

(Australasian Journal of Philosophy, 84,2006,179-89)

Relations between Universals, or Divine Laws?

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David Armstrong has developed and refined his theory of laws of nature as relations between universals in many writings in the course of nearly thirty years¹. The basic idea of the theory seems initially to be a very natural and plausible way of explaining the causal regularities of nature. It is however - I shall argue - ultimately unsatisfactory because it fails to give an adequate account of causation; and a better account of causation opens the way to two very different explanations of the regularities of nature - a possible one of a familiar scientific kind, and/or a more probable one involving divine agency.

I

The world is a regular place; states of affairs follow each other almost all the time in regular ways - both at the observable level, and at the fundamental level (the latter regularities explaining the former ones). When I let go of a stone, it falls to the ground; when I let go of it again, it falls to the ground again. Approximately half of one block of Carbon-14 will decay in 5730 years, and so will approximately half of another block. We can observe such regularities, and so infer how things will behave in future.

One philosophical reaction to this is - that's just how it is; it cannot be explained further. By means of such words as 'cause' and 'law of nature' we can describe these regularities in a systematic way. But these words do not designate features of reality beyond the regularities by means of which we can explain the regularities. The world consists of 'a vast mosaic of local matters of particular fact', 'an arrangement of qualities. All else supervenes on that'; claims David Lewis [1986: ix-x] stating his programme of 'Humean supervenience'.

But if many things all have the same characteristics, and thereby we can infer something about what will happen in future if we interfere with the world and what will happen if we don't, we should try if we can to explain all this. If all the coins found in a deposit have the same markings, we look for an explanation. A probable explanation is that they were formed from the same mould, and that leads us reasonably to expect that we may

well find the mould and/or further coins with those markings. We should have the same reaction to the regularities of nature. The explanation provided by the Greeks and medievals for the regularities of nature was that individual substances have powers to cause certain effects and liabilities to exercise them under certain conditions. This explanation has been revived and given full and plausible exposition by Harré and Madden [1975] , and most recently by Brian Ellis [2001]. On this view an individual stone has the power to fall to the ground, and the liability to exercise that power (that is , to cause itself to fall) when separated from the ground merely by air. Because its powers belong to its essence, that explains why it will do the same thing again and again. This explanation is fine as the explanation for the behaviour of a particular stone; but we still need an explanation for why all other stones do the same thing. The answer to that cannot be the simple answer, we now realize, that all stones have the same powers. Since Newton we now realize that a stone of 5 kilograms has the power to attract each other body of mass m with a force $\frac{G5m}{r^2}$, while a stone of 10 kilograms attracts each other mass m with a force $\frac{G10m}{r^2}$

The gravitational power of each substance is functionally correlated with another property of that substance, its mass in the sense of its inertial mass. (The latter can be measured in ways other than by the gravitational attraction exerted by the substance; it can be measured for example by the momentum it imparts to other substances when it collides with them.) So there is reason to assert that something apart from an individual substance determines how the properties of a substance (including its powers) can be bound together. The scientists of the sixteenth and seventeenth centuries thought that God was responsible for such functional correlations, and so talked naturally of him laying down laws determining the correlations; a bit of a metaphor, yes - since 'laws' in the normal sense laid down by a Sovereign are capable of being obeyed or not obeyed by subjects; but not too much of a metaphor, since most legal laws are obeyed much of the time, and there is-these scientists claimed - a Sovereign who intentionally determines the regularities of nature; natural 'laws' are simply ones which cannot be broken because inanimate things have no will to choose to conform or not to conform to them. And then scientists who did not believe in God, but still thought that something of a general non-substance-like character determined these functional correlations

and wanted to do their science using the same vocabulary as theistic scientists, made do with the notion of a law issued by no one which determines how properties fit together.

Once we seek a law determining how substances behave, there is no need to attribute causal powers to the substances themselves; the causal power can be located in the law. The law determines only how properties (that is, universals), of kinds which do not involve causal powers are bound together. The relation must be one of non-logical necessity between universals; and so we reach Armstrong's theory. Since Armstrong holds that there are no uninstantiated universals, the determinate laws will relate actual values of universals possessed by individual substances (determinates), and a functional law will relate actual determinables to each other. ('A functional law is a law that determines and unifies the determinate laws' - Armstrong [1997:243].) Thus let P be the monadic property of having an inertial mass and Q be the relation to each substance in the universe of having the latter accelerate towards it with an acceleration of m/r^2 (where m is its mass, and r is the distance away of the latter). The determinable universals P and Q are related by the relation N (P,Q); in consequence of which each determinate Pm' of P (when m' is a particular value of the mass of some substance) is related to each determinate Qmm'/r^2 of Q (where r is the distance away from the former of each substance of mass m) In this way Armstrong gives an initially plausible explanation of the correlations between the properties of different substances.

These are of course problems about the details of Armstrong's account - in particular ought it not to allow for uninstantiated universals?² But there is a far more serious problem about whether it can give an adequate account of all cases of causation; for, like Hume's account of laws of nature, it was designed to provide one. Armstrong allows that we gain our idea our of causality directly from , 'perception of forces acting on our bodies or our body exerting force on things, and perhaps also introspective awareness of the successful application of the will'. These are cases of singular causation, the causation on particular occasions of individual effects. 'The way is then at least open', he writes 'to postulate singular causation in cases where it is not directly perceived, for instance, the will of others and forces in inanimate nature.' [1997:216-7]. 'Singular causation', he holds, 'is regular in its

operation so that, at the level of types, the maxim same “same cause, same effect” holds good at least in general.’ But doubting whether this is just a brute fact, he takes it further by endorsing the view that singular causation is ‘identical with’ the instantiation of some ‘strong law’ or laws (and ‘strong law’ turns out to mean Armstrong-type law). This is a necessary a posteriori truth, he suggests [1997:218].

Now laws relate properties, and so singular causation will consist in the instantiation of one (value of a) property necessitating the instantiation of (a value of) another property. Causation, that is, relates states of affairs (or events, as others call them). In ordinary language we oscillate between saying that substances cause states, and saying that states cause states; we may say that the brick caused the window to break, or that the fast motion of the brick caused the window to break. But Armstrong is committed to all singular causation being fundamentally of the latter kind; all statements of the former kind are reducible to statements of the latter kind. I now argue that the intentional actions of agents (what Armstrong calls ‘the successful application of the will’) cannot be analysed in this way.

By an intentional action I mean one which a person (or other animate being) does because he means to do it. I use ‘try’ in a wider sense than the normal one. Normally one only speaks of someone trying to do an action if it is difficult to do, or if they fail to do it. We only speak of me ‘trying’ to move my hand or give a lecture, if it was difficult for me or I did not succeed. But to my mind clearly an agent’s intentional contribution to a successful action is just the same as his contribution to an unsuccessful action when the lack of success is due to contingencies out of his control.³ When I move my hand without difficulty and when I try to move it but find I am paralysed, what I contribute intentionally (i.e. meaning to do so) is the same. I shall therefore use ‘trying’ for this intentional contribution of the agent to an action, both when the action is performed easily and when it is performed with difficulty and when contingencies outside the agent’s control prevent it from being performed at all.

I now add the concept of a causally basic action.⁴ What I mean by an action α being causally more basic than an action β is this: the agent does α , α causes ϵ (via some process independent of the agent), and doing β consists in bringing about ϵ . So I do β by doing α , and then α is causally more basic than β . Plausibly when I kill you by pulling the trigger, pulling

the trigger causes a bullet to leave the gun, enter you, and cause your death: killing is causing death. Pulling the trigger is causally more basic than killing. I open the door by grasping it with my hand and pulling it towards me: pulling it causes it to be open; opening the door is causing it to be open. Pulling the door is more basic than opening it. And so on. An action than which no action is causally more basic is a causally basic action *simpliciter*.

Our understanding of ourselves as trying to move a bodily part (normally) just is an understanding of ourselves as performing a causally basic action. Trying to move my hand is an intentional action - I mean to do it. Yet I do not (normally) do it by doing any more (causally) basic action which causes it to be the case that I try. But by trying to move my hand, I cause the motion of my hand; and I try in order to cause that motion. Moving a part of one's body is typically, after trying, the next causally more basic action which humans do. Of course the process by which my trying causes the motion of my hand, a nerve impulse transmitted down my arm, needs to happen in order that my trying may be efficacious. But once I have tried, whether the nerve impulse which my trying initiates reaches my hand is not under my control; and bringing it about is not (normally) an intentional action. There is (normally) nothing causally more basic than moving one's hand except trying to move one's hand. There are exceptions to this pattern - one may sometimes move one part of one's body by moving another part, as when one moves a paralysed hand by grasping it with the other hand and moving that. And there are actions which one can do by trying that do not involve intentionally moving a bodily part - as when one forms a mental image. But the normal story for humans is that one tries to move a bodily part, and thereby moves that part, and thereby effects changes in the world outside one's body. And there is no other way to achieve any result except to try.

Now to try to do α is to do whatever one believes will make success -i.e. doing α , which will consist in the occurrence of some state γ , more probable than it would otherwise be. It makes the occurrence of γ - the agent believes - logically more probable, given his beliefs about what the external world is like before the trying, because - he believes - he is changing features of that world in such a way as to ensure that γ will occur under more possible conditions of that world than it would before the trying. Often there is a recipe for

success, in that there are one or more simpler actions than doing α , doing which will make success more probable than it would otherwise be. For any long-term or complicated action will involve following what the subject believes to be such a recipe. A recipe for passing some exam would be, say, reading books, taking notes, going to lectures. The reason for this is that, given one's beliefs about examiners and the range of questions which they normally set, if one reads books, takes notes and goes to lectures, one will be able to answer far more of the possible questions which they could set than one would otherwise be able to do. Doing these things puts one in a position where, given one's beliefs about examiners, it is logically more probable that one will pass the exam. And so, since all one can do is to try, trying to pass the exam will consist in trying to read books, trying to take notes, and trying to go to lectures. The former trying consists in the latter tryings. And there are recipes for performing the latter actions. To try to go to lectures you need to try to get out of bed in the mornings, get on the bus and so on. But in the end there are simple tryings to do actions, for which there is no recipe to be followed; and these tryings are normally tryings to perform bodily movements. For such tryings, which I shall in future call just basic tryings, there is no recipe. You just try.

Now it is an a priori presupposition of acting at all that basic tryings are in general causally influential, that is will change the world in such a way as to make the relevant bodily movement (or whatever) more likely to occur in the above sense. We could not try to do any action unless we believed that our trying was causally influential, although not necessarily in the end effective (because other partial causes necessary for the effect are not in the right state - e.g. the examiners set untypical questions, or I am ill on the day of the exam, so that my trying to pass it does not bring it about that I pass.) I could not try to lift a weight unless I believed that what I was doing was making some difference to whether or not the weight would be likely to rise into the air. And the same goes for basic tryings, where there is no recipe. I could not try to move the hand grasping the weight unless I believed that what I was doing was making it more likely that the hand would rise - even if in fact my nerves were not in the right condition for my trying to move my hand to cause my hand to move. And in order to believe of any trying that it is making a difference, I have to believe it of the basic

tryings by means of which I try to do other things.

It is logically possible that we are mistaken in supposing that our basic tryings are causally influential - maybe they are mere epiphenomena of what is happening in our brains and make no difference to what is happening. But if we believed that, there would be nothing we could do that would constitute trying; and so we would cease to try and so to act. And it is massively implausible to suppose that our basic tryings have no causal influence. My hand which is grasping the weight is more likely to rise above the ground if I try to move it than if I don't. Yet since our basic tryings do not consist in performing any other intentional action, that is bringing about some intermediate state of affairs, we must regard such trying simply as intentionally exerting causal influence. To try basically is to pull the causal levers themselves, not to do something else which in turn pulls the causal levers. When agents try, that does not consist in their being in a state which makes them liable to exert their causal power; their trying *is* their (intentionally) exerting causal power, and so, given the necessary co-operation of other causes, causing the intended effect.

Now I am not ruling out the possibility that we are caused (e.g. by brain states) to act as we do (though I don't actually believe that that is always so). But what happens if a brain state which is not identical with a mental state causes me to try to move my hand is that the brain state causes me to exert causal influence, and so - given the necessary cooperation of other causes - causes me to cause my hand to move. What doesn't happen in such a case is that the brain state directly exerts such causal influence as - with the necessary cooperation of other causes - causes my hand to move. For if that happened, my will would not be involved at all. You might suggest that what happens is that the brain state causes (or is identical with) the instantiation in me of some mental state; and it is the instantiation of that mental state which causes the hand motion. But then is the mental state a passive state (something that happens to me), such as my having a desire (or a belief, or both)? Having the desire or other passive state will not be enough for the occurrence of an intentional action. I can have the desire to move my arm without moving my arm. I may for good reason resist that desire. Or the desire can cause my arm to move, without me choosing to allow it to do so. The alternative is that the instantiated mental state is an active state, that is one which consists in

my doing something. But then doing is causing and we are back with me causing as something irreducible further; and laws of nature are not needed for the occurrence of causation. Intentional causation is a substance causing, not a state of a substance causing.

In considering in his later writings concerned with laws of nature, cases where we may non-inferentially perceive or be aware of singular causation, Armstrong mentions the possibility of us having 'introspective awareness of the successful application of the will', but he concentrates on the cases of 'forces acting on our bodies or our body exerting force on things'[1997:216-7]. This concentration had the unfortunate consequence that he examined in detail there only cases which can with some plausibility be reduced to causation by states of affairs, and not the one case that cannot be so reduced.

We can take account of such intentional causation in our metaphysical system in one of two possible ways. We can say that there are two radically different kinds of causation - one (intentional) by substances, and one (non-intentional) by states of affairs, claiming that the latter alone consists in the instantiation of a necessary connection between universals;

OR we can say that all causation is by substances - intentional causation by intentional agents, and non-intentional causation by inanimate objects; the former power being exercised by choice, the latter in virtue of unchosen liabilities (to exert causal power under certain circumstances). The latter (the non-intentional causation) would then be an instance of a regularity in nature, but not a regularity of the instantiation of one property being followed by the instantiation of another property in virtue of a causal law, but a regularity of many substances all having the same causal powers and liabilities and so behaving in the same way in the same situations. Then in all cases the causality is exerted by a substance; laws play no role. This account gives a more unified account of causation than does the other one; and so is simpler and therefore more probably correct.

III

But analysing causation in terms of the powers and liabilities of substances does leave us back again without an explanation of the functional regularities in nature. This fuller analysis of causation in terms of substances exercising their causal powers does however point towards two possible explanations of those regularities, of which the first looks rather

improbable unless it is backed up by the second.

We can explain a substance having the powers and liabilities it does because it was produced by another substance exercising (in virtue of some liability to do so) its power to produce a substance with just those powers and liabilities. If a proton is produced (together with an electron and a neutrino) by the decay of a neutron, then the proton's powers and liabilities are caused by the neutron, in virtue of its powers and liabilities. So maybe all actual substances with their powers and liabilities (correlated with each other in the functional way described) are caused to exist (directly or indirectly) by one first substance in virtue of its powers and liabilities. There are two versions of this view, according to whether the causation is non-intentional or intentional. On the non-intentional version at the first instant of the universe's history there was a point-like substance endowed with the power to produce other substances. There are various different ways in which this version could then proceed in such a way that this original substance directly or indirectly caused our whole universe of fundamental particles. Here is one way. The original substance had the power to decay into a few trillion substances with the same powers and liabilities as each other and the liability to exercise that power at some time or other. Each of the resultant substances had the power to decay into 10^{1000} particles of the kinds with which we are familiar in the proportions in which they occur in our universe and the liability to do so within a short finite time, Thus it would be built into the powers and liabilities of the original substance that the universe would evolve into this present state. Maybe this is the story of the first 10^{47} sees after the Big Bang of 15 billion years ago; or maybe it all happened over a much longer time. However, as one eminent physicist pointed out to me, there is at present no serious theory of physics along these lines. And such a theory does seem to presuppose that the universe had a beginning.

Such a theory would provide a logically possible answer to the question of why are there these the regularities there are. But it raises the further question of why, if the Universe began from a point-like substance, it should begin from one with these very special characteristics, that it has the power and liability indirectly to bestow on all substances correlated powers (e.g. the power to ensure that their power of gravitational attraction is proportional to their inertial mass, and that they have an additional power to attract positively

charged substances proportional to their negative charge). And there is the further question of why the original substance had not just these characteristics, but the power and liability to exercise the power to produce initially only such substances as would eventually produce only very few kinds of fundamental particles which would later combine to form larger substances which behave in very simple and (98% of the time) predictable ways graspable by beings of very limited intelligence such as humans; and why the process of producing the fundamental particles and liabilities to exercise these was such as eventually to produce humans. If there are to be creatures such as ourselves who have the kind of life which we do, not merely must be the regularities of the world be such as to cause us to exist, but they must be such as we can grasp and so manipulate. To be able to develop an agriculture, we need to be able readily to observe that sowing and watering seeds produces edible plants. To be able to light a fire, we need to be able to observe that rubbing sticks together or striking a flint will produce one. And so on.

If the universe began from an unextended point-substance, the simplest kind of such point-substance (and so the one a priori more probable) would be one such that it had no power to produce other substances. If it did have such power, it might with equal probability have the power to produce only a few such substances, maybe all with different powers from each other; but it would be a priori very improbable that it would generate substances and only substances with generative power of their own of a kind such as to lead to a universe with the characteristics just described. All of this leads us to look for a substance of a kind whose very nature without complicated ad hoc additions might lead us to expect a development of the sort described. A person acting intentionally would be just such a substance. Persons are beings with powers (to act intentionally), beliefs about the world (largely true, else they would not survive), and some degree of freedom (to choose independently of non-rational causal influences), who exist for a period of time. They act that is in part for reasons; they do things in part in so far as they believe it good to do them. And a being with the power and knowledge to produce a universe would be very powerful and knowledgeable and so - with some considerable probability - might be expected to have enough knowledge of what is good and freedom to pursue it so as create good things; and we

humans are very good things. The very nature of a personal creator means that we might expect him to bring about a universe of this kind; we don't need to postulate an original inanimate substance and then endow it in an ad hoc way with just the right powers and liabilities to produce a universe like ours.

I will end by giving very briefly reasons which I have developed over many years and at great length elsewhere, (e.g. my [2004]) for supposing that the a priori most probable personal creator is a God of the traditional kind - omnipotent, omniscient, perfectly free, and everlasting; perfectly free in the sense that nothing non-rational in any way influences him to do what he does. (Rational considerations alone influence him.) A person, to repeat, is a being with some power, true belief, and freedom, who exists for a period of time. God is the simplest kind of person, in that he has infinite degrees of these properties, that is has these properties with zero limits to their degree. Scientists have always seen as the simplest and so a priori most probable among hypotheses equally successful in rendering the data probable, hypotheses which attribute an infinite degree to some quality rather than some large finite degree . For example a hypothesis that the gravitational force is propagated with some very large finite velocity - e.g. 500,000 km/sec - would have rendered Newton's data just as probable as the hypothesis that it is propagated with infinite velocity. But Newton (implicitly or explicitly) clearly thought that the hypothesis of infinite velocity was intrinsically more probable, and this is because the notion of infinite velocity is a notion of zero limits to velocity which is simpler than the notion of a particular large finite velocity. So the simplest and a priori most probable kind of creator is one to whose power, true belief, freedom and length of life there are no limits. Such a God would not merely have begun the process of creation and then left it alone; he would always be there to sustain the universe in existence. (And he would not need to have begun the process. He could have been sustaining it in existence throughout everlasting time by conserving for ever the powers of substances to produce other substances.)

An everlasting omniscient and perfectly free being will be perfectly good. For being omniscient, he will know which actions are good. A good action is one which there is a reason to do. Being perfectly free, he will be subject to no irrational influences and so do only

what he believes to be good, and having true beliefs will only do what is in fact good . So God will inevitably produce the best of all possible worlds (if there is one), or one of the equal best possible worlds (if there are such), or - if for every possible world, there is a better - a good possible world. There is no best or equal best possible world because for each good possible world, good in virtue of containing (a finite or infinite number of) items of various kinds (e.g. angels or planets), exemplifying a certain kind of goodness, there is a better world containing more such items. (There is no sense to a totality of all possible animate beings.) But plausibly, if there is a best kind of world or an equal best kind of world (even if not a best or equal best of that kind), God in virtue of his perfect goodness will produce such a world. It is plausible to suppose that God himself (or perhaps God as a Trinity) exemplifies all the possible kinds of goodness - except one kind. Angels would be conscious, so is God. Plants are beautiful, so too is God. But if there are a finite number of kinds of goodness not exemplified by God, God will inevitably produce a world containing such kinds. This argument holds only for kinds of goodness whose exemplification does not (probably) bring with it a kind of badness; if the goodness does (probably) bring about badness , God must weigh the good against the bad and only bring about the good in so far as the expected outcome is not negative (not more bad than good). However there is one kind of goodness which God himself does not exemplify- the libertarian freedom to make significant choices between good and evil (libertarian freedom being freedom to choose independently of causal influences). If the exemplification of this kind of goodness had no bad aspects, God would inevitably create beings with such freedom. But of course it does have bad aspects. Hence my inclination is to suggest that a world containing God alone and a world containing both God and creatures with freedom to make significant choices between good and evil are worlds of equal best kinds; and so there is a probability of $\frac{1}{2}$ that God will create such creatures; and if we have freedom of a libertarian kind (as it seems to us when we make choices, and as Quantum Theory mildly suggests) we humans are such creatures.

Of course my figure of $\frac{1}{2}$ for the probability that God would create creatures like ourselves is an extremely arbitrary one - for the purpose of my argument it does not matter if the true value is $\frac{1}{10}$ or $\frac{9}{10}$. My basic point in this paper is that there is a reason why a

personal creator should make creatures like ourselves and so a universe with regularities which we can grasp and manipulate - it's a good thing to do so; and, qua person, everyone has some inclination to promote the good (even if a non-divine person is not perfectly knowledgeable or rational, and so does not always promote the good). But there is no reason why an original inanimate substance should be productive of regularities rather than of irregularities, or of anything at all - let alone the kind of regularities which pervade our universe. So when we seek to explain the pattern of regularities in the world by their having some common personal creator, the most probable kind of such a creator being a God, we postulate a far more probable stopping point for the explanatory regress than does an inanimate substance. Such a creator might create humans with the kind of world in which they live at its very beginning, or he might create a very much simpler world at the beginning which is such that it is programmed to produce humans in the course of time. One way in which he might do the latter is to produce an original inanimate point-substance which had the properties requisite to produce (in the way described earlier) our universe in the course of time. Or, as I have noted above, the universe might have had no beginning; and a creator might act by sustaining in every substance at each moment of beginningless time such powers and liabilities that at some moment humans will evolve⁵.

An explanation in terms of the agency of God has the unique property of being such that if it is true, it cannot itself be explained further. There could not be a more ultimate cause of the existence of an everlasting omnipotent being; for if there is such a being any causes can operate only because he allows them to operate, and so the power of any other cause would depend on him. And if it is God who produces the fundamental regularities of nature, those regularities are indeed laws, divine laws.

NOTES

1. He first stated his theory in sections of Armstrong [1978], and developed it fully in Armstrong [1983]. And of course similar theories were proposed independently by F.I. Dretske [1977] and Michael Tooley [1977].

2. It seems possible that there should be in our universe laws about how substances which had certain properties which were in fact never instantiated would behave if they had those properties, and so - on an Armstrong-type theory, connections between uninstantiated universals. Tooley [1977:669] argues for this and so for connections between Platonic rather than Aristotelian universals.

3. This is also Armstrong's view, well argued in Armstrong [1980:68-73].

4. The two influential modern writers who have introduced and developed a distinction between basic and non-basic (or mediated) actions are A.C. Danto [1965] and R.M. Chisholm [1964]. The words 'basic' and 'mediated' are Danto's; Chisholm contrasts making things happen 'directly' and 'indirectly'. Annette Baier [1971] pointed out that these authors make slightly different distinctions from each other and that there are also many other similar ways of making a distinction which might be confused with theirs. She calls Danto's sense of 'basic', 'causally basic', and Chisholm's sense, 'instrumentally basic'. My account of the causally basic is roughly that of Danto.

1. 5. John Foster [2004] doubts the intelligibility of Armstrong's account of laws of nature - 'we can no more understand how a law could turn out to be a relationship between numbers, or, for that matter between garden gnomes' (p. 110). But we do need, he claims, to explain the regularities of nature, and to do so, he claims for reasons similar to mine, we must postulate God as their cause. We can however still think of these regularities as laws if we think of God as imposing these regularities on objects 'as regularities' (p. 165); that is creating the universe in its initial state and imposing on it these modes of transition, laws, which in turn will give to our present substances their dispositions to act in certain ways.

REFERENCES

- Armstrong, D.M. 1978. *Universals and Scientific Realism*, Cambridge: Cambridge University Press.
- Armstrong, D.M. 1980. Acting and trying in *The Nature of Mind and Other Essays*. St Lucia, Queensland: University of Queensland Press.
- Armstrong, D.M., 1983. *What is a Law of Nature?* Cambridge: Cambridge University Press.
- Armstrong, D.M. 1997. *A World of States of Affairs*. Cambridge: Cambridge University Press.
- Baier, Annette, 1971. The Search for Basic Actions, *American Philosophical Quarterly*, 8: 161-70.
- Chisholm, R.M. 1964. The Descriptive Element in the Concept of Action, *Journal of Philosophy*, 90:613-24.
- Danto, A.C. 1965. Basic Actions, *American Philosophical Quarterly*, 2:141-8.
- Dretske, F.I. 1977. Laws of Nature, *Philosophy of Science*, 44:248-68.
- Ellis, Brian 2001, *Scientific Essentialism*. Cambridge: Cambridge University Press.
- Foster, John 2004. *The Divine Lawmaker*. Oxford: Clarendon Press.
- Harré, R.M. and Madden, E.H. 1975. *Causal Powers* Oxford: Basil Blackwell.
- Lewis, David 1986. *Philosophical Papers*, vol. 2. Oxford: Oxford University Press.
- Swinburne, Richard 2004 *The Existence of God*, 2nd ed. Oxford: Clarendon Press.
- Tooley, Michael 1977. The Nature of Laws, *Canadian Journal of Philosophy*, 7:667-98.