
























ICCL Summer School 2008
The logic of generalized truth values.
A tour into Philosophical Logic







Heinrich Wansing







-  Anderson, A.R. and Belnap, N.D.: *Entailment: The Logic of Relevance and Necessity*, Vol. I, Princeton University Press, Princeton, NJ, 1975.
-  Anderson, A.R., Belnap, N.D. and Dunn, J.M., 1992, *Entailment: The Logic of Relevance and Necessity*, Vol. II, Princeton NY: Princeton University Press.
-  Anderson, D. and Zalta, E., 2004, “Frege, Boolos, and logical objects”, *Journal of Philosophical Logic*, 33: 1-26.
-  Arieli, O. and Avron, A., 1996, “Reasoning with logical bilattices”, *Journal of Logic, Language and Information*, 5: 25-63.
-  Barwise, J. and Perry, J., 1981, “Semantic Innocence and Uncompromising Situations”, *Midwest Studies in the Philosophy of Language*, VI: 387-403.
-  Beaney, M. (ed. and transl.), 1997, *The Frege Reader*, Oxford, Blackwell.







-  Belnap, N.D., 1977a, “How a computer should think”, in G. Ryle (ed.), *Contemporary Aspects of Philosophy*, Stocksfield: Oriel Press Ltd., 30-55.
-  Belnap, N.D., 1977b, “A useful four-valued logic”, in: J.M. Dunn and G. Epstein (eds.), *Modern Uses of Multiple-Valued Logic*, Dordrecht: Reidel, 8-37.
-  Béziau, J.-Y., 1994, “Universal Logic”, in: T. Childers and O. Majer (eds.), *Proceedings Logica' 94*, Czech Academy of Sciences, Prague, 73-93.
-  Béziau, J.-Y., 2006, “Many-valued and Kripke semantics”, in: J. van Benthem et al. (eds), *The age of alternative logics*, Dordrecht: Springer Verlag, 89-101.
-  Brown, B. and Schotch, P., 1999, “Logic and Aggregation”, *Journal of Philosophical Logic*, 28: 265-287.

-  Burge, T., 1986, "Frege on truth", in: L. Haaparanta and J. Hintikka (eds.), *Frege Synthesized*, Dordrecht: Reidel, 97-154.
-  Bush, W., 1908, "Provisional and Eternal Truth", *The Journal of Philosophy, Psychology and Scientific Methods*, 5: 181-184.
-  Caleiro, C., Carnielli, W., Coniglio, M., and Marcos, J., 2005, "Two's company: "The humbug of many logical values"", in: J.-Y. Beziau (ed.), *Logica Universalis*, Basel: Birkhäuser, 169-189.
-  Carnap, R., 1942, *Introduction to Semantics*, Cambridge, Mass.: Harvard University Press.
-  Carnap, R., 1947, *Meaning and Necessity. A Study in Semantics and Modal Logic*, Chicago: University of Chicago Press.
-  Caton, C., 1963, "A stipulation of a modal propositional calculus in terms of modalized truth-values", *Notre Dame Journal of Formal Logic*, 4: 224-226.







-  Church, A., 1943, "Review of Rudolf Carnap, *Introduction to Semantics*", *The Philosophical Review*, 52: 298-304.
-  Church, A., 1956, *Introduction to Mathematical Logic, Volume I*, revised and enlarged edition, Princeton: Princeton University Press.
-  da Costa, N., Béziau, J.-Y., and Bueno, O., 1996, "Malinowski and Suszko on many-valued logics: On the reduction of many-valuedness to two-valuedness", *Modern Logic*, 6: 272-299.
-  Czelakowski, J., 2001, *Protoalgebraic Logics*, Dordrecht: Kluwer Academic Publishers.
-  Davidson, D., 1967, "Truth and meaning", *Synthese*, 17: 304-323.
-  Davidson, D., 1969, "True to the facts", *Journal of Philosophy*, 66: 748-764.








-  Devyatkin, L., “Non-classical definitions of logical consequence” (in Russian), *Smirnov’s Readings in Logic*, Moscow, 2007, 26-27.
-  Draï, D., 2002, “The slingshot argument: an improved version”, *Ratio*, 15: 194-204.
-  Dummett, M., 1981, *Frege: Philosophy of Language*, 2nd ed., London: Duckworth.
-  Dummett, M., 2000, *Elements of Intuitionism*, 2nd ed., Oxford: Clarendon Press.
-  Dunn, J.M., 1976, “Intuitive semantics for first-degree entailment and ‘coupled trees’ ”, *Philosophical Studies*, 29: 149-168.
-  Dunn, J.M., 1986, “Relevance logic and entailment”, in: D. Gabbay and F. Guenter (eds.), *Handbook of Philosophical Logic*, Vol. III, D. Reidel Publishing Company, Dordrecht, 117-224.






-  Dunn, J.M., 1999, "A Comparative study of various model-theoretic treatments of negation: a history of formal negation", in: D. M. Gabbay and H. Wansing (eds.), *What is Negation?*, Applied Logic Series, 13, Dordrecht, Kluwer Academic Publishers, 23-51.
-  Dunn J.M., 2000, "Partiality and its dual", *Studia Logica* **66**: 5-40.
-  Dunn, J.M. and D.M. Hardegree, 2001, *Algebraic Methods in Philosophical Logic*, Clarendon Press, Oxford.
-  Fitting, M., 2006, "Bilattices are nice things", in: T. Bolander, V. Hendricks, and S.A. Pedersen (eds.), *Self-Reference*, Stanford: CSLI-Publications, 53-77.
-  Føllesdal, D., 1983, "Situation semantics and the 'slingshot' argument", *Erkenntnis*, 19: 91-98.
-  Font, J.M., 1997, "Belnap's four-valued logic and De Morgan lattices", *Logic Journal of IGPL*, 5: 1-29.







-  Frankowski, S., 2004, "Formalization of a plausible inference", *Bulletin of the Section of Logic*, 33: 41-52.
-  Frankowski, S., 2004, " p -consequence versus q -consequence", *Bulletin of the Section of Logic*, 33: 197-207.
-  Frege, G., 1891, "Function und Begriff. Vortrag, gehalten in der Sitzung vom 9. Januar 1891 der Jenaischen Gesellschaft für Medicin und Naturwissenschaft", Jena: H. Pohle, Jena, 31 pp. (Reprinted in [44].)
-  Frege, G., 1892, "Über Sinn und Bedeutung", *Zeitschrift für Philosophie und philosophische Kritik*, 100: 25-50. (Reprinted in [44].)
-  Frege, G., 1918, "Der Gedanke", *Beiträge zur Philosophie des deutschen Idealismus* 1: 58-77. (Reprinted in [42].)
-  Frege, G., 1962, *Grundgesetze der Arithmetik, Bde. I und II*, 2nd ed., Darmstadt: Wissenschaftliche Buchgesellschaft.







-  Frege, G., 1967, *Kleine Schriften*, Ignacio Angelli (ed.), Darmstadt: Wissenschaftliche Buchgesellschaft and G. Olms.
-  Frege, G., 1976, *Wissenschaftlicher Briefwechsel*, G. Gabriel, H. Hermes, F. Kambartel, C. Thiel, and A. Veraart (eds.), Hamburg: Felix Meiner Verlag.
-  Frege, G., 1986, *Funktion, Begriff, Bedeutung. Fünf logische Studien*, G. Patzig (ed.), Göttingen: Vandenhoeck & Ruprecht.
-  Frege, G., 1988, *Grundlagen der Arithmetik. Eine logisch mathematische Untersuchung über den Begriff der Zahl*, Hamburg: Felix Meiner Verlag.
-  Frege, G., 1990, “Einleitung in die Logik”, in: Frege, G., *Schriften zur Logik und Sprachphilosophie*, Hamburg: Felix Meiner Verlag, 74-91.
-  Gabriel, G., 1984, “Fregean Connection: Bedeutung, Value and Truth-Value”, *The Philosophical Quarterly*, 34: 372-376








-  Gabriel, G., 1986, "Frege als Neukantianer", *Kant-Studien*, 77: 84-101.
-  Ginsberg, M., 1988, "Multivalued logics: a uniform approach to reasoning in AI", *Computer Intelligence*, 4: 256-316.
-  Gödel, K., 1944, "Russell's mathematical logic", in: P.A. Schilpp (ed.), *The Philosophy of Bertrand Russell*, Evanston and Chicago Ill.: Northwestern University Press, 125-53.
-  Gottwald, S., 1989, *Mehrwertige Logik. Eine Einführung in Theorie und Anwendungen*, Berlin: Akademie-Verlag.
-  Gottwald, S., 2001, *A Treatise on Many-valued Logic*, Baldock: Research Studies Press.
-  Gowans, C., "Moral Relativism", *The Stanford Encyclopedia of Philosophy* (Spring 2004 Edition), Edward N. Zalta (ed.), URL <http://plato.stanford.edu/archives/spr2004/entries/moral-relativism/>.







-  Grossmann, R., 1992, *The Existence of the World*, London: Routledge.
-  Hájek, P., 1998, *Metamathematics of fuzzy logic*, Kluwer Academic Publishers, Dordrecht.
-  Hochberg, H., 2003, *Introducing Analytic Philosophy. Its Sense and Its Nonsense 1879-2002*, Frankfurt am Main: Ontos Verlag.
-  Jain, P., “Investigating Hypercontradictions”, May 1997 (Unpublished Mns), 16 pp.
-  Jennings, R. and Schotch, P., 1984, “The Preservation of Coherence”, *Studia Logica*, 43: 89-106.
-  Kamide, N. and Wansing, H., 2008, “Sequent calculi for some trilattice logics”, manuscript.
-  Lewis, C.I., 1943, “The modes of meaning”, *Philosophy and Phenomenological Research*, 4: 236-249.

-  Lowe, J., 1995, "The metaphysics of abstract objects", *The Journal of Philosophy*, 92: 509-524.
-  Lowe, J., 1997, "Objects and criteria of identity", in: *A Companion to the Philosophy of Language*, R. Hale and C. Wright (eds.), Oxford and Cambridge MA: Basil Blackwell, 613-33.
-  Łukasiewicz, J., 1918, "Farewell lecture by professor Jan Łukasiewicz, delivered in the Warsaw University Lecture Hall in March, 1918, in: [66], 87-88.
-  Łukasiewicz, J., 1920, "O logice trójwartościowej", *Ruch Filozoficzny*, 5: 170–171. (English translation as "On three-valued logic" in: [66], 87-88.)
-  Łukasiewicz, J., 1921, "Logika dwuwartościowa", *Przegląd Filozoficzny*, 13: 189-205. (English translation as "Two-valued logic" in: [66], 89–109.)

-  Łukasiewicz, J., 1970, *Selected Works*, L. Borkowski (ed.), Amsterdam: North-Holland and Warsaw: PWN.
-  MacFarlane, J., 2002, "Review of Stephen Neale, *Facing Facts*", *Notre Dame Philosophical Reviews* (<http://ndpr.nd.edu/review.cfm?id=1117>).
-  MacIntosh, J., 1991, "Adverbially qualified truth values", *Pacific Philosophical Quarterly*, 72: 131-142.
-  Malinowski, G., 1990, "Q-Consequence Operation", *Reports on Mathematical Logic*, 24: 49-59.
-  Malinowski, G., 1993, *Many-valued Logics*, Oxford: Clarendon Press.
-  Malinowski, G., 1994, "Inferential Many-Valuedness", in: Jan Woleński (ed.), *Philosophical Logic in Poland*, Dordrecht: Kluwer Academic Publishers, 75-84.

-  McGinn, C., 1976, "A note on the Frege argument", *Mind*, 85: 422-423.
-  Neale, Stephen, 1995, "The Philosophical Significance of Gödel's Slingshot", *Mind*, 104: 761-825.
-  Neale, Stephen, 2001, *Facing Facts*, Oxford: Oxford University Press.
-  Olson, K., 1987, *An Essay on Facts*, Lecture Notes No. 6, Stanford: CSLI Publications.
-  Oppy, G., 1997, "The philosophical insignificance of Gödel's slingshot. Response to Stephen Neale", *Mind*, 106: 121-141.
-  Perry, J., 1996, "Evading the slingshot", in: A. Clark, J. Ezquerro, and J. Larrazabal (eds.), *Philosophy and Cognitive Science. Categories, Consciousness, and Reasoning*, Dordrecht: Kluwer Academic Publishers.

-  Popper, K., 1972, *Objective Knowledge: An Evolutionary Approach*, Oxford: Oxford University Press.
-  Priest, G., 1979, “Logic of Paradox”, *Journal of Philosophical Logic*, 8: 219-241.
-  Priest, G., 1984, Hyper-contradictions, *Logique et Analyse* **27**: 237-243.
-  Quine, W.v.O., 1953, “Reference and modality”, in: W.v.O. Quine, *From a Logical Point of View*, Cambridge: Harvard University Press, 139–59.
-  Quine, W.v.O., 1960, *Word and Object*, New York: John Wiley and Sons and Cambridge: MIT Press.
-  Quine, W.v.O., 1969, *Ontological Relativity and Other Essays*, New York: Columbia.
-  Reck, E., 2007, “Frege on Truth, Judgment, and Objectivity”, *Grazer Philosophische Studien* 75: 149-173.

-  Rescher, N., 1965, “An intuitive interpretation of systems of four-valued logic”, *Notre Dame Journal of Formal Logic*, 6: 154-156.
-  Rescher, N.: *Many-Valued Logic*, McGraw-Hill, New York, 1969.
-  Routley, R., 1975, “Universal Semantics?”, *The Journal of Philosophical Logic*, 4: 327–356.
-  Ruffino, M., 2003, “Wahrheit als Wert und als Gegenstand in der Logik Freges”, in: D. Greimann (ed.), *Das Wahre und das Falsche. Studien zu Freges Auffassung von Wahrheit*, Hildesheim: Olms, 203-221.
-  Ruffino, M., 2004, “Church’s and Gödel’s Slingshot Arguments”, *Abstracta*, 1: 23-39
-  Ryan, M. and Sadler, M., 1992, “Valuation systems and consequence relations”, in: S. Abramsky, D. Gabbay, and T.

Maibaum (eds.), *Handbook of Logic in Computer Science, Vol. 1.*, Oxford: Oxford University Press, 1-78.



Shramko, Y., Dunn, J.M. and Takenaka, T., 2001, “The trilattice of constructive truth values”, *Journal of Logic and Computation*, 11: 761-788.








Shramko, Y. and Wansing, H., 2005, “Some useful 16-valued logics: how a computer network should think”, *Journal of Philosophical Logic*, 34: 121-153.














Shramko, Y. and Wansing, H., 2006, “Hypercontradictions, generalized truth values, and logics of truth and falsehood”, *Journal of Logic, Language and Information*, 15: 403-424.





Shramko, Y. and Wansing, H., 2007, “Entailment relations and/as truth values”, *Bulletin of the Section of Logic*, 36: 131-143.

-  Simmons, K., 2002, “Semantical and Logical Paradox”, in: D. Jacquette (ed.), *A Companion to Philosophical Logic*, Blackwell Publishes, Malden/Mass., 115-130.
-  Suszko, R., 1975, “Abolition of the Fregean Axiom”, in: R. Parikh (ed.), *Logic Colloquium, Lecture Notes in Mathematics 453*, Berlin: Springer Verlag, 169–239.
-  Suszko, R.: 1977, “The Fregean axiom and Polish mathematical logic in the 1920’s”, *Studia Logica*, 36: 373-380.
-  Tarski, A., 1930, “Über einige fundamentale Begriffe der Metamathematik”, *Comptes Rendus des Séances de la Société des Sciences et des Lettres de Varsovie XXIII*, Classe III: 22-29.
-  Tarski, A., 1930, “Fundamentale Begriffe der Methodologie der deduktiven Wissenschaften, I”, *Monatshefte für Mathematik und Physik*, 37: 361-404.

-  Tarski, A., 1956, *Logic, Semantics, Metamathematics. Papers from 1923 to 1938*, translated by J.H. Woodger, Oxford: Clarendon Press.
-  Tsuji, M., 1998, “Many-valued logics and Suszko’s Thesis revisited”, *Studia Logica*, 60: 299-309.
-  Tuomela, R., 1985, “Truth and best explanation”, *Erkenntnis*, 22: 271-299
-  Wagner, S., 1986, “California semantics meets the Great Fact”, *Notre Dame Journal of Formal Logic*, 27: 430-55.
-  Wansing, H., 2001, “Short dialogue between M (Mathematician) and P (Philosopher) on multi-lattices”, *Journal of Logic and Computation*, 11: 759-760.
-  Wansing, H. and Shramko, Y., 2008, “Suszko’s Thesis, inferential many-valuedness, and the notion of a logical system”, *Studia Logica*, 88: 405-429, 89: 147.

-  Wansing, H. and Shramko, Y., 2008a, “Harmonious many-valued propositional logics and the logic of computer networks”, to appear in: C. Dgremont, L. Keiff and H. Rckert (eds), *Dialogues, Logics and other Strange Things Essays in Honour of Shahid Rahman*, College Publications, London.
-  Widerker, D., 1983, “The extensionality argument”, *Nous*, 17: 457-68.
-  Windelband, W., 1884, *Präludien: Aufsätze und Reden zur Einführung in die Philosophie*, 2 vols. Freiburg im Breisgau.
-  Wójcicki, R., 1970, “Some Remarks on the Consequence Operation in Sentential Logics”, *Fundamenta Mathematicae*, 68: 269-279.
-  Wójcicki, R., 1988, *Theory of Logical Calculi. Basic Theory of Consequence Operations*, Dordrecht: Kluwer Academic Publishers.

-  Wójtowicz, A., 2005, “The Slingshot Argument and Non-Fregean Logic”, in: A. Brozek, J. Jadacki, and W. Strawinski (eds.), *Logic, Methodology and Philosophy of Science in Warsaw*, Vol. 2, Warsaw: Wydawnictwo Naukowe Semper., 185-192.
-  Wrigley, A., 2006, “Abstracting propositions”, *Synthese*, 151: 157–176.
-  Zalta, E., 1983, *Abstract Objects: An Introduction to Axiomatic Metaphysics*, Dordrecht: D. Reidel.