton says that for Shepherd, causation is a compositional determination relation (Bolton, 2011, §2.1). Ariel Melamedoff describes it as a form of metaphysical emergence, where the base properties are the cause and the emergent properties are the effect (Melamedoff, n.d.). One could also think of causation as a kind of grounding relation. For although contemporary philosophers tend to think of grounding as constitutive as opposed to causal (Bliss & Trogdon, 2021), for Shepherd causal relations *are* constitutive. All these ways of speaking fit well with the way in which Shepherd tends to equate effects and qualities, and they all distinguish cause and effect in some way without making them into completely distinct entities.

I am not sure it's all that useful for us to pick a dependence relation from contemporary metaphysics and try to assimilate Shepherd's notion of causation to it. But these suggestions are helpful if understood as ways of emphasizing that for Shepherd, effects depend on causes and not vice versa, in the sense that effects are *less fundamental* than their causes. Although cause and effect exist at the same time, the relationship is not symmetric. The union of fire and wood explains why there's combustion, but combustion doesn't explain why there's a union of fire and wood.

2.3 The Causal Likeness Principle

Perhaps the most important implication of the Causal Principle is the Causal Likeness Principle: like causes must have like effects.¹⁹ Shepherd argues for this principle on the grounds that if like causes did not have like effects, there would be a “difference of existence,” and such “DIFFERENCES OF EXISTENCE cannot begin of themselves” (ERCE 49). For a “*difference* is an *Effect*, a *change of being*, an *altered existence*, an existence which *cannot ‘begin of itself’* any more than any other in Nature” (ERCE 48). The reasoning here might require some spelling out. Assume for the sake of *reductio* that two like causes, A and B, have unlike effects, C and D. Assume also that A is the “one whole cause” of C and B is the whole cause of D.²⁰ Given the Causal Principle and the claim that it

¹⁹ Keota Fields reads this as a biconditional: like causes must have like effects, and like effects must have like causes (Fields, forthcoming). He takes this to follow from the fact that cause and effect are “one.”

²⁰ Shepherd explains that “any *one* of the qualities or objects needful in order to the formation of another, may be termed a *Cause*” and that the “*whole* number of objects existing, which are necessary to it, may . . . be deemed the *one whole cause*” (ERCE 187).