Two-dimensional truth

Wolfgang Spohn

Department of Philosophy, University of Konstanz

The paper identifies two major strands of truth theories, ontological and epistemological ones, and argues that both are of equal primacy and find their home within two-dimensional semantics. Contrary to received views, it argues further that epistemological truth theories operate on Lewisian possible worlds and ontological truth theories on Wittgensteinian possible worlds and that both are mediated by the so-called epistemic-ontic map the further specification of which is of utmost philosophical importance.

Keywords: truth, two-dimensional semantics, possible worlds

This paper purports to tell something about truth that appears new and insightful to me. This is an outrageously immodest aim. Therefore I hasten to add that this paper is of a most tentative nature. If it succeeds to unfold a frame that inspires further more careful thoughts, it would already fulfil its purpose. Let me start by very swiftly rehearsing some basics concerning the state of the art about truth. This rehearsal is bound to be biased and incomplete, in order to prepare for the main part of the paper.

First, we must take a stance towards truth bearers and truth makers. Let me short-cut the rich and sophisticated discussion about this issue (see, e.g., Armstrong 1997, ch. 8, or Künne 2003, sect. 3.5) by simply assuming that truth bearers are propositions—or states of affairs, as I shall sometimes say, though this is a delicate substitution—and that truth makers are worlds. A lot is prejudged thereby, but not everything, since we do not really know what propositions and worlds are.

My assumption entails that, whatever propositions are, they are such that all other potential truth bearers are true or false only in virtue of the propositions associated with them. This is plausible at least for the main rival truth bearers. Beliefs are true or false in virtue of their content, and contents are supposed to be propositions. Sentences or utterances are true or false, if

Corresponding author's address: Wolfgang Spohn, Department of Philosophy, University of Konstanz, 78457 Konstanz, Germany. Email: Wolfgang.Spohn@uni-konstanz.de.

they have a truth value at all, in virtue of their meanings, and their meanings presumably consist in the propositions expressed by them. Thereby I seem to equate contents of beliefs and meanings of sentences or utterances. Yes, almost; but this also belongs to the things not yet prejudged and to be reconsidered.

As to truth makers, I have simply moved to the safe side. Some truth bearers may be true independently of anything, but most of them need not be true and, if true, are made true by something. This cannot be more than an entire world. Mostly, it is much less; each truth is made true only by some part of the world. To substantiate this would require, though, explaining how parts of worlds are to be understood for this purpose and which part then is responsible for which truth. Staying on the safe side means refraining from entering these issues.

My assumption also entails that truth is basically a relation between propositions and worlds; a proposition is true in a world (and hence true *simpliciter*, if true in the actual world—whichever that is). Since propositions are moreover assumed to be nothing but, as it were, capabilities to be true or false, nothing but truth conditions, to use traditional terminology, it is clear that propositions can be represented by, or equated with, sets of worlds. However, this does not yet fix the truth relation. Nor does it tell what propositions and worlds are. It only says that they are related in such a way that propositions can consequently be represented as sets of worlds.

When the truth relation is not yet fixed by my assumption, what is it then? The history of philosophy provides many answers. Perhaps the oldest is what has been called the existence theory of truth: a proposition or a state of affairs is true if and only if it exists. It was a big topic in ancient philosophy that in some sense falsities cannot exist, as the existence theory entails. This was a big topic since it creates great problems, for instance, how one could ever have false beliefs or how there could ever be false sentences. I confess I find these problems misguided, and I do not see a way to take the existence theory of truth seriously. Let us simply put it to one side.

The other old conception, indeed the dominant one ever since, is, of course, the correspondence theory of truth. A proposition, or whatever expresses it or conceives of it, is true if and only if it corresponds to the facts. I say it is still the dominant conception since I take most of the theories discussed in the last 60 years to be mere variations: the semantic conception of truth, the redundancy theory, the disquotationalist theory, minimalist conceptions, other conceptions of the deflationary kind, and even the identity theory (for all this see, e.g., Künne 2003, ch. 3, 4, and 6, or Engel 2002, sect. 1.2+6 and ch. 2). I know, of course, that it is dangerous to level all the subtle differences between these theories. I am fascinated by the discussions of

these differences, and I would never claim that these discussions are idle. Still, from a sufficiently detached point of view, as we are bound to have it here, they all look similar; they all fight with the point that the linguistic means for describing or referring to the truth bearer and the truth maker look almost identical so that the truth relation appears somehow trivial. Indeed, I am unsure whether the illusion of substance was even held in the old times from which the label 'correspondence theory' derives, as is supposed by the modern variants eager to dissociate themselves from the old times. So, as far as I see, I can simply ignore the differences for the present purposes. One may point out that this neglect is entailed already by my decision to take propositions as truth bearers; all these subtleties are thereby erased. Yes, I admit this; this was indeed one goal of my decision.

There is finally a much younger and much less clear-cut family of truth theories, starting with the pragmatic theory of truth of Charles S. Peirce and William James at the turn of the last century and followed by ideas for a coherence theory of truth (see, e.g., Rescher 1973). The consensus theory (see Habermas 1973) made some contribution to this direction. Putnam's internal realism is to be listed here (best displayed in his 1983). Recently we have seen attempts to conceive truth as a kind of evaluational concept (see Ellis 1990). And so on. These theories are quite indeterminate and indeterminately different. For instance, the pragmatic theory takes truth to be the limit of inquiry, something desperately in need of explication. The coherence theory suffers from its continuous inability to characterize coherence more sharply than by metaphorics. The consensus theory seems flatly wrong, if not softened to the pragmatic theory. And so forth again.

It is easy therefore to ridicule this family of truth theories; nothing of that indeterminate kind could ever be said to give a definition of truth. Defenders often retreated to the position that they were offering only a criterion of truth. This may even be an enlightening hint. For the time being, though, it is not particularly helpful, since the notion of a criterion is as obscure as the truth theories it is to characterize.

What lets me count these theories as one family is a negative point they all share: a dissatisfaction with the correspondence theory and its variations. Let me try to sketch this dissatisfaction.

A first cause of concern certainly is the afore-mentioned triviality of the correspondence theory. Somehow, truth seems to be something substantial and important. So, if the correspondence theory does not get beyond its platitudes, there must be other ways to say more about truth. That is the mind-boggling quandary: you want to say more, but you cannot. I guess this partially explains the desperate intensity of the discussion among the variants of the correspondence theory: if you cannot say more, you at least

want to get right the little you can say.

Let us try, though, to get at the content of the disappointment. It consists, I think, in the fact that the correspondence theory as such is completely silent about the epistemological side of truth, how we learn the truth, whether we approach the truth, how, if ever, we can determine the truth. Rather, the correspondence theory stays entirely on the ontological side. There are two kinds of entities, truth bearers and truth makers, whether or not we conceive of them as I decided to do here, and there is a specific relation between them called truth. The misfortune is that the two kinds of entities are described or referred to by the same, or more or less the same linguistic means; whence the appearance of triviality. In the contemporary variants the ontological dimension is easily overlooked, since truth theory is rather treated as an intralinguistic play that can be studied neglecting the referential aspect of language. As soon as one puts back that aspect into the picture, the ontological character of the correspondence theory reappears.

One may counter that the epistemological side of truth belongs to epistemology, not to truth theory. Yes, maybe. One might still reply that in order to do its job properly epistemology must connect up with truth theory and that the correspondence theory or its variants are not responsive in this respect. I am unsure which stance to take in this dispute; I am even unsure whether I have to take a stance. As long as it is merely a dispute about the delineation of disciplines, it appears quite immaterial. In any case, the feeling of dissatisfaction remains.

So, where do we stand? Or rather, if the description given so far is as fair as it can be on three pages, how can we move ahead? One thing that urgently needs to be done is to improve on the state of the second family—let us call them the epistemological truth theories. This is very difficult; if it would not be so, these theories would already be in much better shape. And though I clearly see the need, I have nothing firm to offer in response.

If one had a better picture there, it would be of great help. Still, it would not settle the question how to bring all the truth theories I have mentioned into a scheme. This is another thing urgently needed. I would like to emphasize at this point that I have mentioned all the main offers on the market in my sketch. That is, it is not so that we should only look at theory X not mentioned so far in order to possess a more satisfactory scheme. The point also means that a scheme for the theories mentioned would indeed be a scheme for the theory of truth altogether; no important strand would be simply ignored.

So, how should we integrate the two families of truth theories, the ontological and the epistemological family, into one picture? Should we accept the unequal distinction between a primary definition and a secondary crite-

rion of truth and try to elaborate on it? In the sequel, I would like to pursue a different idea, the idea to embed the theory of truth into two-dimensional semantics that I think to be the leading paradigm in philosophical semantics; it could actually have acquired a status of orthodoxy already if it would not present itself in such a torn state. In order to explain this idea, I have to explain the essentials of two-dimensional semantics quite independently of all truth theoretic concerns.

Two-dimensional semantics is 30 years old, but its history is the history of the philosophy of language in general that moved into the center of theoretical philosophy in the beginning of the 20th century and was, no doubt, the most important philosophical achievement of its first seven decades. However, the theories of meaning developed there were burdened with an original sin. Meaning has an ontological aspect, since it comprises reference; with our words we describe and refer to what is. And meaning has an epistemological aspect, since it is more or less synonymous with cognitive significance; with our words we express our beliefs about what is. (Moreover, we *do* a lot of things with words; but this is not our present focus.) These two aspects were, however, hopelessly confused since (Frege 1892). The confusion shows up in the continuous double purpose intensions and propositions had to, but could not serve, in the continuous indecision between verifiability (or assertibility) and truth conditions, and at many other places.

The radical change came with Kripke (1972) and Putnam (1975) (and those preparing the ground like Dagfinn Føllesdal and Barcan Marcus—see, e.g., Føllesdal 2005). They pushed the ontological reading of intensions and propositions so forcefully that one could no longer mix it with epistemological ingredients and thus continue on the confusion. The hallmark of the change is Kripke's reform of modalities. There is (metaphysical) necessity (and possibility), there is apriority or epistemic necessity (and possibility), and the two are independent; analyticity is down-graded to a derivative notion and defined as a priori metaphysical necessity. However, necessity and apriority were not yet on a par; modal logic and intensional semantics were then reserved for the ontological aspect, and there was at first no corresponding theorizing for apriority.

This changed only with Kaplan (1989) and Stalnaker (1978), the birth of two-dimensional semantics in my view. The grand picture that thus emerged is this: There is the set of epistemic possibilities, there is the set of ontic possibilities, and there is a correspondence mapping epistemic onto ontic possibilities. Whether or not this correspondence is something substantial is not clear. In the beginning it was thought to be trivial and thus slipped attention—still a wide-spread attitude. However, since it will acquire some

importance here, let us give it a name and call it the *epistemic-ontic map* or the *EO-map*, for short. In the simplest case, assumed by Stalnaker, for instance, both kinds of possibilities are just possible worlds, and the EO-map is identity. Together, these two sets span a two-dimensional space of possibilities.

Now, every word or phrase receives, in a recursive way, a two-dimensional meaning that assigns a type-adequate extension to each point of this two-dimensional space of possibilities. This sounds abstract and formalistic, but it is most substantial. Let me explain this with the familiar example of the word 'water'. The two-dimensional meaning of 'water' provides an ontic intension for each epistemic possibility or situation. For instance, in the epistemic situation we actually live in the extension of 'water' is, for all we know, H_2O (in fluid form); and since 'water' is a substance word and hence a rigid designator, its extension is H_2O also in all other ontic possibilities. There are other epistemic possibilities, though, that we excluded after the rise of modern chemistry. In one of it, water might have turned out to be Putnam's *XYZ*; then water would have been *XYZ* in all ontic possibilities. Water might also have turned out to be a mixture of two or three substances; then water could have been any mixture of these two or three substances in other ontic possibilities. Each attempt to find a physical structure below the phenomenological level might have failed. Then the ontic intension of 'water' would have contained any kind of stuff with the same phenomenological properties water has for us. Thus, what is water in an ontic possibility from the perspective of our actual epistemic situation need not be water from the perspective of a different epistemic possibility, and vice versa. In this way the ontic intension of a linguistic expression may vary with the epistemic situation.

The two-dimensional meaning does not only contain an ontic intension for each epistemic possibility, but also an epistemic intension. How? Let us continue on our example. For each epistemic possibility we can ask what is water in this possibility. The two-dimensional meaning of 'water' provides an answer: it is the extension assigned to this epistemic possibility and the very same possibility taken as an ontic possibility. In this way the two-dimensional meaning defines a one-dimensional epistemic intension, i.e., a function from epistemic possibilities to type-adequate extensions. In more technical slang, it is the diagonal of the two-dimensional meaning and hence also called diagonal intension. It is clear, though, that the definition of the diagonal involves what I called the EO-map; an epistemic possibility taken as an ontic possibility is just the EO-map of that epistemic possibility.

The epistemic intension of our example, the word 'water', is not easily described. The best short description is perhaps the one of Putnam (1975)—see

also the detailed discussion in (Haas-Spohn 1995, sect. 3.1–2)—that in each epistemic possibility the extension of 'water' consists of those samples that consists of the same fluid as those examples that we take there as our familiar paradigms of water. One difficult point here is that each of the paradigms is defeasible, though not most of them. Another difficulty clearly recognized by Putnam is that consisting of the same fluid is not well determined, but stands for whatever empirical research on that epistemic possibility would end up classifying as the same fluid. We abbreviate this by saying that 'water' is a substance word or a natural kind term; but this only hides most complex epistemic dispositions.

What I have thus explained and exemplified is how the two-dimensional meaning determines two kinds of intensions: an epistemic intension and for each epistemic possibility an ontic intension. One can view, however, the matter the other way around. We may start with a word's epistemic intension, then project its ontic intension in a given epistemic situation from its extension in this situation (i.e., assigned to this situation by its epistemic intension), and thus arrive at its two-dimensional meaning. This is, in a nutshell, David Kaplan's (1989) theory of direct reference.

Kripke's (1972) pair of modalities is well accounted for within this conceptual scheme. A sentence expresses an (unrevisably) a priori truth if its epistemic intension assigns truth to each epistemic possibility; there is no way then for such a sentence to turn out false. And in a given epistemic situation a sentence expresses a metaphysical necessity if its ontic intension in this situation assigns truth to each ontic possibility; in that situation this sentence could not be false. (Finally, a sentence is analytic if its two-dimensional meaning always assigns truth.) This must suffice as a very rough sketch of two-dimensional semantics.

The picture offers a grand promise. There are ontology and epistemology, the two basic disciplines of theoretical philosophy. They span the space of meaning, the third fundamental topic. Two-dimensional semantics then promises to clearly separate ontological and epistemological aspects of meaning and at the same time to articulate their relation, in terms of the EO-map and diagonalization. There is hardly anything deeper to accomplish in theoretical philosophy. Chalmers (2006) speaks no less emphatically of the golden triangle of meaning, reason, and modality. I am convinced that this formal frame is basically sound and a great theoretical advance. There is always the danger to distort phenomena in order to squeeze them into a given frame. My continuous experience, however, is the reverse, namely that the two-dimensional frame is of great help in getting clear about the phenomena.

I should not give the impression, though, that two-dimensional seman-

tics and its interpretation would be a settled affair. It is not at all. It has surprisingly little radiated outside philosophy. And within philosophy its claim is contested. Even among its supporters its interpretation is contested, as is indicated by the fact that the two kinds of intension carry several different names (see, e.g., the impressive list of possible interpretations in Chalmers 2006). There are indeed many subtle differences and distinctions that should be observed and critically discussed in a thorough treatment of the topic. Let us neglect these disagreements, though, since I am after more basic issues that arise however we resolve these disagreements and that I have hardly seen addressed. That is, I would like to more closely consider the basic architecture of two-dimensional semantics. One reason is, of course, that we cannot really understand two-dimensional semantics without being clear about its foundations. The other more topical reason is that we may thereby make progress on our truth theoretic quandary.

As I have explained, the basic architecture consists of ontic and epistemic possibilities and the EO-map connecting them. So, the first question must be: what are these ontic and epistemic possibilities? Well, they must be possible in some sense, they must be mutually exclusive, i.e., they are not compossible; they must be exhaustive, i.e., there must not be any further possibility besides them; and they must be maximal in some sense, i.e., no contingency may remain undecided in any of them. Because of the latter, philosophers tend to call them possible worlds.

Still, these basic assumptions do not inform us about the nature of those possible worlds. As long as we confine ourselves to doing modal logic or formal semantics, we need not know more, however. There it is fine to assume just a non-empty set W the elements of which are do-not-cares called possible worlds.

In the same attitude, one may say that both, ontic and epistemic possibilities, are possible worlds, whatever these are. In this case, the EO-map simply reduces to identity. Most would grant, though, that epistemic possibilities are slightly more complicated, namely centered possible worlds. The reason is (see Lewis 1979) that I may have beliefs *de se* and *de nunc* that are about me or about the presence directly and not via the presentation by some eternal description. If the contents of such beliefs are to be represented as sets of possibilities, these must be centered worlds, i.e., triples $\langle w, s, t \rangle$ consisting of an uncentered world w and a center, i.e., a subject s and a time t in the center. Thereby, however, the EO-map hardly becomes less trivial; now it is truncation, cutting off the center from a centered world and leaving an uncentered world.

Indeed, I have argued in (Spohn 2008, ch. 16) that epistemic possibilities should be augmented even by a sequence of possible objects; that is, however,

a different issue. When we look at linguistic applications of two-dimensional semantics, then we find epistemic and ontic possibilities being called contexts and indices. Indices do not only contain worlds, but everything that can be shifted or quantified in natural language, and contexts contain contextual parameters on which the reference of linguistic phrases may depend (see, e.g., Lewis 1980 for further explanation). Still, contexts consist of larger lists of parameters than indices—this must be so, if diagonalization is to be applicable—, and the EO-map is again nothing but truncation.

As philosophers we cannot be content with these statements; we still do not know what the basic entities, the possible worlds are. My impression is that the default answer has become: Lewisian worlds (as explained and defended in book length in Lewis 1986). Apparently, the criticism in (Lewis 1986, part 3) of all the other ways of conceiving possible worlds has proved to be convincing. A Lewisian possible world is a maximal possible object endowed with some space-time analogous extension relative to which maximality makes sense at all. This extension need not be Euclidean (and hence need not conform to Kant's a priori forms of intuition). What precisely counts as space-time analogous is not so clear; even Lewis himself remains inconclusive (see Lewis 1986, sect. 1.6). Moreover, a Lewisian world is fully determinate. Everything there is to it is essentially so. Each difference makes for another possible world and not for the same world with slightly different features.

So, this is what possible worlds usually are supposed to be. I have indicated the negative argument. One hardly finds a positive argument, though; maybe emphasizing that Lewisian worlds are metaphysically possible worlds already qualifies them as ontic possibilities. Add a center, and you have an epistemic possibility, requiring just truncation as EO-map. That is then the complete basic architecture for two-dimensional semantics.

The latter point, however, is a bad argument. Whenever I assume something for whatever purposes, this assumption is of an ontological character; that alone does not yet make it an ontic possibility as used in two-dimensional semantics.

Indeed, at least Chalmers (2006) has doubts about the architecture. He calls epistemic possibilities scenarios. To understand scenarios as centered metaphysically possible worlds is one feasible option for him. He prefers another option, though, because it is more illuminating or because the first option rests on assumptions that may not be acceptable. According to this second option, scenarios are maximal hypotheses, i.e., linguistic-conceptual constructions, and he thinks there is a neutral canonical vocabulary for expressing such maximal hypotheses. Now the EO-map turns into something substantial. It presupposes at least the claim that for each scenario there is a

unique Lewisian possible world (and a unique center) that is completely described by the scenario. I have no clear objection against Chalmers' conception. However, I deeply mistrust Chalmers' conceptual foundationalism, his idea that ontological supervenience of everything on fundamental physics (whatever that is) could be copied on the conceptual side. Carnap's *Logischer Aufbau* did not work; no successor did get much farther; and if the many intimations in the literature about the holistic character of concepts (see, e.g., Esfeld 2001) are basically true, such programmes cannot work. Still, I find Chalmers' thinking congenial at least insofar as he takes the EO-map as something deeply in need of explanation.

In any case, my picture is a different one. I think that Lewisian worlds, or rather centered Lewisian worlds, are precisely suited as *epistemic* possibilities. I said that a Lewisian world is a fully determinate maximal object. However, such a maximal object is a maximal black box for us; it is entirely unknown, indeed unconceived. It is the raw material of our epistemic endeavour. Thus, an epistemic possibility is not something constructed out of concepts prefabricated in our mind; it is rather something concrete, real, and external on which we can try and exercise our minds, just as our actual universe. In fact, it is something containing us at some time, whatever we are. Hence, an epistemic possibility must be a centered Lewisian world. We might also call such an epistemic possibility a noumenal world in the sense of Kant (1781/87), if we avoid the association of there being an inaccessible or unknowable reality. It is rather the as yet inaccessed and unknown point of departure of our cognitive efforts.

Now, confronted with such a Lewisian world we develop concepts and form beliefs. Concept formation has presuppositions. Worlds that would not stimulate our senses do not even allow us to form purely perceptual concepts. Deferential concepts require the embedding into a linguistic community to defer to. And so forth. The concepts we actually have would not fit most of the worlds, and the beliefs we actually have exclude still much more. But we might have other beliefs and even other concepts, depending on the epistemic possibility we encounter. I guess that most possibilities would be completely dark and barren—unless we exclude them on a priori grounds and take the sensibility and the conceptualizability of an epistemic possibility not as a harmony actually pre-established by evolution, but as an a priori truth.

When starting the process of concept and belief formation vis á vis a Lewisian world, what is the goal of this process? A goal that we shall never reach even in the case of the actual world and that is never reachable by all human standards? Of course, we always move in the middle of the process, very far from the beginnings and very far from the end. It is obvious that I do

not want to draw a picture of the actual ontogenesis or phylogenesis of our cognitive life as individuals or as a species. The purpose of my far-fetched speculations is rather to gain at least a frame for describing the process we are always amidst, a frame I take two-dimensional semantics to be providing.

So, to repeat, what is the ideal end of the process of concept and belief formation? In the end we have fully investigated the Lewisian world and have completed our judgment about it; all the evidence, even if only counterfactually available, is acquired, and all even only counterfactual ways to improve our judgment according to our rules of rationality are exhausted. Then we have reached a state of omniscience, no proposition remains undecided, we know the nature of every object and every property and relation, and we know all the properties of and all relations among the objects existing in the world.

What we have thus determined is, I contend, an ontic possibility, a totality of coexisting states of affairs, a possible world as Wittgenstein (1922) has conceived it and as Armstrong has repeatedly explained it, e.g., in (Armstrong 1997). Lewis (1986, sect. 3.2) denounces these Wittgensteinian possible worlds as Lagadonian ersatz worlds, as he calls them, since he senses linguistic residues. Unjustifiedly, in my view. One must conceive of such a Wittgensteinian world in a purely ontological and, to be more specific, essentialistic way. Each object is individuated by its possibly or usually relational essence; properties and relations are individuated by metaphysically necessary equivalence; states of affairs are built from objects, properties, and relations; and a Wittgensteinian world is a maximal collection of states of affairs in which the objects have properties and relations within their ranges of contingency (what maximality is to mean here needs to be specified). Indeed, such a Wittgensteinian world is the essence of the corresponding Lewisian world; all states of affairs obtaining in a Lewisian world do so necessarily. (This is not to say, of course, that these states of affairs themselves would be necessary.)

Thus, the EO-map is not trivial at all. It is inconceivably complex; it embodies nothing less than the full transformation of a Lewisian into a Wittgensteinian world by a complete process of concept and belief formation. Hence, we can substantiate the EO-map only by developing detailed accounts of this process. Haas-Spohn and Spohn (2001) provide, I believe a crucial, though very incomplete element of such an account. In any case, this development seems to me be one of the most urgent philosophical tasks.

In a way, we might understand an ontic possibility, a Wittgensteinian world, also as a phenomenal world in the sense of Kant (1781/87), when fully conceptualized and judged. I am certainly not entitled to engage here in Kant exegesis. Also, we should not enter Kant's elaborate, but foreign the-

ory of concept formation or any of his idealistic verbiage. I think, however, that when Kant is pondering about noumena und phenomena he is partly struggling with similar issues as we find them at the foundations of two-dimensional semantics.

Now I can finally close the circle of my consideration. I took propositions as truth bearers and worlds as truth makers. Now we have two kinds of worlds, and so we have two kinds of propositions. I also said that, when we have specified the truth relation, we can simply represent propositions as sets of worlds, as truth conditions. This still holds, and so we have Lewisian propositions as sets of Lewisian worlds and Wittgensteinian propositions as Wittgensteinian worlds. However, we have not yet specified the appertaining truth relations; they are indeed quite different.

I contend that the truth relation between Wittgensteinian propositions and worlds is the correspondence notion of truth, indeed a particularly trivial version of it, i.e., almost the identity theory. There are elementary states of affairs built from objects, properties and relations; they can be composed by logical or Boolean operations to form arbitrary complex states of affairs or Wittgensteinian propositions. And such a proposition is true in a Wittgensteinian world if it obtains in that world, i.e., if it is included in that maximal collection of states of affairs that is that world. This given, we can, of course, reconstruct Wittgensteinian propositions as sets of such worlds.

With Lewisian propositions and worlds it is quite different. I further contend that the truth relation appropriate to them is some as yet ill-defined pragmatist or coherentist notion of truth. There are elementary possible belief contents built from concepts; and they can again be composed by logical or Boolean operations to form arbitrarily complex Lewisian propositions or belief contents. Such a proposition is true in a Lewisian world if it would be believed after a complete process of concept and belief formation about this world, if it would be contained in the ideal theory about this world. This appeals to Peirce's ideal limit of inquiry, to Putnam's ideal theory that cannot be wrong, to coherentism, since considerations of coherence will enter any process of belief formation, to rationality, of course, since ideal belief formation is a rational one, and so forth. I said this is ill-defined and urgently needs substantial clarifications. This, however, must not keep us from seeing some such notion being required at this theoretical place. If this notion were provided—a big 'if'—, then, of course, we can reconstruct Lewisian propositions as sets of Lewisian worlds.

I cannot dispel the worry that I am relying here on too indeterminate a notion. For those, however, who find the correspondence notion of truth too trivial, there may be more substantial offers. We may say, for instance, that a Lewisian proposition, a belief content, is true in a Wittgensteinian world

and thus corresponds to the facts if this world is the EO-map of a Lewisian world in which the content is true. However, this notion presupposes the notion of an EO-map that is of the same indeterminate kind as the notion of truth for Lewisian propositions and worlds.

In any case, this is how I see the foundations of two-dimensional semantics connected with the long-standing dispute about theories of truth. There is not a primary definition and a secondary criterion of truth. Rather, the two big strands of truth theories are on equal footing, they find their proper place in the two dimensions of two-dimensional semantics, and they are related via the substantial EO-map that deserves all our further philosophical scrutiny.

Bibliography

Armstrong, D. M. (1997). *A World of States of Affairs*, Cambridge University Press, Cambridge.

Chalmers, D. J. (2006). The foundations of two-dimensional semantics, *in* M. G. a Carpintero and J. Macià (eds), *Two-Dimensional Semantics*, Clarendon Press, Oxford, pp. 55–140.

Ellis, B. (1990). *Truth and Objectivity*, Blackwell, Oxford.

Engel, P. (2002). *Truth*, Acumen, Chesham.

Esfeld, M. (2001). *Holism in Philosophy of Mind and Philosophy of Physics*, Kluwer, Dordrecht.

Føllesdal, D. (2005). Five questions to a formal philosopher, *in* V. F. Hendrcks and J. Symons (eds), *Formal Philosophy. Aim, Scope, Direction*, Automatic Press, pp. 35–51.

Frege, G. (1892). Sinn und Bedeutung, *Zeitschrift für Philosophie und Philosophische Kritik* **100**: 25–50.

Haas-Spohn, U. (1995). *Versteckte Indexikalität und subjektive Bedeutung*, PhD thesis, Univesity of Tübingen, Berlin: Akademie-Verlag.

Haas-Spohn, U. and Spohn, W. (2001). Concepts are beliefs about essences, *in* A. Newen, U. Nortmann and R. Stuhlmann-Laeisz (eds), *Building on Frege. New Essays on Sense, Content, and Concept*, CSLI Publications, Stanford, pp. 287–316.

Habermas, J. (1973). Wahrheitstheorien, *in* H. Fahrenbach (ed.), *Wirklichkeit und Reflexion. Walter Schulz zum 60. Geburtstag*, Neske, Pfullingen, pp. 211–265.

Kant, I. (1781/87). *Kritik der reinen Vernunft*.

Kaplan, D. (1989). Demonstratives. an essay on the semantics, logic, meta-physics, and epistemology of demonstratives and other indexicals, *in* J. A. et al. (ed.), *Themes from Kaplan*, Oxford University Press, Oxford, pp. 481–563. manuscript.

Künne, W. (2003). *Conceptions of Truth*, Oxford University Press, Oxford.

Kripke, S. A. (1972). Naming and necessity, *in* D. Davidson and G. Harman (eds), *Semantics of Natural Language*, Reidel, Dordrecht, pp. 253–355, 763–769.

Lewis, D. (1979). Attitudes *De Dicto* and *De Se*, *Philosophical Review* **88**: 513–543.

Lewis, D. (1980). Index, context, and content, *in* S. Kanger and S. Öhman (eds), *Philosophy and Grammar*, Reidel, Dordrecht, pp. 79–100.

Lewis, D. (1986). *On the Plurality of Worlds*, Blackwell, Oxford.

Putnam, H. (1975). The meaning of 'meaning', *Mind, Language and Reality. Philosophical Papers*, Vol. II, Cambridge University Press, Cambridge, pp. 215–271.

Putnam, H. (1983). *Realism and Reason. Philosophical Papers*, Vol. 3, Cambridge University Press, Cambridge.

Rescher, N. (1973). *The Coherence Theory of Truth*, Oxford University Press, Oxford.

Spohn, W. (2008). *Causation, Coherence, and Concepts. A Collection of Essays*, Springer, Dordrecht.

Stalnaker, R. C. (1978). Assertion, *in* P. Cole (ed.), *Syntax and Semantics*, Vol. 9 of *Pragmatics*, Academic Press, New York, pp. 315–332.

Wittgenstein, L. (1922). *Tractatus logico-philosophicus*, Routledge & Kegan Paul, London.