Forms and Norms

Alexander R. Pruss

Contents

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CHAPTER I

Introduction

Bibliography

[1] David Z. Albert. *Quantum Mechanics and Experience*. Cambridge, MA: Harvard University Press, 1992.

[2] David Z. Albert and B. Loewer. "Interpreting the Many Worlds Interpretation". In: *Synthese* 77 (1988), pp. 195–213.

[3] David E. Alexander and Daniel M. Johnson, eds. *Calvinism and the Problem of Evil*. Eugene, OR: Wipf and Stock, 2016.

[4] G. E. M. Anscombe. *Causality and Determination: An Inaugural Lecture*. Cambridge: CUP, 1971.

[5] Saint Aquinas Thomas. *Summa Theologica*. Trans. by Fathers of the English Dominican Province. London, 1920.

[6] Aristotle. *Complete Works*. Ed. by Jonathan Barnes. Princeton, NJ: Princeton University Press, 1984.

[7] Aristotle. *Physics: Books 1–4*. Trans. by P. H. Wicksteed and F. M. Cornford. Cambridge, MA: Harvard University Press, 1957.

[8] Aristotle. *Physics: Books 5–8*. Trans. by P. H. Wicksteed and F. M. Cornford. Cambridge, MA: Harvard University Press, 1934.

[9] F. Arntzenius, A. Elga, and J. Hawthorne. "Bayesianism, Infinite Decisions, and Binding". In: *Mind* 133 (2004), pp. 251–283.

[10] Jeffrey A. Barrett. "The Single-Mind and Many-Minds Versions of Quantum Mechanics". In: *Erkenntnis* 42 (1995), pp. 89–105.

[11] Paul Bartha. "Symmetry and the Brown-Freiling Refutation of the Continuum Hypothesis". In: *Symmetry* 3 (2011), pp. 636–652.

[12] Paul Bartha and Richard Johns. "Probability and Symmetry". In: *Proceedings of the Philosophy of Science Association* (2001), S109–S122.

[13] J. Beam. "Unfair Gambles in Probability". In: *Statistics and Probability Letters* 77 (2007), pp. 681–686.

[14] John S. Bell. "Are There Quantum Jumps?" In: (1987). Ed. by C. W. Kilmister, pp. 41–52.

[15] Paul Benacerraf. "Tasks, Super-Tasks, and the Modern Eleatics". In: *Journal of Philosophy* 59 (1962), pp. 765–784.

[16] Paul Benacerraf. "What Numbers Could Not Be". In: *Philosophical Review* 74 (1965), pp. 47–73.

[17] J. Benardete. *Infinity: An Essay in Metaphysics*. Oxford: Clarendon, 1964.

[18] D. Bohm. "A Suggested Interpretation of the Quantum Theory in Terms of 'Hidden' Variables, I and II". In: *Physical Review* 85 (1952), pp. 166–193.

[19] George S. Boolos and Richard C. Jeffrey. *Computability and Logic*. 3rd ed. Cambridge: CUP, 1995.

[20] F. H. Bradley. *Appearance and Reality: A Metaphysical Essay*. London: Swann Sonnenschein, 1893.

[21] Lara Buchak. *Risk and Rationality*. Oxford: OUP, 2014.

[22] Martin Carrier. "How to Tell Causes from Effects: Kant's Causal Theory of Time and Modern Approaches". In: *Studies in History and Philosophy of Science, Part A* 34 (2003), pp. 59–71.

[23] David Chalmers. "The St. Petersburg Two-Envelope Paradox". In: *Analysis* 62 (2002), pp. 155–157.

[24] Samuel Clarke. *A Discourse Concerning the Being and Attributes of God, the Obligations of Natural Religion, and the Truth and Certainty of the Christian Revelation*. Glasgow: Griffin, 1803.

[25] William Lane Craig. "The Kalam Cosmological Argument". In: *The Blackwell Companion to Natural Theology*. Malden, MA: Wiley-Blackwell, 2009.

[26] William Lane Craig. *The Kalām Cosmological Argument*. Cambridge: CUP, 1979.

[27] Donald Davidson. "Actions, Reasons, and Causes". In: *Journal of Philosophy* 60 (1963), pp. 685–700.

[28] Alexander Dewdney. *The Planiverse: Computer Contact With a Two-Dimensional World*. New York: Copernicus, 2001.

[29] Joseph Diekemper. "The Existence of the Past". In: *Synthese* 191 (2014), pp. 1085–1104.

[30] P. A. M. Dirac. *The Principles of Quantum Mechanics*. 4th ed. Oxford: Clarendon.

[31] M. V. Dougherty. Cambridge: CUP, 2011.

[32] Trent Dougherty and Alexander R. Pruss. "Evil and the Problem of Anomaly". In: *Oxford Studies in the Philosophy of Religion*. Ed. by J. Kvanvig. Vol. 5. 2014, pp. 49–87.

[33] L. E. Dubins. "Finitely Additive Conditional Probabilities, Conglomerability, and Disintegration". In: *Annals of Probability* 3 (1975), pp. 89–99.

[34] Michael Dummett. "Causal Loops". In: *The Nature of Time*. Blackwell, 1986, pp. 135–169.

[35] Kenny Easwaran. "Why Countable Additivity?" In: *Thought* 2 (2013), pp. 53–61.

[36] Paul Edwards. "The Cosmological Argument". In: *The Rationalist Annual for the Year*. London: Pemberton, 1959.

[37] Adam Elga. "Self-Locating Belief and the Sleeping Beauty Problem". In: *Analysis* 60 (2000), pp. 143–147.

[38] H. Everett. "'Relative State' Formulation of Quantum Mechanics". In: *Reviews of Modern Physics* 29 (1957), pp. 454–462.

[39] Richard Feynman. *Surely You're Joking, Mr. Feynman!* New York: Norton, 1985.

[40] Terence L. Fine. *Theories of Probability: An Examination of Foundations*. New York: Academic Press, 1973.

[41] Branden Fitelson and Alan Hájek. "Declarations of Independence". In: *Synthese* (forthcoming).

[42] Bas C. van Fraassen. "Belief and the Will". In: *Journal of Philosophy* 81 (1984), pp. 235–256.

[43] C. Freiling. "Axioms of Symmetry: Throwing Darts at the Real Number Line". In: *Journal of Symbolic Logic* 51 (1986), pp. 190–200.

[44] G. C. Ghirardi, A. Rimini, and T. Weber. "Unified Dynamics for Microscopic and Macroscopic Systems". In: *Physical Review* D34 (1986), p. 470.

[45] I. J. Good. "On the Principle of Total Evidence". In: *British Journal for the Philosophy of Science* 17 (1967), pp. 319–321.

[46] H. Greaves. "Probability in the Everett Interpretation". In: *Philosophy Compass* 2 (2006), pp. 109–128.

[47] Theodore Gulesarian. "God and Possible Worlds: The Modal Problem of Evil". In: *Nous* 17 (1983), pp. 221–238.

[48] Amit Hagar. *Discrete or Continuous? The Quest for Fundamental Length in Modern Physics*. Cambridge: CUP, 2014.

[49] John Haldane. "Privative Causality". In: *Analysis* 67 (2007), pp. 180–186.

[50] Casper Storm Hansen. "A Fair Infinite Lottery". URL: http : / / www . casperstormhansen.com/A%20Fair%20Infinite%20Lottery.pdf.

[51] Christopher S. Hardin and Alan T. Taylor. "An Introduction to Infinite Hat Problems". In: *The Mathematical Intelligencer* 30 (2008), pp. 20–25.

[52] John Hawthorne. "Before-Effect and Zeno Causality". In: *Nous* 34 (2000), pp. 622–633.

[53] Geoffrey Hellman. "How to Gödel a Frege-Russell: Gödel's Incompleteness Theorems and Logicism". In: *Nous* 15 (1981), pp. 451–468.

[54] Frederik Herzberg. "Hyperreal Expected Utilities and Pascal's Wager". In: *Logique et Analyse* 54 (2011), pp. 69–108.

[55] Germund Hesslow. "The problem of Causal Selection". In: ed. by D. J. Hilton. New York: New York University Press, 1988, pp. 11–32.

[56] Michael Townsen Hicks and Peter van Elswyk. "Humean Laws and Circular Explanation". In: *Philosophical Studies* 172 (2015), pp. 433–443.

[57] Berhard Hofmann-Wellenhoff and Helmut Moritz. *Physical Geodesy*. 2nd. Vienna: Springer, 2006.

[58] Colin Howson. "Finite additivity, Another Lottery Paradox and Conditionalisation". In: *Synthese* 191 (2014), pp. 989–1012.

[59] Michael Huemer. *Approaching Infinity*. New York: Palgrave Macmillan, 2016.

[60] David Hume. *Dialogues Concerning Natural Religion*. CUP, 1779.

[61] Peter van Inwagen. *Material Beings*. Ithaca, NY: Cornell University Press, 1995.

[62] Allyn Jackson. "Interview with Martin Davis". In: *Notices of the American Mathematical Society* 55 (2008), pp. 560–571.

[63] T. J. Jech. *The Axiom of Choice*. Amsterdam: North Holland, 1973.

[64] J. B. Kadane, M. J. Schervish, and T. Seidenfeld. "Reasoning to a Foregone Conclusion". In: *Journal of the American Statistical Association* 91 (), pp. 1228–1235.

[65] Robert Kane. *The Significance of Free Will*. Oxford: OUP, 1999.

[66] Immanuel Kant. *Immanuel Kant's Critique of Pure Reason*. Trans. by F. Max Müller. Macmillan, 1907.

[67] P. Klein. "Foundationalism and the Infinite Regress of Reasons". In: *Philosophy and Phenomenological Research* 58 (1998), pp. 919–925.

[68] Donald E. Knuth. "All Questions Answered". In: *Notices of the American Mathematical Society* 49 (2002), pp. 318–324.

[69] Donald E. Knuth. *Surreal Numbers: How Two Ex-students Turned on to Pure Mathematics and Found Total Happiness: A Mathematical Novelette*. Reading, MA: Addison-Wesley, 1974.

[70] Robert Koons. "A New Kalam Argument: Revenge of the Grim Reaper". In: *Noũs* 48 (2014), pp. 256–267.

[71] P. H. Krauss. "Representation of Conditional Probability Measures on Boolean Algebras". In: *Acta Mathematica Academiae Scientiarum Hungarica* 19 (1968), pp. 229–241.

[72] Kenneth Kunen. *Set Theory: An Introduction to Independence Proofs*. New York: Elsevier, 1980.

[73] Jonathan Kvanvig. *The Possibility of an All-Knowing God*. New York: Palgrave Macmillan, 1996.

[74] Serge Lang. *Algebra*. 3rd ed. 2002.

[75] G. W. Leibniz. *Philosophical Essays*. Trans. by Roger Ariew and Daniel Garber. Indianapolis: Hackett, 1989.

[76] David Lewis. "Causation". In: *Journal of Philosophy* 70 (1973), pp. 556–567.

[77] David Lewis. "Counterfactual Dependence and Time's Arrow". In: *Noûs* 13 (1979), pp. 455–476.

[78] David Lewis. *On the Plurality of Worlds*. Oxford: Blackwell, 1986.

[79] David Lewis. "Tensed Quantifiers". In: *Oxford Studies in Metaphysics* 1 (2004), pp. 3–14.

[80] David Lewis. "The Paradoxes of Time Travel". In: *American Philosophical Quarterly* 13 (1976), pp. 145–152.

[81] Kris McDaniel. "Extended Simples and Qualitative Heterogeneity". In: *Philosophical Quarterly* 59 (2009), pp. 325–331.

[82] Vann McGee. "Learning the impossible". In: *Probability and Conditionals*. Ed. by Ellery Eells and Brian Skyrms. Cambridge: CUP, 1994.

[83] Elliott Mendelson. *Number Systems and the Foundations of Analysis*. Mineola, NY: Dover, 2008.

[84] Trenton Merricks. "Good-Bye Growing Block". In: *Oxford Studies in Metaphysics* 2 (2006), pp. 103–110.

[85] Trenton Merricks. *Objects and Persons*. Oxford: OUP, 2001.

[86] Ulrich Meyer. "Explaining Causal Loops". In: *Analysis* 72 (2012), pp. 259–264.

[87] Alexandre Grothendieck Michael Artin and Jean-Louis Verdier, eds. *Séminaire de Géométrie Algébrique du Bois Marie - 1963-64 - Théorie des topos et cohomologie étale des schémas - (SGA 4)*. Lecture Notes in Mathematics 269. Berlin: Springer, 1972.

[88] Lawrence E. Nielsen and Robert F. Landel. *Mechanical Properties of Polymers and Composites*. 2nd. New York: Dekker, 1994.

[89] John D. Norton. "How to Build an Infinite Lottery Machine". In: *European Journal for Philosophy of Science* (forthcoming).

[90] John D. Norton and Alexander R. Pruss. "Correction to John D. Norton "How to Build an Infinite Lottery Machine"". 2017.

[91] Graham Oppy. *Philosophical Perspectives on Infinity*. Cambridge: Cambridge University Press, 2006.

[92] J. Parsons. "Must a Four-Dimensionalist Believe in Temporal Parts?" In: *The Monist* (2000), pp. 399–418.

[93] Blaise Pascal. *Oevres Complètes*. Vol. 1. Paris: Hachette et Compagnie, 1858.

[94] Kenneth L. Pearce. "Counterpossible Dependence and the Efficacy of the Divine Will". In: *Faith and Philosophy* (2017), pp. 3–16.

[95] Kenneth L. Pearce and Alexander R. Pruss. "Understanding Omnipotence". In: *Religous Studies* (2012), pp. 403–414.

[96] Plato. *Parmenides*. Trans. by Mary Louise Gill and Paul Ryan. Indianapolis: Hackett, 1996.

[97] Alexander R. Pruss. *Actuality, Possibility and Worlds*. New York: Continuum, 2011.

[98] Alexander R. Pruss. "Divine Creative Freedom". In: *Oxford Studies in the Philosophy of Religion*. Ed. by Jonathan L. Kvanvig. Vol. 7. 2016, pp. 213–238.

[99] Alexander R. Pruss. "Infinitesimals Are Too Small for Countably Infinite Fair Lotteries". In: *Synthese* 191 (2014), pp. 1051–1057.

[100] Alexander R. Pruss. "Might All Infinities Be The Same Size?" 2017.

[101] Alexander R. Pruss. "Null Probability, Dominance and Rotation". In: *Analysis* 73 (2013), pp. 682–685.

[102] Alexander R. Pruss. "Omnirationality". In: *Res Philosophica* 90 (2013), pp. 1–21.

[103] Alexander R. Pruss. "On two problems of divine simplicity". In: *Oxford Studies in the Philosophy of Religion*. Ed. by Jonathan L. Kvanvig. Vol. 1. 2008, pp. 150–167.

[104] Alexander R. Pruss. "Popper Functions, Uniform Distributions and Infinite Sequences of Heads". In: *Journal of Philosophical Logic* 44 (2015), pp. 259–271.

[105] Alexander R. Pruss. "Prophecy Without Middle Knowledge". In: *Faith and Philosophy* 24 (2007), pp. 433–457.

[106] Alexander R. Pruss. "The Hume-Edwards Principle and the Cosmological Argument". In: *International Journal for Philosophy of Religion* 43 (1998), pp. 149–165.

[107] Alexander R. Pruss. "The Leibnizian Cosmological Argument". In: *The Blackwell Companion to Natural Theology*. Oxford: Blackwell, 2012, pp. 24–100.

[108] Alexander R. Pruss. *The Principle of Sufficient Reason: A Reassessment*. CUP, 2006.

[109] Alexander R. Pruss. "The Principle of Sufficient Reason and Probability". In: *Oxford Studies in Metaphysics* (forthcoming).

[110] Alexander R. Pruss and Joshua Rasmussen. *Necessary Existence*. manuscript.

[111] Nicholas Rescher. *G. W. Leibniz's Monadology: An Edition for Students*. Abingdon, England: Routledge, 2013.

[112] Nicholas Rescher. *Studies in Philosophical Inquiry*. Frankfurt: Ontos Verlag, 2005.

[113] Abraham Robinson. *Non-Standard Analysis*. Revised. Princeton, NJ: Princeton University Press, 1996.

[114] Michael Della Rocca. "PSR". In: *Philosophers' Imprint* 10 (2010), pp. 1–13.

[115] W. L. Rowe. "Two criticisms of the Cosmological Argument". In: *The Monist* 54 (1970), pp. 441–459.

[116] Walter Rudin. *Real and Complex Analysis*. 3rd. New York: McGraw Hill, 1987.

[117] Jonathan Schaffer. "Grounding in the Image of Causation". In: *Philosophical Studies* 173 (2016), pp. 49–100.

[118]   M. J. Schervish, T. Seidenfeld, and J. B. Kadane. "The Extent of Non-Conglomerability of Finitely Additive Probabilities". In: *Probability Theory and Related Fields* 66 (1984), pp. 205–226.

[119]   Christoph Schmid. *Newton's Superb Theorem: An Elementary Geometric Proof*. 2012. URL: http://arxiv.org/abs/1201.6534.

[120]   "Second-Order Languages and Mathematical Practice". In: *Journal of Symbolic Logic* 50 (1985), pp. 714–742.

[121]   Nicholas Shackel. "The Form of the Benardete Dichotomy". In: *British Journal for the Philosophy of Science* 56 (2005), pp. 397–417.

[122]   David Sheehan. *Physical Biochemistry: Principles and Applications*. 2nd. Chichester: Wiley, 2009.

[123]   Tomás Oliveira e Silva. "Goldbach Conjecture Verification". In: (2015). URL: http://sweet.ua.pt/tos/goldbach.html.

[124]   Quentin Smith. *The Language of Time*. New York: OUP, 1993.

[125]   R. Smullyan. "Memories and Inconsistencies". In: *A Lifetime of Puzzles: A Colleciton of Puzzles in Honor of Martin Gardner's 90th Birthday*. Ed. by E. D. Demaine, M. L. Demaine, and T. Rodgers. Wellesley, MA: A K Peters, pp. 245–252.

[126]   R. M. Solovay. "A Model of Set-Theory in Which Every Set of Reals is Lebesgue measurable". In: *Transactions of the American Mathematical Society* 92 (1970), pp. 1–56.

[127]   Charles Taliaferro. "Unknowable Truths and Omniscience: A Reply to Kvanvig". In: *Journal of the American Academy of Religion* 61 (1993), pp. 553–566.

[128]   James F. Thomson. "Tasks and Super-Tasks". In: *Analysis* 15 (1954), pp. 1–13.

[129]   B. L. D. Thorp. "Solution of Problem 5348". In: *American Mathematical Monthly* 72 (1967), pp. 730–731.

[130]   Stan Wagon. *The Banach-Tarski Paradox*. Cambridge: Cambridge University Press, 1994.

[131] Leonard M. Wapner. *The Pea and the Sun: A Mathematical Paradox*. Taylor & Francis, 2007.

[132] Brian Weatherson and Dan Marshall. "The Stanford Encyclopedia of Philosophy". In: ed. by Edward N. Zalta. 2014. URL: `http://plato.stanford.edu/archives/fall2014/entries/intrinsic-extrinsic/`.

[133] Paul Weirich. "The St. Petersburg Gamble and Risk". In: *Theory and Decision* 17 (1984), pp. 193–202.

[134] Timothy Williamson. "How Probable Is an Infinite Sequence of Heads?" In: *Analysis* 67 (2007), pp. 173–180.

[135] Richard Wiseman. "LaughLab: The Scientific Search for the World's Funniest Joke". In: (2002). URL: `https://richardwiseman.files.wordpress.com/2011/09/ll-final-report.pdf`.

[136] James Woodward. *Making Things Happen: A Theory of Causal Explanation*. Oxford: OUP, 2003.