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Logic – A map of language?

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In my doctoral thesis, I have argued that the formal system of logic fails as a tool for language. I have attempted to demonstrate that formal logic is inadequate as a tool for deciding truth and validity, and that it cannot offer us any clarifications with respect to how we do, or ought to, reason with language.

But this inadequacy of logic is not caused by some plain and amendable technical mistake within the system. Rather, the very philosophical foundation that the logical system is built on contains some fundamentally mistaken principles and presuppositions about language, – and about the relation between language and the world.

In this lecture, I will try to illustrate how I view the relationship between logic and language, by means of an allegory that should be widely known, – namely that of the map and the landscape.

1.

The most exciting thing about travelling, I think, is the first meeting with a place. – To nose around, taking in all the new impressions: the sounds, the smells, the surroundings and the atmosphere. And then, to become familiar with the neighbourhood: looking for the most charming café, the best eatery, the local pub, the galleries of modern art, and so on. – That's the thrill about new places.

But of course, I like to do some planning. Being an efficient woman and – a bit of a control freak – I like to make sure that I don't miss out on the best sights. So I do my homework before leaving: I scan a couple of travel guides, look at maps, and make a few searches on the Internet. This way, I can plan what I want to see during my stay, – which in my opinion adds some scope and focus to the whole exploration.

My husband, Jon Henrik, on the other hand – who is not an efficient woman like me – does not like to travel by the book. He prefers to wander around, without direction, and face circumstances as they come along. The compromise is that we explore one neighbourhood at a time, leaving my husband room for aimless strolling, and me some scope and focus. By marking my preferred sights on a map, I can make sure that we pass them all at least once.

Now it turns out that, since Jon Henrik is strolling around, letting his eyes wander in all directions, totally independently of the guidebook; he often discovers other and perhaps much more interesting things, than the ones I am looking for: A charming café; a small second-hand bookstore; and a magnificent modernistic bridge in steel, made by a Finish designer and architect. And much too often, I fail to notice these important sights, just because they are not mentioned in the guidebooks.

Sometimes the guidebook is even outdated, and the new attractions are not even marked on any of the maps.

So with my nose stuck in the map most of the time, letting the guidebook define and delimit my focus, I would have missed out on some of our best travel experiences if it hadn't been for Jon Henrik's totally unguided exploration. But on the other hand, Jon Henrik would have missed out on a lot too, if it weren't for me and my guidebook. A good and updated guidebook is therefore nothing to sneer at. If I can get hold of the best guidebook there is, then I should of course be able to at least trust its recommendations.

Logic is kind of like a map, and its terrain is language. The map of logic is supposed to help us orientate in the complex landscape of language. The guidebooks of logic, the introductions to formal logic, offer us an insight into the essentials of language, such as for instance connectives, quantifiers, functions, variables and inferences. It also contains a list of all the dos and don'ts, the "unwritten rules", of language. These are the basic laws of language, such as the law of contradiction, the law of excluded middle, the principle of substitution, and so on.

The logical guidebooks will thus guide us in the most basic activities of language, like the making of sound and valid inferences. So if we want to use language in a correct way, the guides in logic will help us out. By following the outlined rules of logic, and by following the guides step by step, we can all reach the goal: a rational, sound and valid use of language.

2.

When I first got introduced to the system of logic, it was my conviction that logic worked as an informative and useful map of language. Following its rules and principles, I made valid inferences by the yard, which I considered an extremely rewarding activity.

But soon I came to understand that this system involved some considerable flaws, – first of all with respect to if-then statements, or conditionals, as they are called. By using the logically defined conditional, the material conditional, it was possible to construct valid arguments containing a set of true premises and a false conclusion.

This was totally in contradiction with the intention of the logical system, – which was to prevent derivations of false conclusions from a set of true premises. The system also enabled false statements to come out as true, and true statements to come out false. Could this really be an adequate map of language? I began to seriously doubt this. My love and affection for the logical activity of calculating truth and validity motivated me to set out to solve this annoying little problem concerning conditionals. And during the work on my doctoral thesis, I have ended up arguing that the guidebooks of logic are based on a mistaken map of language.

The map fails to outline the natural borders in language. And it seems to contain borders where there are none in language. The map also seems to be devoid of vegetation and variations in the landscape, in that it totally ignores the complexity and flexibility of language. So the overall impression of the logical map, then, is that, in containing no superfluous details whatsoever, it is easy

to understand and follow. But, on the other hand, the map does not contain the essentials of the terrain, or the information found on it is often wrong when compared to the landscape.

During the eight years that I ended up working with this “small” problem, trying to figure out its cause in order to find a solution, I have come to some clarifications with respect to how one is not supposed to view the relation between logic and language: For instance, I am told that the map of logic is not necessarily intended as a pictorial map over language, taking in every little detail of the landscape. Rather, a functional map is supposed to serve a certain purpose. All maps therefore contain a minimum of information, carefully adjusted to the purpose that they are supposed to serve. A map will then necessarily be a simplification of the landscape that it is a map over. – And the scale will be considerably smaller, – all for practical reasons.

This is for instance seen in the way that we have different maps for different purposes: We have weather maps, road maps, orthographical maps, maps over technical installations, maps for navigation on sea, historical maps, and so on. So that one single map cannot provide all the information we would ever need about the landscape does therefore not in any way mean that the map is not an adequate map of the landscape. So even though we for instance acknowledge that language also consists of speech acts, implicatures, metaphors, etc., I am told that these properties of language do not necessarily have an obvious or natural place on the map of logic.

A map is accordingly not adequate or inadequate as such, – it is adequate according to how it fulfils the requirements of its purpose. Naturally, one cannot use a road map for navigating at sea, and a historical map cannot help us locate technical installations in a building. And since logic is not intended as a complete representation of language, it cannot guide us through every single aspect and detail of language, as for instance speech acts and implicatures. But it might still be an adequate map of language, providing a tool for orientating in language with respect to the calculation of truth and validity.

For instance, the city map of Oslo is a useful tool for orientation in the streets of Oslo, although it is not in any way intended as a completely detailed representation of the city. The map contains the names of streets and places, and the main roads are emphasized. By following it, I can get an idea of the different ways to get from A to B, and it is also helpful if I’m lost or wonder where I am. If the map were a *photo* of Oslo, on the other hand, it would of course have been a much more representative image of the city. – But it would not serve the purpose of a map. A photo would not be able to serve as a tool the way the map does.

3.

The map of logic cannot be like a city map, and most logicians would claim that it is not intended as one either. Its rules and distinctions are intended as much more fundamental, and its scope and limits are much more clearly drawn. The city map, on the other hand, contains all these details, like buildings, parks, pathways, and so on. That is, a city map of language would include truth conditions, assertion conditions, speech acts, and so on. Furthermore, a city map must be revised almost every year: – New houses and roads are being built, rivers are dried out and forests are cut down.

The map of logic is however meant to sketch the *core* of language: its never changing, underlying, fundamental structure and principles. If we dig a bit deeper into the landscape of Oslo, then, we get to another level, – to a much more simple and clear-cut landscape. This is the subway system of Oslo. This system consists of five lines and about a hundred stations. The stations are located at various places in Oslo.

By taking the subway – instead of going by bus, tram or foot – one gets from A to B without getting lost in the complex city structure: Roads, short cuts, one-way streets and a large number of bus- and tram routes. The subway system takes the shortest path, and it can do this because it is not controlled or restricted by the structure of the landscape. No buildings, one-way streets, parks or traffic jam can get in the way of the subway.

In this way, the subway is kind of like an *ideal* landscape, – at least when it comes to fast and smooth transportation from A to B. Let's therefore say that, while language is like the landscape of Oslo – with all its variety and complexity – logic can be seen as a map over the subway system.

We thus see that we are talking about two different structures here; where one is a complex landscape, and the other is a map of a more simple landscape.

If we then compare the city map of Oslo and the map over the subway system, we see that the map of the subway system is extremely simplified and without any excessive details. It only contains the names of the stations, the placing of the stations in relation to each other, and the corresponding lines. These simplifications are made for practical reasons, in order to serve the map's purpose. Of course, we are not interested in knowing every little turn on the trail, – nor are we concerned with the distance between the stations. All we want is to find out, how to get on the right trail, and off at the right station!

4.

But what if it turns out that, when you use the map over the subway system, you end up at the wrong subway or at the wrong station? – If the map tells you, that you are now at Blindern; while when you get off, you find yourself being at Grorud. – Isn't the map then useless as a map over the subway system?

In my thesis, I argue that the map of logic does not get the job done, – even for the narrow purpose that it is intended to serve. When we cut to the bone, and say that logic is only intended as a map of language with respect to truth and validity, – and the map *still* can't deliver the goods; – then what's the point of having such a map at all? What do we need it for? And who would ever consider buying it?

One would expect that the market for such a map would eventually dry out for obvious reasons. But surprisingly, it is printed in new editions every year, and promoted as the one and only correct map over the subway system. How could this be?

Well, the point is that, if one really is into maps, and one likes to look at maps, study maps, draw maps, and imagining travelling on the map – like many people actually do – then one would never find out that there's something wrong with it.

If one sits at home, imagining taking the subway to different stations – studying what train goes to which stations, the various ways to get from one station to another, and so on, – well – then this is a self-rewarding and self-sufficient activity. And this is very often the case with logic. Being more interested in the logical system as a formal system rather than as a tool for language, one seems to lose oneself in all the intricate and appealing details of formalism. And then it's much more interesting to construct meta-proofs of the soundness and completeness of the system, than to have to explain away all the counterintuitive results one gets from applying the logical system on language.

So what was initially supposed to be a *tool* for the use and understanding of language, has started to live its own life as an *autonomous system*. Once the map is considered to have a value *independently* of the actual landscape of the subway system, we are not far from asking whether the map really needs the landscape at all. We can even ask what is most *real*: the map or the landscape? This may seem absurd in the map-landscape discussion. But in the logic-language discussion, the separation between the logical system and language opens up for all kinds of philosophical misunderstandings:

First of all, we can claim that the map is more accurate than the landscape, – being ideal and everything. This means that, if the map takes us to the wrong places, then this is so not because the map is wrong. – It's because this is where the place *ought* to be located in an *ideal* landscape. So, if the map takes us to Grorud when it is supposed to take us to Blindern, – this is because Blindern should have been located at Grorud. By following the map, then, we get insight into what the landscape would have been like, – if it had been an ideal landscape.

Now, during the decades with firm indoctrination of the ideal map, students of logic have been lead astray: Blinded by the beauty of an ideal map, they have taken the subway to Blindern, without even noticing the fact that they are actually at Grorud. And when someone, once in a while, discovers this fatal mistake; they are told by some devoted map drawers that they actually need a second map, in addition to the logical and ideal map. This is because, even though the logical map is ideal, and therefore more accurate than the actual subway system, it cannot be used or believed in our everyday travel.

So what they need in addition is a more *pragmatic* map, where the actual use of the subway system is taken more into account. But of course, even this map cannot be totally in correspondence with the subway system, – since it is, after all, supposed to be based in an understanding of the logical map as the ideal subway system. This means that one should really not use the pragmatic map either, – if one wants to get on the right train and to the right station.

5.

But where's the sense in all this? Shouldn't the map be based in the actual landscape? Isn't it only fair and square to take the actual stations as the starting-points of where to place them on the map?

Once we claim that the map is more accurate than the landscape, we seem to have gone outside the borders of common sense. But also, we seem to have presupposed that the map is an autonomous system, detached both from the subway system and from the overall landscape. When the map is considered as autonomous in this way, separated from the context of use and from the context of the landscape, – then we can begin to think that the map has a use independently of the landscape. Instead of regarding the map as a tool for orientation in the landscape, we will then think that the map and the landscape represent two separate systems.

Secondly, with the separation between the map and the landscape, we might begin to think that the map is what actually enables us to understand the landscape.

Without the map, then, we seem to have no way to orientate in the landscape. From this misunderstanding, we can go even further, and begin to think that we have access to the landscape only through the map. But this is in no way the end of the story.

To think that we have access to the landscape, *only* by way of the map, opens up for even more fundamental misunderstandings. We can for instance begin to ask ourselves how we can be certain that other people are equipped with the same map as we are. And how can I prove that they are? And if I can prove that they are, do they understand the map in the same way as I do? Are they not all just taking the subway here and there, seeming to know what they are doing, but actually being totally confused? Are other people following the map at all, or are they just coincidentally ending up at stations? And, perhaps even worse: How can we be certain that we actually have access to the landscape through the map? What makes it possible for us to infer, from the fact that we have a map, that it actually is a map of something? How can we even know that a landscape exists, independently of the map?

These and related questions place us outside the landscape. So while we stand there on the outside, – looking into the landscape, we can start wondering whether we are totally alone in the world. We understand ourselves as separated from the landscape, – only equipped with a map to guide us. But what we then seem to forget, is that we are *always already* in the landscape, – just like we are *already in the world* and like we *actually use language*. We also forget that the map wouldn't even make sense to us, if we were not already in the landscape.

So my claim is that a sceptical position is founded on a misconception of the relation between the map and the landscape. And what makes this misconception possible at all is that we all of us have plenty of examples where the map has actually helped us to orientate in the landscape. But of course, a map can be very helpful. We can use the map to find out where we are and where we are going, and how to get from where we are to where we are going. But in the case of formal logic, this leads us to the philosophical misunderstanding that we can actually start on the outside of the landscape, and use the map to orientate us back again into the landscape.

6.

My point is that a map gets its function and meaning as a *tool* for orientating in the landscape. And without the landscape, the map doesn't even make any sense. If we start questioning our placement in the landscape, and think that the landscape is dependent on a decent subway map, – then we

have turned the whole map-landscape issue around. Then we also seem to forget that the map is drawn on certain premises, and that it is made to serve certain purposes. We also seem to forget that, in order to serve a certain purpose, the map contains several limitations in relation to the landscape. It is not the landscape that is limited in relation to the map.

This means that, when a statement is judged as true within the logical definition, but is actually false according to our intuitive understanding of it, it is our common sense that is right, not logic. The same holds for inferences. If an inference is defined as valid by the logical system, but contains intuitively true premises and an intuitively false conclusion, then logic is not in a position to correct our common sense.

In my thesis, I claim that the logical map is useless for the purpose of orientating us in the landscape of language, – even on its own limited premises. In fact; if we let logic guide us in our use of language, we will end up in a trivial world, where all true statements entail each other, and all false statements entail each other. This means that, since it is true that I am a woman, and it is true that I have a bike, I can infer that “If I am a woman, then I have a bike”. But this is basically the same as saying that I have a bike *because* I am a woman. And we cannot be sure of that. Logic even enables me to say that: “If I have a bike, then I am a woman”. And perhaps worse, I can claim that “If Hitler was alive today, he would have been a very popular movie star”. And I can do this just because I know that Hitler does not live today, and that he is not a very popular movie star.

As we can see, then, to let logic guide us in the use of language, will commit us to claim truth and validity where there actually are none. Let me take an example of an inference where we have true premises but a false conclusion, but where we still are committed by logic to say that the inference is valid, and hence, that the conclusion actually is true.

P1:	If God does not exist, then it is not the case that if I pray, my prayers are heard (by Him).
P2:	I don't pray.
Concl.:	
	God exists.

By using logic to check this inference for validity, we will get the result that the conclusion is true if the premises are true. Accordingly, the logical system will judge this inference as valid. So if we accept both the premises, we must also accept the conclusion. I will demonstrate how this works:

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|----|------------------------------------|---------|
| 1. | $\neg p \supset \neg(q \supset r)$ | P1 |
| 2. | $\neg q$ | P2 |
| 3. | $q \supset r$ | 1, 2, T |
| 4. | $\neg\neg(q \supset r)$ | 3, T |
| 5. | $\neg\neg p$ | 1, 4, T |
| 6. | p | 5, T |

But can we actually infer that God exists on the basis of these two premises? Even if we consider both the premises to be true, we would not thereby consider the conclusion to be true. This means that the formal logical system allows inferences that we would consider neither rational, nor logical.

How can a map enable us to travel to stations we don't even know whether exist or not? When we can use a logical system to derive the truth of God's existence from plain and in an everyday situation accepted premises, what else will this system enable us to do? Can this be called a map at all?

7.

It seems clear, then, that a map is not only a map. – We have good maps and we have bad maps. But the idea of a map involves the idea of a *functional* map; – a map that is correct and useful. The same holds for logic.

The logic that I am criticizing is a formal system that is supposed to define and determine what's logical and what's not. But the logic that we *think* we are dealing with is what we tend to think of as synonymous with "rational", or even "sound" or "plausible". This means that we use the term "logic" in an intuitive sense. The problem is that this formal system seems to have copyright on the concept of logic. This means that when we hear the word "logic", we confuse it for the non-technical and intuitive sense of the word. But, in fact, when something is "true", "valid" and "sound" according to the formal logical system, this does not at all mean the same as "true", "valid" and "sound" according to how we actually and rationally use and understand language.

This means that the formal logical system does not even deserve to be called "logic" at all. Rather, we should only call it a *formal system*. The term "logic" should however be reserved for talk about rational, sound and valid reasoning in the intuitive sense that everybody somehow understands. And a formal system is only a formal system. – It is not a *language*. And if a formal system cannot serve as a tool for reasoning in language, it does not even deserve to be associated with language, – or with logic.

The inefficient and inadequate system of logic is a result of a misconception. This misconception is to think that we have to be placed in a position outside of our context, in order to grasp the core, the underlying principle, of language. We then seem to believe in some clear-cut distinction between an idealized, context-free, rational and trustworthy core, on the one hand – namely logic – and some phenomenological, contextual, fallible and unpredictable language, on the other.

But it's not language, in its great variety and complexity, that is limited, fallible, or in any way imperfect. It is the system of logic that has a limited use, and that contains mistakes and that is imperfect, – both in relation to its purpose and in relation to language. That it is possible to go wrong in a landscape, – that some roads have the same name or that someone might misunderstand where we wanted to go; – these are not shortcomings of the real-life landscape.

That the map of logic might seem to add some clarity and precision to our understanding of the complex landscape of language, is thus an unmitigated illusion. Alone, the rules and definitions of logic do actually not make any sense at all. To the degree that the logical system seems plausible, it is because it draws upon a natural language understanding. Logic does not by any means have an independent, meaningful use outside of the context of language. In fact, we are not even able to spell out the rules and definitions of the logical system, without the use of natural language expressions. – After all: What is a map without a landscape? At least, it cannot be called a map.

In this way, logic is parasitic on language. Logic gets its plausibility and meaning totally from language. It does not get its meaning from some set of rational, analytic, unintuitive and non-empirical principles of logic, that are taken as fundamental rules for how we ought to use language, *if* we were to use it in a purely rational and logical manner.

Logic is still today seen as the ultimate scientific tool, free from metaphysical presuppositions, and free from the possibility of error. In my doctoral thesis, I have argued that logic is everything but this: The map of logic is not rational or ideal in any way. – In fact, it is not even *logical*.