

## **Introduction**

Brad Armendt and Kevin Zollman

### **1. Origin of this issue.**

On March 13-15, 2008, the Department of Logic and Philosophy of Science at UC Irvine held *SkyrmsFest*, the Laguna Workshop 2008 in honor of Brian Skyrms' seventieth birthday. It was held at the Laguna Hotel in Laguna Beach; friends, colleagues, past and current students were present, and nine papers were presented. Jeff Barrett organized the workshop with much assistance from Patty Jones, and they arranged and conducted a first-rate event. Rory Smead and Elliott Wagner provided logistical help in addition to their philosophical contributions to the meeting. The members of the Department of Logic and Philosophy of Science were gracious hosts, and a number of other distinguished members of the UC Irvine faculty attended workshop sessions. Photographs can be seen at <http://www.lps.uci.edu/home/news/skyrmsfirst/index.html>.

The nine presentations were given by Kevin Zollman, William Harms, Peter Vanderschraaf, Nancy Cartwright, Brad Armendt, Patrick Suppes, Jason Alexander, Cristina Bicchieri, and Persi Diaconis. Six of the presenters are Skyrms' former students—in chronological order, Cartwright, Armendt, Vanderschraaf, Harms, Alexander, and Zollman. The scheduled tenth presenter, Jim Joyce, was unable to travel to the workshop and missed the fun. Seven of the presented papers are included in this issue; unfortunately, because of other commitments we do not have the contributions by Cristina Bicchieri and Persi Diaconis. But three additional papers are included here—the paper that Jim Joyce planned to present, a paper by Jeff Barrett, and a paper by Brian Skyrms himself.

### **2. Brian Skyrms' career.**

Brian Skyrms was born in Pittsburgh in 1938. He studied economics and philosophy at Lehigh University, and among his teachers were Adolf Grünbaum and Nicholas Rescher. After completing his B.A. in 1961, Skyrms followed Grünbaum and Rescher to the University of Pittsburgh and entered the Philosophy Ph.D. program there. He completed the Ph.D. in 1965, writing his dissertation, *The Concept of Physical Necessity*, under Rescher's direction. His first teaching appointment was at San Fernando Valley State College, followed by a position at the University of Delaware. His widely used textbook *Choice and Chance*, now in its 4<sup>th</sup> edition, was published in 1966. In 1967 he was recruited by Ruth Barcan Marcus to join the growing Philosophy Department at the University of Illinois at Chicago (Chicago Circle, as it was then known). His book *Causal Necessity* was

published in 1980, and in the same year, Skyrms moved to the Philosophy Department at the University of California at Irvine. *Pragmatics and Empiricism* appeared in 1984, followed by *The Dynamics of Rational Deliberation* in 1990, and in 1996 by *Evolution of the Social Contract*, which won the Lakatos Award. In 1994 Skyrms was elected to the American Academy of Arts and Sciences, and in 1999 he became one of the very few philosophers ever to be elected to the National Academy of Sciences. He helped to found the new Department of Logic and Philosophy of Science at UC Irvine when it was formed in 2000. The sequel to the 1996 book, *The Stag Hunt and the Evolution of Social Structure*, appeared in 2004. A new book, *Signals: Evolution, Learning, and Information* is currently in press.

Skyrms served as President of the APA Pacific Division in 2000-2001, and as President of the Philosophy of Science Association in 2004-2006. He is currently Distinguished Professor of Logic and Philosophy of Science and Economics at UC Irvine, and he is also Professor of Philosophy at Stanford University. He presently spends two academic quarters at Irvine and one quarter at Stanford each year.

It would require a committee of authors and far more than our available space to describe the important contributions that Skyrms has made to many areas of research, on many topics: physical necessity and causality, truth and the liar, modality, logical atomism, conditionals, probability, induction and inductive logic, evidence and confirmation, rational decision and game theory, deliberational dynamics. In the early 1990s his attention turned to patterns of social interaction, social norms, and communication. His development and use of models from evolutionary game theory has shed considerable light on the conditions under which we may expect them to appear and persist. In these explorations Skyrms makes extensive use of computer simulation, while also pursuing and obtaining analytic support for results that the simulations suggest. He has produced a rich and widely known body of work, and its influence extends well beyond philosophy into other fields.

### **3. The papers in this issue.**

The scope and fruitfulness of Skyrms' work is illustrated by the contents of this issue. The included papers make contributions to the philosophy of language, general philosophy of science, philosophy of biology, epistemology, the foundations of probability, causation, statistics, ethics, and the philosophy of social science. Six of the papers collected here present work inspired by Skyrms' research with evolutionary games. The other four papers discuss issues concerning probability, causation, evidence, and belief. Brief descriptions of the papers follow; to learn more, see the abstracts and the papers themselves.

The papers appear in the order they were presented at the conference, followed by the three additional papers by Barrett, Joyce, and Skyrms himself. The first paper by Kevin Zollman and Rory Smead is titled "Plasticity and Language: An Example of the Baldwin Effect?" Zollman and Smead consider a widely discussed, and largely controversial, effect in evolutionary biology known as the Baldwin effect. Utilizing models developed by David Lewis and Brian Skyrms,

they focus on a simple question: can the Baldwin effect (or any part of that effect) occur in the evolution of language? Ultimately they conclude that some aspects of the effect are plausible in this context while others are not, suggesting that this effect deserves to be studied in more detail and also that more care must be taken in explicating the details of the effect.

Bill Harms' contribution, "Determining Truth Conditions in Signaling games," relates the Lewis signaling game – developed extensively by Skyrms – to more traditional problems in the philosophy of language and epistemology. He shows how one might develop notions of truth and reference, as well as a notion of justification, from these relatively simple games. Lewis believed that his game captured the essential core of the philosophical concept of meaning, and Harms extends this game in order to capture the core of these other notions as well.

"The Invisible Foole" by Peter Vanderschraaf is a contribution to the difficult project of reconciling rational self-interest and morality. Vanderschraaf constructs a new challenge from two well-known problems, Hobbes' Foole and Plato's Lydian shepherd. He imagines a person who is free to renege on his agreements without fear of retribution. Utilizing a game theoretic methodology, Vanderschraaf evaluates Hobbes' solution to this problem, and the common knowledge assumptions on which it relies. Vanderschraaf goes on to suggest that impermanent concealment or the possibility of indirect retribution may tend to bring moral behavior and rational self interest into agreement.

Nancy Cartwright, Brian Skyrms, and Patrick Suppes are well known for their work on the probabilistic theory of causality. In her paper "What are Randomized Controlled Trials Good For?" Cartwright draws on that theory to examine randomized controlled trials (*RCTs*) and the conditions under which their results are significant. The probabilistic theory yields a direct link between an outcome that *C* raises  $P(E)$  in an *ideal RCT* and the conclusion that *C* (sometimes) causes *E*. It will be a nontrivial question, of course, how well a real *RCT* fits the conditions of an ideal one. Supposing it does fit well enough, a further issue is how well the results of the *RCT* can be exported to draw conclusions about a target population of interest, and Cartwright spells out conditions and assumptions that are needed to back up such conclusions. One point that her discussion highlights is that questions concerning the *external validity* of an investigation often conflate two distinct issues: First, does the conclusion that *C* causes *E* in the *RCT* carry over to the target population? Second, what would be the result in the target population of implementing the treatment *C*?

Are beliefs sensitive to what is at stake? Brad Armendt's paper, "Stakes and Beliefs," explores that question in several ways. A degree of belief that *p* is not usually regarded as a variable that depends on the pragmatic significance of *p*. Nor is the strength to which a categorical belief is held usually regarded as such a variable. In epistemology there is a general neglect of the idea that beliefs are stake-sensitive in that way, perhaps for good reason. The contrary constraint, that degrees of belief are stake-invariant, clearly has implications for probabilism. The synchronic Dutch book argument is a controversial defense of probabilism. Adopt the interpretation of that argument developed by Skyrms; this defuses many

objections. Other objections, to the package principle in its finite and countable versions, are sometimes raised. But the objections most commonly offered, Armendt says, turn out to undermine the principle of stake-invariance. Whether or not that is a desirable consequence is left unsettled.

In this issue Patrick Suppes writes about probability. His paper, “The Nature of Probability,” is, as he says, ecumenical in spirit. Bayesian applications are useful in many contexts, yet the theoretical probabilities of physics indicated by experimental frequency data seem as objective as anything else that the theory is about. In the seventeenth century, controversies about the nature of force were prominent, and so have been controversies in the twentieth century about the nature of probability. Prediction: just as the controversies about force died out in time, so will the controversies about probability. The true nature of probability lies in its formal properties, about which there is widespread intuitive acceptance. Variations may be worth exploring for some applications. The one controversial core concept is the concept of randomness, but the difficulties of defining randomness do not seem to arise out of differences between subjectivists and objectivists about the nature of probability.

In *The Dynamics of Rational Deliberation*, Skyrms considers two different algorithms for strategy change which relax the assumption of full economic rationality while also preserving the idea that individuals try to do better for themselves. Much of the discussion focuses on the case of a homogeneous group of individuals interacting with one another repeatedly. In “Local Interaction and the Dynamics of Rational Deliberation,” Jason McKenzie Alexander modifies these algorithms, so that they may capture the idea that groups have some social structure – some individuals interact with a subset of the members of the whole group, each of whom interacts with a (potentially different) subset, and so on. Alexander finds that this modification creates several interesting differences, which suggest many fruitful new ways of understanding the way humans change their behavior over time.

Jeffrey Barrett's contribution to this issue is titled “Faithful Description and the Incommensurability of Evolved Languages.” In this paper he relates the Skyrms-Lewis signaling game to the problem of incommensurability, widely discussed in philosophy of science. Thomas Kuhn famously declared that the languages used by later scientific paradigms are incommensurable with the languages used by their predecessors and as a result, we cannot make sense of any notion of scientific progress across paradigms. Using a relatively simple model, Barrett shows how an incommensurable language can evolve from a prior one even if the new language is predictively more accurate than its predecessor. This suggests (contra Kuhn) that even if current theories are incommensurable with their predecessors, we still might be able judge them as better theories.

In “Causal Reasoning and Backtracking,” Jim Joyce looks at reasoning that takes causes to be evidence for their effects; he seeks to characterize direct cause-to-effect evidential import. A starting point is ‘Skyrms’ Thesis,’ which plays a central role in Skyrms’ causal decision theory, recommending how the deliberator should be guided by his beliefs concerning the causal efficacy of his options. Joyce

pursues the problem of factoring incremental evidential import into two components, front-door (direct) and back-door (backtracking) evidence, in the context of several approaches: causal Bayesian networks, counterfactual models, and probabilistic accounts of causation. For the causal networks framework Joyce develops an evidential version of Pearl's interventionist front-door adjustment function; for counterfactual models his proposal makes use of Bayesianized imaging functions. The ideas behind his factorization work well within each of the three approaches, and the results they produce are in agreement.

Finally we come to Brian Skyrms' contribution, "The Flow of Information in Signaling Games." This paper is a continuation of his most recent project on the evolution of meaning and information. Skyrms distinguishes between the *informational content* of a signal and the *quantity of information* in a signal. Beginning with a game invented by David Lewis, and discussed by several of the preceding papers, Skyrms shows how evolution and learning can spontaneously create information and how that information might come to be transmitted between people using a sort of proto-language. He details many of the interesting types of systems that can evolve as a result of incorporating increasing complex settings for the evolution of signaling. We encourage those interested in learning more to look for Skyrms' new book *Signals: Evolution, Learning, and Information*, which should be out with Oxford University Press near the time of publication of this issue.

The topics of these papers are varied and so are the views expressed in them. But each of them has been inspired by Brian Skyrms' ideas, arguments, and above all by the standard of excellence he sets for creative, rigorous, and ground-breaking philosophical work. The participants in *SkyrmsFest* were delighted to gather at that meeting in his honor.