Lab notes

Digital appendix forming part of the data package for my thesis (Eide, 2012).

The data package can be found at:
http://www.oeide.no/dg/dp/ (checked 2012-08-29)

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Contents

1 Introduction

What follows after this introduction are notes made during the process of modelling. They should be read as "thoughts in action" and are not conclusive. See the thesis text (Eide, 2012) for a scholarly presentation of the results from the PhD project.

These lab notes should be read in connection with the source code for the application GeoModelText and a running version of it, as well as with the data files used in the project. All this is available from http://www.oeide.no/dg/dp/ (checked 2012-08-27).

2 Preliminary tests

In February 2010, the tool was at a stage when it was usable, although bug fixing and adding of functionality continued in parallel. The first witness whose statement to be worked through was Lasse Jensen Femund, on page 9–14. What is modelled is the paragraphs for which he is defined as the speaker.

- Paragraph 8302: The sequence "og er der ingen græsgang paa den Side." is not modelled.
- Is it really possible to read and understand the text without either knowing the landscape or sitting with a map?
- part-of is transitive.
- Paragraph 9276: "Mellom" pose a problem when you do not have the directions so you cannot use transitivity. That is, for a triple. Solution: $between(A, B) \wedge between(A, C) \equiv A\ is\ between\ B\ and\ C$. This implies that one place can only be connected unambiguously in the between-relation to one pair (or set) of places.
- Same goes for "division", as in "Om dette Sluggu Field har hand hørt at det Skal giøre Skillet imellem Eire bøyd og Tennes bøyd Herjedalen;" (para 9708).
- What if there are things that cannot be modelled in the conceptual model (or in *any* conceptual model? We can assume such things cannot

be expressed on a map either, but we do not know that, and there is no way to find out using conceptual modelling.

- It is clear that the paragraphs connected to a speaker (or, for that sake, Schnitler) can in some cases be seen as entities in the experiments, e.g. is this speaker coherent? Is he in line with other speakers? But what, then, with things such as "Stadfæster han det første viidnes udsagn i alle Ting" (para 9837)?

- To add a comment to a fact, use an entity with type "comment". See 9837. But I have to link to the entity, not the property — thus, need a better comment procedure. Some kind of annotation? Resolved by adding property as target for properties.

- Coref is a type of property, with special column for efficiency. Explicit non-coref is a normal property.

- 9981: Two possible solutions for Waula: has-length and distance from start to end. The former more correct; distance gives the impression of measurement along a straight line.

- 20611 and around: Not sure how detailed travel roads should be modelled — still something to go on here.

- Difference between "part of" and "lies within" will be hard to keep.

- 20779: This is actually not possible to interpret without quite a narrow context: Someone knowing the area or a map.

3 Large scale modelling test

The first attempt at a full scale modelling is from what in the handwritten document was called Volume 2. The part of it printed in Schnitler (1962) can be found from page 138 to 178. A larger part of Volume 2 was printed in Schnitler (1929, p. 1–104). This rather short part of the volume still contains a variety of different text types: Interviews of Sami as well as Norwegian witnesses, travel reports, summaries, and appendices of various kinds.

Before the modelling started, the material consisted of . . . paragraphs and tables, containing . . . person names, . . . place names and . . . dates. The first

iteration of the modelling added ... entities and ... properties. A detail of the data is in table ....

The situation changes again: Need to develop a tool to quickly handle co-reference for places. This is done. Because of the movement back and forth, a regular dated lab diary is better than the paragraph based notes.

- 41928: Continuation of for events means the same participants and in general connected events.
- 42844: "rs: reoccurring event" or "event type"? Need something more specific than event type in order to see how persons and places are connected in different situations, e.g. fishing in different lakes.
- 42917: There is already significant reduction of complexity in the conversion from text to model, of course.
- 43150: The information expressed in the text is quite close to the information expressed on a Mixtec map. It seems quite tempting, given a better form for the geostory, to use such a map to express it.
- Why is it that time seems to have a closer relation to the modelling of geographical space than other qualities? It is more important than the quality and usability of land, for instance. It is more closely related to the land. Or maybe: It is about what happened on the land...
- Events being "continuation of" is like "part of": the participants are inherited.
- If a text reading is not possible without a map, but is possible and likely with a map, is that reading then a Reading?
- 44459: In general not included what people live from, e.g. "Bønderne der i Nordre Finlje leeve af deris gaardz brug og Fiskerie." "De bønder leeve af deris gaarder, og Fiskerie, j Hølands vandene og Tømmer hugst til Saugbrug."
- 44459: Not in general typed places (should do? Classification system?) but does in cases where it is needes, e.g., "Dends Kiercke kaldes FolderEid af den gaard hun Staar paa."

- 44726: Problematic on maps: Events connected to places, such as "Erhvervede Sig Fæste-Sæddel".
- 44726: Vinterbeite and sommerbeite are properties at the dwelled relationship, not at the place.
- 45106: There may be something tending to miss on map: References to land use. Ownership is fine, but use is often lacking, and if included, makes complicated maps (Canadian land use maps).
- 45240: "Norden der fra, er ingen bonde gaard." Tries to express negative data. But the expressions of nothingness following from a blank on the map is not strong enough to say explicitly "no farms found". It is a rather vaguer expression of nothingness. Also: ambiguity, such as the question if "hands district" and "hands field-sæte" is the same.
- 45263: Similar problem as negation: only one: "Sønden for Sig kiender hand ingen Finn meer end Breed Thomes Tomesen".
- 45279: When a list is given, is that list extensive? Only when this is said explicitly?
- 45299: Measurement types are post inherited: When "Svenske Maalte Miile" is said early in the paragraph, it will be the measurement referred to using "Miile" later, presumably.
- 45659: First(?) use of rifle shot (note: before switch of hand).
- 45659: The text only say what it says about shape of things. A lake has length and width, but the rest of the form is undefined. Has to be defined on a map.

4 Lab diary

2010-09-20 The semi-automatic co-ref system is ready to use. Shows all TEI place name elements on the top, sorted on place name, and the records from the register at the bottom. In some cases the register combines more than one place name (X mountain; X lake), so even the sub-headings must be included in the list so their ID can be used for co-referencing.

2010-09-21 Coref resolution. Problems with register records for more than one name, when the different names refer to different places. For the time being: Do not corefer them. Example: Sc1Place_id1736a and b, "Ongdalen, Aangdals-bøjden". Also Ajevara and versions, Sc1Place_id0039a etc. Also Sc1Place_id0042a Akevagg; three different places in one bunch. Cf. feature request 3072613. Next problem: To sort out all "see", "=", etc., in the place name register, to coref at a "higher level". This is sorted out for those without page numbers already, cause there I follow the "see", like Sc1Place_id0041a Akeness-jok. *By including coref info from the register I extend from the knowledge of Schnitler and his sources into the knowledge of Kvamen in the 1960s. This I must be clear about. Maybe not use it? On the other hand: The 1960 knowledge is also textual (as I overlook the references to maps). On the third hand: Would it be any different if I re-found this information from other sources? As long as I in 2010 look for info, 1960 must be fine. But it must be clearly stated all the same. This coref information is geographical information I read from the text assisted by Kvamen.*

2010-09-22 Full work on coref resolution. When page numbers are not listed for certain pages: if clear, include page name in coref as well, e.g. Schn1_120228 Bajas-mutkie. If doubt or more complex situations, do not include it. Only coref Schnitler (arabic numbers), not preface (roman numbers). Problem with double records: Sc1Place_id0145a "Bakiel-jok og Bakiel-vare"; not corefed. Same: Sc1Place_id0166a "Bekkerfiord"; Sc1Place_id0176a "Bergebye"; Sc1Place_id0197a "Billefiord (Jndre og Yttre)"; Sc1Place_id0233a "Bolma-Vande"; Sc1Place_id0252a "Bosmed"; Sc1Place_id0257a "Boxnæss Hovedkirke og Præstegield"; Sc1Place_id0261a "Brasshavn"; Sc1Place_id0287a "Buemandsfiord, Vestre og Østre". Tagged as place name, is really date: Schn1_114418.

2010-09-23 Coref. Doubt about location of a place, like Sc1Place_id0327a "Da(h)laaen", does not matter at this stage. The problem with double records do not apply when there are several names pointing at the same place, they are OK to co-refer, which means I do not divide between different spellings and different names—at least not here. But the ones like Sc1Place_id0402a "Ekkerøe, Lille" are still not corefed. When a place name is partly used alone, parly with "kirke", "elv" etc, I try to sort out also the names standing alone to find out if they

really refer to one of the other meanings. Example: Sc1Place_id0421a "Enontekis" etc. Still, I am not able to be detailled enough: "Paa dette Falder Eide Ligger dend Gaard FalderEide og Kiercken Falder-eide, et Annex af Nærøens Præstegield." (para 50549): I divide the farm from the church, I am not able to divide the farm from the place in general. I do not count "Femunds Nordre viig" (Sc1Place_id0448a) or "Femunds Syndere Viig" (Sc1Place_id0449a) as place names, I coref all on "Femunden" (Sc1Place_id0446a).

2010-09-24 Continue corefing, with the already mentioned problems. One of the good things in my approach is that the coref stuff is very close to TEI — it is a matter of links between objects who are well defined as TEI elements identified with xml:id.

2010-09-26 The coref thing is not so simple... What I am coreferring, the Real World or the world knew in the text ("Schnitler") or the world known by the witness?

2010-09-28 Coref. In some cases, it is hard to know how much interpretation should be used. Some is needed; this is not just mechanically recording the strings being place names, but understanding how the text refer to the world. This falls on Linell and similar: It is not about the place name string only (although it is influential), it is how it is used in context to refer to a specific point. The sentence "Hamar is in Hamar" may make perfectly sense, given the right context. Of course, saying that the first one is the city (centre) and the other the municipality is but one reading, but may be the most legitimate one. As I am not doing "context-free" markup any more, it is fine; but the level of investigation needed to make a choice (say "same", say "different", let it be) is always a trade off. Mistakes will be made. The consequences must be thought about. There are some rules of calculation "in the middle" that may or may not be applied, such as the fact that "Harrans Annex Kiercke" is located in "Harrans Kiercke-Sogn" and is close to or located in "Harrans bøid". Interesting comment from Kvamen on Sc1Place_id0868a: "Hornvigen 273 = Hornvika, mellom Hornet og Skinnstakknæringen (etter teksten; etter kartet bare ei lita vik S for Hornet), W 1, 10.11 Nordkapp." What about errors in the text pointed out by Kvamen, such as in Sc1Place_id0880a and Sc1Place_id0874a? I do not take it into account, as I am modelling statements, not truth.

2010-09-30 Detected bluntly wrong tagging — corrected from place to person: Schn1_95710. Such changes can be done, because the only identification used is the xml:id, and as long as nothing is stored for this one, nothing can go wrong. Sc1Place_id1019a "Kafring-Næss": Page 355 clearly misspelling for 335. Slightly irritating that the really important Sc1Place_id1048a "Karasjok" do not split the river from the place. This means I cannot use the register for this one either. "Kautokeino" is also too difficult, maybe another go at it using another method? But the explicit ones I do (such as "Kautokeino Fielde" — I make no statement of completeness, only that a coref info piece is supposed to be correct, so doing "Kautokeino Fielde" without doing "Kautokeino" is perfectly fine. I have made no way to add comments to my coref statements.

2010-10-01 Not too sure about Sc1Place_id1154a "Kiøllefiord" and all the other versions, if my distribution among the items in the register makes any sense.

2010-10-04 Coref. Uses knowledge about appellatives, e.g. "jaure" = "vand"; "jok" = "elv". By now it is clear that in the original tagging, the place name register should have been used to assist the choice of how much to include in a place name; that is, to help solving the problem of varying use of space or not between words of a place name, e.g., "Leerpolls Botten", "LeerpollsBotten". This is non-existing in the oral statement, unclear in the manuscript, definite in the printed text. Logos-centrism, also Linell (2009).

2010-10-06 Split paragraphs some places in the register file in order to clarify the items of the register (instead of making a better import filter in java). Example "Tana" Sc1Place_id2577a et.al. The places are clearly marked, by a note and by paragraphs with xml:id Sc1Place_manual[1..]. In the case of Sc1Place_id0713a et.al. "Gust-fielde(ne)", this means that the "=" with the map references connects to the third name only. The division between Sc1Place_id1652a "Nordland(ene)" and Sc1Place_id1653a "Nordlands Amt" may not be as clear cut as it should. Possible digital transcription error in Schnitler (1962, p. 251): Schn1_74857 "Næverf[ord".

2010-10-07 Started a very unsystematic connection of some place names

directly onto modern maps for the first part of Schnitler's travel, stored in the spreadsheet "simpleMappingModernMap.xls".

2010-10-08 Disambiguation, e.g., between Sc1Place_id1753a "Otzjok-bye", Sc1Place_id1754a "Otzjok(elv)" and the other ones is to a large extent done by the page numbers in the register, but with some thinking in the cases of overlap and closeness. The name "Porsanger" is hard to fit in because there is no pure place in the register, only fjord, river, etc.

2010-10-11 A list of page numbers totally out of sync with the real numbers leads to rejections. But the list do not have to be totally correct, minor differences are acceptable, given other evidence. But large distance in page numbers generally indicates large difference in area and is a contra-argument. Possible wrong tagging: Schn1_48374 "Rohylbaken Lurru-Elv". Place name element needs a split: Schn1_50110 "Rundfurru- og Demands fielde"; Schn1_12695 "Rutten Dahlvaald og Glee-Fieldet"; Schn1_6669 "Røe- og Mugen Elfve". The distance between the perspective of the text and the place is important: The difference between "Røraas" and "Røraas værck" is not very important as a spatial locations seen from miles away. As for function, on the other hand, it may be implicit. I am quite stupid here, do not make conclusions such as "Someone discussed with the director of the works, so it must have taken place in his office". Do never overwrite older corefs made during modelling unless they are obviously wrong. Use translations: if the register has "Saide-jaure" (Sc1Place_id2058a), I will connect "SaideVand" (Schn1_100308) to it, given correct pages and no other candidates.

2010-10-12 Sc1Place_id2108a "Saukadasjok" seems to have wrong page number in the register, 267 instead of 367. Some small corrections, such as replacing "l" with "1" is done in silence. Schn1_26525 "Sehiærrevandet" probably wrongly transcribed for "Schiærrevandet". Should have been split: Schn1_23109 "Selboe og Støerdalens gield". Or maybe not? The string refers to a place which is the sum of two parishes? Yes, but then it is not a place name, but a referring string consisting of two place names. In order to find place name elements in need of a split: search for "og", ",", "-" and maybe some other things in their content.

2010-10-13 Relations between two strings referring to the same place is co-

reference and is stored simplicitly. Other Allen operators are seen as more complex and a part of the modelling proper.[1] This means I have to clearly define "same place". In the case of Sc1Place_id2262a "Skietzem-jok" vs. Sc1Place_id2260a "Skietzem-elv" I connected all occurences to the former — they were obviously referring to the same place and the page numbers were muddled. Do not care much about location of end tag; in Schn1_34545 "Snaasens hoved Kiercke", the name end tag is after "Snaasens", still, I connect it to Sc1Place_id2301a "Sneaasens (hoved) Kierche". But do not go the other way: When it is tagged "Schn1_29452" "Sparboes fielde", it cannot be connected to "Sparboe" as a general concept.

2010-10-15 The fact that "Tanafiordz Botten" is a place name but "TanaFiordz Vestre Næss" is not (there the name is "TanaFiordz" only) is solely based on the register. It becomes almost absurd when "TanaFiordz Vestre Botten" is not a place name either, because it is not in the register. The corefering of "$< placeName > A < /placeName > B$" to "A B" is rather problematic, in a technical sense. Needs further discussion. Because, what else could I do? This is not a problem of the material, but of the tagging. Or is it?

2010-10-18 The inclusion in tagging of place names is a problem that leads to an idea that the tagging of the place name shows a place where it is located in the text, not the exact bounds of it. This is the same way of thinking that underlies the modelling, and a way that should suit my theoretical thinking well. All the very many forms of "Veinæss" only partly solved.

2010-10-19 Sometimes two or more place names are added together and tagged as one name element. Then I do not coref it; it could be done, but in a more advanced way, using part-of. When two or more place names are put as different names on the same place, commonly using or between, I do, however, coref them when it is obvious what the situation is.

2010-10-20 Spelling error: Sc1Place_id2940a "Ysrnæss" should be "Ystnæss"? Finalised main round of coref. Will study some options in

[1] Use mereotopology as it is proposed by Smith (1996) instead; it is a spatial system of relations.

using this stuff.

2010-10-21 After finalising the coref work it became clear that more exploration into the material is needed. The "boxes on the screen" were helpful, but put a lot of emphasis on the entities. I need to study the properties more. Therefore, a properties tab was added to the application, thereby moving into the 0.7 series.

2010-10-22 The properties view already makes it easy to find and somewhat easy to correct some mistakes. The last backup since the new storage format: rdfBck1287643525494.xml

2010-10-25 Algorithm for attempting to map (parts of) the Schnitler material. Will in principle run for everything connected to the start node through links or coref, or it can be restricted to information based on a set of paragraphs (e.g., those based on a specific witness).

1. Set start coordinates, plot starting entity
2. Find all linked entities
3. Set coordinates for linked spatial entities
   - distance and angle: point
   - angle and vague or unknown distance: line
   - distance and vague or unknown angle: circle or part thereof
   - both vague: filled circle or section
   - both unknown: see non-spatial entities
4. Set coordinates in non-spatial space for non-spatial entities (just a list?)
5. Go to any connected point (will not be able to do the lines and polygons?

Lines and spaces are possibility rooms.

This clarifies the need of the parsed type on links.

In order to attempt export to map, seems like we need spatial type of places: point, line, polygon — although points and lines are really just abstractions. Directions are expressed in degrees, 360 scale. Directions given with and, such as "Nord- og nord-væst" is not interpreted as

the same as north-northeast, but as a sector, covering everything from north to northwest.

2010-10-26 In medieval times, a direction includes the area around the angle, as long as it is not clearly specified as in the middle: "i miðiu norðri" etc. (Holtsmark, 1961, c. 566). This means that north represented degrees $337\frac{1}{2}$ to $22\frac{1}{2}$, north east $22\frac{1}{2}$ to $67\frac{1}{2}$, east $67\frac{1}{2}$ to $112\frac{1}{2}$, and so on. Old norse used the system of 8 direction, the system of 12 was never used among common people, only in latin (Holtsmark, 1961, c. 567), Further, "north and north east" has the same meaning as "north north east", they both refer to the sector. According to Grønvik (2010), this system was still in use in the 18th century. This means that I will use the middle part of the sector in all cases, knowing that I have a leeway based on the 16 directions given by the system in Schnitler. So the final system is as in table 1 on page 36, and the value I include in the model is the middle value.

2010-10-27 Working on direction and distance in the model: Distances are expressed in a quite similar way in the text and on the map, apart from the inherent lack of exactness in the text. Everyone knows that 1 mile in a source such as the one in question does not mean the same as 1,00 mile. In the mountains it can be at least between 0,90 to 1,10 miles without anyone lifting a brow. In the valleys, given a road with physical milestones, the accuracy may be expected to be a little bit higher. Be that as it may, the map will, as long as it is a scaled map and not a topological one (which may be another core difference to be discussed), give a statement with a higher level of asserted exactness. The modern way to do it will be to add a scale figure or a ruler to the map. Even without that, other distances on the map, known from the real world by the user, will give this accuracy. Sometimes, a map of an unknown place may not.

A speaker or reader can say "it is between 1 and 10 miles". In order to make a map. however, the location of a place, the direction and length of a creek, the size and shape of a lake, will have to be connected to several other places. There will be a set of more fixed places you start out from, then other places are located on the map in reference to those fixed places. One example from my own experience: When making an orienteering map, you have a base to work out from based on aerial

photo. Someone have been sitting with double sets of photos and stereo glassed to study the 3 dimensional image of the landscape, putting whatever they see on the base map. This will generally mean that the crossing between a creek and a road will be marked, but the stretch of the creek between such crossings will not, because of vegetation. Creeks in the landscape in which I was working is often in a bushy area of a certain size, so that the constructor see the bushes, knows the creek is there, but do not know where. When mapping out the creek, the techniques used was to start from one of the fixed points, try to define straight stretches, measure the angle by the compass and the length with footsteps. This is difficult to do very accurately in thick vegetation, of course, so once I reached the next fixed point, there would be a deviance on the map. This was corrected with pen and eraser by stretching and moving, keeping the principles of the angles and lengths.

This process is not necessary, or even possible in a text. A text will mention the fixed points, the general direction and level of straightness of the creek, but not every turn, and the stretching process would be meaningless. On the map, on the other hand, more choices have to be made. The places has to be located in relationship to other places.

Similar problems appear for directions. We saw that the directions are expressed in a system of 16, each covering $\frac{1}{16}$ of the full circle, or $22\frac{1}{2}^\circ$. On the map, on the other hand, the directions are expressed in a totally different way. If we are talking about two places expressed as points on the map[2], then the angle between them will be a single number. Such angles are very rare in verbal text.

So, one of the answers to the big question in this research, whether it is possible to express the geographical information read from a text on a map, is that it depends on what one means with the question. It

[2]It can be argued that points do not exist, neither in reality nor on the map, because everything, e.g., the dot representing stone, all have an area. This is true of maps as we see them as images, and maybe also for the world as we see it as a physical surface. But in abstract cartography, it is not. One you see the map as a vector space, then a point is actually a point, with zero area. It is expressed as a number, x and y, referring to some coordinate system, and zooming in even beyond scale 1:1 will not make it bigger. The same can be said about a border point in physical space. Even if the stone marking the point has area (even volume), it can be argued that the conceptual point is a point with zero area.

may, in the areas we speak now, be possible to express everything, but not to avoid expressing more as well. If one see the expression "A is related to B with an angle in the are of $11\frac{1}{4}^\circ$ to $33\frac{3}{4}^\circ$" as containing less information than the expression "A is related to B with an angle of 14°", then the map cannot be made without adding information in this case. But if the areas are large and the distance short, the change may be the other way around, to larger span of angles, but then that span is the actual span, not a room of possibility.

I do believe I have a breakthrough. As you will remember, my research hypothesis is that "types of geographical information exist that can be stored and read out of texts but are impossible to express on maps without significant loss of meaning".

In working out more formal ways to rephrase of the properties (links between entities) in my model, I came to see the following:

An idealised sentence may read (I have excluded vagueness on distances):

"1 mile to the east of A, we have B. 1 mile north-northwest of B is C, and 1 mile southwest of C we have D."

Okay, to map this out, we would naively (as I have been thinking all the time) do the following on a sheet of millimetre paper (or a modern version of it):

- Make a mark on an arbitrary place, call it A
- Put a line from A in 90°
- Mark a point on the line 1 cm from A and call it B
- Put a line from B in 337,5°
- Mark a point on the new 1 cm from B, call it C
- Put a line from C in 225°
- Mark a point on the last line 1 cm from C, call it D

Fine, but wrong. This is a misreading of the text.

With the help of a lexicographer with knowledge of language history, and through a encyclopaedic article about medieval directions in the

Nordic areas, being assured that this system was still in use in the 18th century, the following was brought to my knowledge:

A system of 8 direction was the common system in medieval times in the Nordic countries (12 used only in latin). In addition to north, east, south, west, there were four in between: "northeast" or "north and east", etc.

In this system, east did not mean 90°. It meant the span from 67,5° to 112,5°.

Based on what I have now learned, which must be investigated closer if this actually turns out to be an important point, the 16 directions system used by Schnitler and/or his witnesses will give us:

- Make a mark on an arbitrary place, call it A
- Span a sector from A bounded by 78,75° and 101,25°
- Mark a fragment of a circle with centre in A, cutting the sector 1 cm from A. Call the circle fragment possible locations for B
- Span sectors from any point on the B circle fragment bounded by 326,25° and 348,75°.
- ...

Already at this stage, it gets tricky in my head, so I stop; the point is demonstrated. Mathematically, the model we will get by going through all of this will be fine, I suppose, and it should be possible to draw it.

But this drawing will not be a map.

Further: by adding more facts from the text, some of the lines or areas of possible locations may be reduced. I have a nice example on how this works when "reading the landscape" in real life surveying[1]. But the point is partly, the drawing will never become a map (as the text will never have a complete set of information) and partly, this is not a way to make maps anyway.

I will, of course, have to work further on this to try to break the argument, but I do think this is the core of the difference between maps and texts seen from a practical side (as you well know, I am also working on it from the theoretical side).

The remaining question being, of course: If it is so simple, and if it is true, why is it not found before? Partly, it may have; although maybe expressed in other words. And partly, nobody asked the question. Maybe. Maybe time will show.

2010-10-28 It is of course not the case that the people made accurate measurements in order to know if what they should say was east or over the limit to east-northeast. That is not the point. In some cases, east may even be part of a 8 or 4 direction system, or even finer directions are given, such as in "norden, lidet i væster" (paragraph 9214 (Schnitler, 1962, p. 13)). The point is that the possible location of the placement of a place is a room of possibility. This is a general situation of which the "or" expression is a special case. It is, as far as I can see, under-specification.

The consequence is that, based on a text, an unlimited number of maps can be made, presenting significantly different situations on the ground. Thus, as only a limited number of maps can be made, there will be significant loss of meaning. The only way around it: to make groups of maps internally without significant differences, and present one map from each group.

2010-11-04 I need in the application a way to produce a table showing each speaker and the number of paragraphs and statistics for modelling.

2011-11-05 Although it is not possible, I will still make a geometric figure. I will based it on one specific speaker first, and use whatever simplifications I may chose (e.g. east 90°). This will then be one possible map, and it will presumably be very different from the "real" map. If both can be said to be true representations of the text, then expanding to saying there are unlimited numbers of representations should be quite easy, thus showing that making maps on a text is impossible. Under-specification in linguistics. Indeterminate system in mathematics. That is what is going on: an indeterminate system, saying that this B one exact (to a certain 'degree', e.g. minute) direction between 78,75° and 101,25° from A, but refuse to (cannot) say which.

It will be a most fascinating observation if all the results I find will be things seen by Lessing as differences between poetry and painting. A curiosity, maybe, but still interesting.

The difference I have found here is not a necessary one. A text can be written with exact angles and distances (although it becomes a peculiar text). It is a difference between what is usually expressed in a text of ... type (normal? narrative?) and what is needed to make a map. Any map can be expressed as a text, because a vector map is a textual expression (although with a lot of numbers), e.g. in SOSI format. But the textual (vector) version of the text is very hard to use for a human being without being drawn as an image (although a computer may 'use' it to do searches, etc., as a spatial database query).

2010-11-08 Could it be that "east" etc. are the kind of words where the dictionary way of thinking fool us the most? Because we get so hang up in the idea of definition (90°) and not usage.

2010-11-22 Start the modelling experiment anew: Now, two sections will be modelled thoroughly, one witness statement and one written by Schnitler. Candidates:

1. Witness: person378 Povel olsen (Schnitler, 1962, p. 141–143), Norwegian farmer ("nybygger").
2. Witness: person319 Ole Nilsen (Schnitler, 1962, p. 150–155), Sami reindeer herder, interpreted.
3. "Tabell over bevidnede grensefjell" (Schnitler, 1962, p. 195–206).

2010-11-24 Added a way to store a geographical description, for the time being only for places from the register. Last save before the new data format: rdfBck1288105595689.xml

2010-11-25 Starting to work with maps (NB Oslo). Some biographical data:

43B Aursunden (rektangel) Öst Oslo (Oslo meridian er 10°43′22.5" öst, Greenwich. NGO 1887. Revidert i marka 1939. Off. veger à jour 1962. Checked coordinate grid against "Norgesglasset" (EPSG:4326). Place for check: "Brekken kirke". Y ordinate correct: Norgesglasset: 62,64725): 62°38'50,1". X ordinate: Norgesglasset: 11,87330): 11°52'24". Map: 1°9'10" (+10°43'22.5" = 11°52'32,5" which is pretty close, given the exactness I use; still, may be a projection error).

Kart over Tromsø amt... P. 29–32 in: "Norske Amtskarter" (pagination by pencil) Took some tests, it all works fine. Useful for the area in question. Also available in Norgesglasset. Quality now seems ok.

The 1840 Finland map I got was not the one mentioned in the preface to the place index.

Kart 1282a-b Håndtegnet: "Greentz Carta Duved skanse, Jerpe skanse, Järpe skanse, Kråksjøen, Skalsvatnet, Skånes skanse, Stene skanse, Storsjøen, Storsjön, Sul, Sulsjøan, Verdalsøra, Vuku 1718" (one map divided in to). Very long east-west, north oriented. Goes from Levanger-Verdalsøra to way into Sweden: Past Östersund?

Kart 2333b Håndtegnet: "Carta Ower det Sneeaaßensche Scielöber Compagniets Districht Imsdalen, Ongdalen, Skalsvatnet, Snåsa, Snåsavatnet, Sparbu, Sul, Verdal 1718 ". Ca. bounding box: (63,62°, 12,30°), (64,06°, 11,52°). Direction: W.

Kart 2333a Håndtegnet: "Carta Ower det Sneeaaßensche Scielöber Compagniets Districht Imsdalen, Ongdalen, Skalsvatnet, Snåsa, Snåsavatnet, Sparbu, Sul, Verdal 1718[sic]". Korrekt datering er da 1765?. Ca. bounding box: (64,14°, 11,40°), (64,08°, 12,75°). Direction: NV.

Kart 2332 Håndtegnet: "Carta Ower det Sneeaaßensche Schielöber Compagniets Districht Grøningen, Holderen, Hærvola, Inderøya, Ismenningen, Kråksjøen, Leksdalsvatnet, Ongdalen, Snåsa, Snåsavatnet, Stene skanse, Storsjøen, Storsjön, Torrön, Verdal, Ytterøya 1718". Ca. bounding box: (64,34°, 12,39°), (63,45°, 12,5°). Direction: S (has compass).

Kart 2328 Håndtegnet: "Uten tittel. [Grensedistriktene mellom Østerdal og Verdal] Anjan, Aursunden, Brekken, Dalarna, Djupsjøen, Duved, Elfnås skanse, Elnes skanse, Enång skanse, Essandsjøen, Femunden, Feragen, Feren, Funäsdalen, Grønningen, Grøthogna, Handöl, Hegra, Helagsfjället, Hyllingen, Härjedalen, Håsjøen, Jerpe skanse, Jerpen, Järpe skanse, Järpen, Kallsjön, Langen, Lungdalen, Långå skanse, Meråker, Muggsjøen, Norge, Rambergsjøen, Rensjön, Rogen, Røros, Skarvdørs skanse, Stene skanse, Stiklestad, Storsjøen, Storsjön, Sul, Sulfjellene, Sylfjellet, Tennås, Torrön, Tydal, Undersåker, Veresvatnet, Vuku, Ålen, Ånn

Før 1720 [1718?]" Follows the border from Femund to around (63, 87°, 12,56°). Mostly Swedish side. Direction: NW (has compass)

Kart 2327 Håndtegnet: "Grentz Carta Aunet, Duved skanse, Fjergren, Flor, Fundsjøen, Grøningen, Grønningen, Hallsjøen, Meråker, Nesjøen, Selbusjøen, Stjørdal, Stjørdalselva, Tydal, Værnes, Ånn 1719" Direction: S according to compass, but actually more W. Ca bounding box: (63,62°, 10,93°), (62,79°, 12,30°).

The hand drawn maps may be of some use in detailed identification, but it is a question if it gives more than Qvigstad and Kvamen found out.

The "Amtskart" for Tromsø are available in Norgesglasset and rectified, so precise coordinates can be extracted.

The rektangel- and gradteigskart is available at NB, probably also at UiO (check that). Not available digitally? Check with Statkart. If not, scan for myself, and rectify? Pay Statkart to do it?

To test the quality, goes through from para 6289 to identify all places from the register described as being on 43B, 43D, and 47B.

Note: places in the register with farm numbers can be identified much simpler.

If I am going to do mapping a lot: find a more effective way to do it.

To para 8655; too little, jump to 10179.

"Præstegield" and other larger (administrative) areas must also be sorted out differently.

2010-11-29 Looking at gradteig- and rektangelkart at UiO, dept. of place name studies. Identifies the places connected tot he registry in the testimony of person378 and person319.

2010-11-30 When something cannot be drawn on a map, it can be because of:

1. Things that cannot be expressed ('or') on one single map, so on needs at least two maps.
2. Things that are under-specified, so that any number of different maps can be drawn.

This is like logical ‘and’ vs. ‘or’, in a way...

There are two ways in which a text cannot be expressed as a map. The first way is when the text contains information that breaks with the expressability of the map mediality. One example is the ‘or’, another one is ‘impossible figures’ with the U shape as mentioned in (Brodersen, 2003). In this first way of being impossible, there is no difference between the pronouns ‘as’ and ‘on’. The information cannot be expressed *on* a map, neither can it be expressed *as* a map. This is only a problem for certain texts; how wide spread the problem is, is not clear at the moment.

A second way of impossibility is the fact that a text will never, except in some rare cases I will come back to in a moment, contain all the information needed to make one single map representation without other information taken from the context. There will always be a level of underspecification. Further, this is not at the level of minute detail, the fact that no map is perfectly correct. Is it rather a question of very different maps being drawable based on one single text.

If the text contains no spatial information at all, any map can be said to represent is. But in normal human thinking, no map would be said to do so. Maybe the blank map could be said to do so: the explicit statement about what I can not or will not say. If a text has some information, possible maps can be made, from what is said. York is north of London. He travelled by boat in one week. Possible maps can be made. And in many cases, the words chosen will, supported or not by the paratext, make the reader realise: “This is England!” Everything will fall into the internal or external map of England used. This is robust, to the level that a small town outside York named Brultington, which do not exist, is accepted as a possible place in England. Just a little different England, based on the least difference.

But the text itself never gave enough information to unambiguously make one map, as opposed to all the other maps that could be made. The act of disambiguation happened the moment the reader realised “These names, London and York, is really the English ones, or can be seen as until further notice.”

Then texts can be seen which are more and more descriptive, reducing the possible maps more and more. Schnitler is rather far going in this

direction. But still far from the end. And the end is "texts" like this one:

```
<gml:Curve gml:id="c22222" srsName="EPSG:4326">
  <gml:segments>
    <gml:LineStringSegment>
      <gml:posList>
        10.1, 60.02 10.5, 60.02 10.5, 60.16 10.1, 60.16
      </gml:posList>
    </gml:LineStringSegment>
  </gml:segments>
</gml:Curve>
```

The example shows geographical vector data representing a curve. With the numbers specified, this "text" can only represent one map. No text in a natural language looks like this. But some may be pretty close, like a surveyor's certificate.

2010-12-07 *Generalstabens karta över Sverige* available on the web: http://historiskakartor.lantmateriet.se/arken/s/advancedsearch.html Latitude is fine here as well, it seems, but longitude is relative to Stockholm, which is said to be $18°3'29,8"$ east of Greenwich.

2011-01-08 The technical infrastructure for mapping is now more or less in order, so the process of putting a few mapped places on a map of Norway will start shortly. When that experiment is done, mapping of the first interview will be done using the following method:

1. Enter as many co-ordinates to places modelled as possible.[3]
2. Express those co-ordinates on the map. This is now the mapping to a modern map.
3. Examine if there are other possible mappings to a modern map (detail differences excluded[4]).

[3]There is a question if impossible figures will be found at all using this method. Because we are now talking about putting the reading of the text onto a pre-existing map and any statement must be read in context, searching for information. What may be, of course, is lack of identification. One may not know where a place is. But if a place is identified and the angles are impossible, well, they will not be once the information is mapped, because at that stage, they fit a geographical map per definition.

[4]Define detail differences, as opposed to major differences.

4. Remove the background map from the mapping of the text. The "mapless" mapping of the text is now one possible expression of the text as a map.
5. Construct at least one more expression of the text as a map, with major differences from the first.

2011-01-14 After reading the novel Robinson Crusoe: Feedback towards Schnitler: Note the scale of descriptions (geograhical, local, object). Use CRM's place scope note.

2011-01-18 A river between two lakes expressed as a straight line between the lakes looks stupid. But often, it is all the text says.

In the part which is mapping the places: How do you express a mountain or a lake on a map? The level of data does not exist in vector format. Mountains are not there, even lakes are not. It will become a question of manually copying. And from what? The 18/19th century maps? That is still secondary. And the 18th century maps are partly based on this text. Circle argument, all the way; if maps are not seen as just the Truth.

Seems like we are now back on the original way of doing it: Whatever is there for making a polygon, and for relationships. Make a map without connection to external layers, and without any earth co-ordinates.

2011-01-19 My whole attitude works against my project. I use maps all the time in order to understand Robinson Crusoe. They are good. Still, I knew that...

New workplan:

1. Write a parsing of places turning all the description types I now have into geometry. *Need: a list of all entities, not just all properties. Also: a table based visualisation of all entities and properties. Connect the two?*
2. Lay out one basic "as map" version of this in SVG.
3. Change some parameters and show how the SVG map then made, while still adhering to the model and to the text, is different.
4. Fully model a section, fully formalise the model, and repeat this process as a "real" experiment.

2011-01-24 Maybe the category of impossible figures do not exist. But at least contradictions are likely to exist, if one witness says 1 mile and another says 2.

Example of negation: link1488, "states: not Lande Mærcke".

2011-01-25 Need rules of calculation for each *link type*. Must be formalised, but as a beginning:

according to the opinion of

The rules will have to be read as instructions to make a figure in SVG, GML or similar. It must traverse the graph, and therefore, must have a list of visited nodes.

2011-02-12 Appl pseudo-code:

- See all properties from one entity as a whole
- Go through them in order:
  - size
  - orientarion
  - other form based
  - relations grouped for each range; distance+direction different from either alone.
- Make an object for each entity representing a place, with size etc.
- Then another object for each property between two such entity objects.

2011-02-15 Tried round two of visualisation, with SVG production. Too complicated to read straight out of the existing data, need a layer of calculation. Will make an object oriented such layer in no.uio.edd.model.geo.calc: GraphEntity and GraphRelation.

2011-03-02 Still struggling with visualisation round 2. The table navigation is fine and better than the boxes were. But how to make three different maps on a model? Will need a lot of Q&D solutions. First one: to make a list of input and output for transformations from my first modelling to formalised statements as a file to be read by the application. Then I

can set certain parameters in the reading, hopefully changing the map when parameters are tuned. Last chance if this do not work: do the changes to the file itself, e.g. by adding a second and third formalised column.

No. Must make the same system as Property tool for added nodes as well. Starting now.

2011-03-12 Must add speaker to the link and added node tools. This way, formalising can be done for single speakers.

Further, this must be implemented for the visualisations as well. But in order to visualise e.g. single aggregations or appendices as well, this should go via a list of paragraphs—for speakers, this list is taken from the person object; for the other situations, the list must be made ad hoc.

2011-03-16 Remember this note from 2010-04-30: Add dates to modelling? Have the dates for each interview...

2011-03-21 Enters parsed type and contents for all added nodes and properties on paragraphs for which person378 is responsible, cf. modelling plan from 2010-11-22. No longer uses degrees, but north, south etc., in order to be able to vary the interpretation.

Some of the modelling (e.g. detailed events, not speech events) turned out to be of no use to calculations, but were still useful in getting into the text.

Check if "fierding miil" is actually a quarter mile.

2011-03-23 In parsed fields, numbers are usually entered, but the scale is kept (new mile, old mile, etc.) so that different re-calculations can be made. This means that I interpret "noget meere" and similar expressions now, but do not interpret what an old or undefined mile, or a rifle shot, means in kilometres. "omtrent" is not considered, as everything is approximate anyway.

2011-03-24 The question if I model all information in the text or not is somewhat more delicate than first thought. Because if I omit information, then the map may no represent the text, even if it represents the model.

2011-04-03 Starting to make geometries. Move from SVG to GML, currently using Quantum GIS to display. SVG had too little flexibility in scaling in/out and canvas size.

2011-04-06 The statements I use ("part of", "north of") are not expressed explicitly on the map, they are only implicit. Not only that: they are not *expressable* either. Where do I put this phenomenon/these two phenomena in my typology? To say they cannot be expressed is an exaggeration. But they are expressed slightly different from their textual counterpart.

This is about the relationship between implicit and explicit being played out differently on the map?

2011-04-12 I should take the section in which Schnitler used the "or" he did not map. Based on my model of it, a map should not be possible to make. Then I have proved what I felt in the introduction.

There are two types of results:

1. A model which gives some sort of result, e.g. two significantly different maps.
2. Something happens during the modelling process which makes the modelling of a specific thing impossible, telling us that something is impossible and giving us a hint why this is so. Such things can happen at any stage from storing of triplets via RDF- and map generation to display.

2011-04-17 The modelling takes place in a series of distinct stages, with different balances between man and computer.

1. Make entities and properties. Man or computer.
2. Formelise into XML fragment. Man.
3. To RDF. Algorithmic.
4. To GML. Algorithmic, tunable parameters.

2011-04-18 Model one of the tables of border mountains? The problems will be pretty clear if I do that, e.g. implicit general direction.

2011-04-23 Should more or less know enough about what is needed for the GML based visualisation to make the full modelling of a person now?

2011-04-26 The modelling will be used to show two things:

1. Under-specification. This will be demonstrated by showing the making of more than one map, and by showing how restricted a map is, as compared to a map based on real geographical knowledge.
2. Ambiguity and negation. Use the excerpts used in the articles.

In order to compare to real geographical (map based) knowledge, expressing on, not as, a map: leave all polygons, just use points to indicate the area. The point is to be shown in a *simple* way.

2011-04-28 The thing about events in the modelling is taken care of by the fact that I visualise one person or a set of nodes at a time.

Has to solve: "Ooops! node275 and Sc1Place_id1828a both have coordinates already."

Must go through what relations exist once more in order to lay out an order for the map making.

Also must find out what to do with places who are disconnected.

Make another interim step: a graph of all places with all the geographical relationships between them, so that conflicts can be detected before drawing.

I could ask on lists if they knew of tools that would do the job I want to get done... if I knew what the job was. I find out only through developing the tools to do it. Or?

2011-05-10 Still rebuilding code in an attempt to organise all the relationships between places.

2011-05-12 When two places are not connected by any property, they relate to different spaces. So I make different GML files, one for each interconnected set of places. Then these different GML files can make up different layers in a map visualisation. Maybe co-reference or other interpretative information added can make interconnections?

What about making a series of maps where each value is chosen randomly within a possibility scope? The any number of different maps can be made.

2011-05-13 I am really struggling in my attempts to make algorithms for map production. I start wondering if the problem is not (only) bad programming and wrong strategies, but if the problem may be that there are no possibilities for making any meaningful maps at all based only on the textual descriptions. Maybe, to document this, I may list all statements for one witness and show in detail how it does not make any sense as a map.

It cannot be expressed as a map without significant loss of meaning because the meaning was not in the text from the beginning. The text is a memory scaffold (minnekrykke, find citation) with just a few small items to be connected to a huge mass of context information.

Because sometimes one just have to take a step back and see why things do not work. Is it just me being stupid, or is it something else? Why will not this problem let itself be solved?

Show this by detailed work on two witnesses and one aggregation. Difference between the types? Try a "landscape description" appendix as well?

2011-05-16 It is nothing in the proposal stating that the map production has to be automatic. I will now try to make lists that can streamline a process with some manual intervention.

OK, done. I now have the output of GraphTraversal.getMapPlacesInfo(). But how do I proceed from there to a map? Should I go interactive? Or should I make a map that is to be adjusted manually?

Go through and check modelling of person378 para by para.

42528 Connects to previous witnesses, which is not included here. Two examples of Brændsfieldet, one 6 miles long, the other "Brændsfieldet i Sæhrdeelished" a part of the former 2 miles long.

Stop for a while here. Make the modelling clear for this single paragraph first.

2011-05-23 Connecting added statements of entity type to paragraph level only is good, but some better method for making a connection to a specific part of the paragraph should still have been available.

2011-05-31 Take a relationship between two places and model it based on two or more different voices in the text, and also based on different interpretations of angles and distances. This is: go down to very fundamental relationships, give up the idea of full maps because there is not enough to combine the fragments.

Explain how this works in ch. 4: From the attempt to make maps, why it did not work, to the small scale place-place-relationship visualisation method.

May be able to use SVG in this.

2011-06-01 Or rather: one for each connected place, with every place it is connected to.

2011-06-07 What I do is network analysis similar to Hestia? If so, references can be made to the book when it comes, cf. the networks-network mailing list.

2011-06-13 No more *maps* now. What I now need to do is to make a model of all information in a set, with possible problems (Jon). Disambiguation is done in the modelling stages; a place and a place relation also need to store the extreme possible values. Possible disambiguation also in a later stage, based on the extreme possible values. This systems needs to be modelled from scratch.

2011-06-20 Presenting my dataset: Make a version with each paragraph presented in the following way:

- The text of the paragraph.
- The sentences made based on it, both based on TEI and manually.
- The RDF set
- Include co-reference information &c.

The whole experiment can be ran manually as long as I follow the same strict rules as a computer would (act algorithmically?) cf. early versions of the Ivanhoe game.

2011-10-06 Are now implementing a new system for map (GML) production. Have stored the information in interlinked place elements (GeoPlace). Routine for adding coordinates to the places:

1. Add rectangle and change type for things with length and width taking direction into consideration.
2. Add line and change type for things with length only.
3. Add coordinates when part of, change outer to rectangle when applicable.

2011-10-08 Here are the specific rules for all parsed types of properties in use:

hasBorderOnSide/isBorderOnSide Direction and **touch**.

spaceBetween Last. Used to add coordinates if one of them has.

spaceClose Numeric distance.

2011-10-09 Spatial vs. non-spatial properties of places. I did model both. Here is a list of all parsed types for properties:

actorDwelling (27) Relation between person and place. Person is the source, place the target. Can be seen as a property of the place, that is, the target.

eventActor (30) Relation between event and person. Event is the source, person the target.

eventPlace (36) Relation between event and place. Event is the source, place the target. Can be seen as a property of the place, that is, the target.

hasBorderOnSide (6) Spatial relation.

isBorderOnSide (1) Spatial relation.

placeType (41) Relation between place and a property of the place.

spaceBetween (75) Spatial relation.

spaceBorders (1) Spatial relation.

spaceClose (7) Spatial relation.

spaceDirection (184) Spatial relation.

spaceDistanceDayTravel (3) Spatial relation.

spaceDistanceLong (1) Spatial relation.

spaceDistanceMileMountain (3) Spatial relation.

spaceDistanceMileNew (22) Spatial relation.

spaceDistanceMileNewSwedish (1) Spatial relation.

spaceDistanceMileOld (9) Spatial relation.

spaceDistanceMileUnknown (57) Spatial relation.

spaceDistanceMileVillage (1) Spatial relation.

spaceDistanceRifleshot (2) Spatial relation.

spaceDistanceShort (2) Spatial relation.

spaceDistanceSteps (1) Spatial relation.

spaceHasDircection (15) Spatial property of a place.

spaceHasLength (45) Spatial property of a place.

spaceIncludes (1) Spatial relation.

spaceLengthRelationship (1) Abstract spatial relation, that is, the relationship between two types of measurements.

spacePartOf (250) Spatial relation.

spaceRiverRunsFrom (13) Spatial relation.

spaceRiverRunsInto (25) Spatial relation.

spaceRiverRunsThrough (5) Spatial relation.

spaceRiverRunsTowards (1) Spatial relation.

spaceTouch (37) Spatial relation.

timeBefore (6) Time relation.

2011-10-10 Start with one map layer for each place. Then combine two layers when a place in each of them are connected.

2011-10-14 The direction of one place is always seen as coming from the 180° opposite direction through origo.

2011-10-16 Position (e.g. "Sogne-Præst paa Sneaasen") goes as event in the formalisation.

2011-10-21 Starting to get somewhere in the combination of places, but need to vary the initial random coordinates or the standard changes in size or something for the various places to avoid them all getting on top of each other.

Set the double factor to 2 and skew the new polygon sideways.

2011-11-02 Made a system for reports of all entities and properties at paragraph level, used it to make a printout for person378 that I went through. Added corefs to added nodes where applicable, they were lacking many places. In order to do that, the coref value was added as a new column to the added nodes view table.

Is it correct to coref the place "de Svenske Grændser"? It is the same line, but each sentence can refers to quite different parts of it...

Before implementing the between relationship, person378 had 26 different layers. After first implementation it is reduced to 16.

Should probably have used the java.awt.geom package for basic spatial features.

2011-11-04 The following maps are made based on paragraph 42677:

1. Direction south: 180, default width: 4000, default length: 6000, default between x: 500, default between y: 200, mile unknown: 8
2. Direction south: 160, default width: 1000, default length: 500, default between x: 1000, default between y: 2000, mile unknown: 6

2011-11-08 The application today went to version 1.0.0.

In the following text:

> Dette tillegger Viidnet til oplysning angaaendes Svanesteenen: jmellem de østligste gaarder i Nordre Finlje og dend Første nærmeste Gaard i Jemteland Strøms Aanex Hilsand, er, Som melt, 20 gamle Miile; j dette mellemRom ligger Svanesteenen 2: Miile længere bort paa den østere kandt,

> nemblig Saa meget nærmere dend bemelte Svenske gaard Hilsand. — (Schnitler, 1962, p. 143)

it is clearly implicit that the places in Sweden are east of the other places. Connected to the wording "paa den østere kandt" it is strong enough to model.

The following maps comes out of the model for person 378:

1. **mapPerson378Layer4.gml** 2 places. Not connected to other maps because the only connection possible was the type of border signs. Although this common feature is possible to combine the places into a group on a map, by using the same symbol for them, it does not really say how they are spatiality related to each other. There is a line drawn here. Of course, the border as it was believed by one person could have been defined as a line object, with all the places with type border sign located on this line. Further, the fact that they are mentioned in order could be used as an indication of their spatial order, as done by Schmidt (1983). Cf.: (Schnitler, 1962, p. 142), cf. questions: (Schnitler, 1962, p. 87 ff.). If I had made this stronger interpretation it would have reduced the disconnectedness of the maps but not removed it. So it is a question of degree, not a question of solving the fundamental problem.
2. **mapPerson378Layer9.gml** 2 places. Not connected to other places because the fact that the "area from Svanesteen to Murru-vand" as a place name is said to touch Svanesteen, but the direction between them is not modelled because it is explicitly expressed in the text. It could, however, had been seen as implicit in a non-localised sense, thus, the fact that Svanesteen is to the east could have been noted. Further, the modelling is weakened by the fact that Murru-vand is to the west of this area is not noted.
3. **mapPerson378Layer16.gml** 1 place. Must do something with spaceRiverRunsFrom and spaceRiverRunsInto, they are not interpreted correctly leading to this place being disconnected.
4. **mapPerson378Layer20.gml** 1 place. As #4: border sign.

5. **mapPerson378Layer25.gml** 2 places. He has heard something about a farm in another parish. This parish is well known, but he never explicitly connects it to other places.
6. **mapPerson378Layer30.gml** 1 place. As #4: border sign.
7. **mapPerson378Layer32.gml** 1 place. As #4: border sign.
8. **mapPerson378Layer33.gml**
9. **mapPerson378Layer36.gml**
10. **mapPerson378Layer37.gml**
11. **mapPerson378Layer39.gml**
12. **mapPerson378Layer41.gml**
13. **mapPerson378Layer43.gml**

2011-11-09 Next go:

1. **mapPerson378Layer4.gml:** 2 places. Border sign.
2. **mapPerson378Layer20.gml:** 1 place. As #4: border sign.
3. **mapPerson378Layer25.gml:** 2 places. He has heard something about a farm in another parish. This parish is well known, but he never explicitly connects it to other places.
4. **mapPerson378Layer30.gml:** 1 place. As #4: border sign.
5. **mapPerson378Layer32.gml:** 1 place. As #4: border sign.
6. **mapPerson378Layer36.gml:** 1 place. As #4: border sign.
7. **mapPerson378Layer37.gml:** 1 place. As #4: border sign.
8. **mapPerson378Layer39.gml:** Complex. Need to work on this.
9. **mapPerson378Layer41.gml:** Problems with part of-relationship.
10. **mapPerson378Layer43.gml:** Jemtland: Somebody lives there. Says nothing about where it is.

Even if many of the places are described in relation to other places some of these connection are to be found a totally different place in the reading and is thus not really available.

Introduce a list of “used places”.

2011-11-10 : Change: run for each paragraph separately, then see possible connections between maps manually afterwards.

2011-11-11 Useful map: **mapFirstPara45124Layer4.qgs**. Attempt for negation: **mapFirstPara45240Layer3.qgs**, **mapFirstPara45299Layer7.qgs**.

Must make place and relationship statistics: How many of the places and relationships have expressed direction, distance, size, etc.

2011-11-24 Used to have relative distance and direction before part of in GeoMap.inferGeometry. Not part of is before relative distance and direction.

Seems like I have to change the mapmaking... Not going through all relationship types in order, but going through all relationships between two places at once. This may be back to former sins, and may not really solve the problem... Need to think, I think.

Need to implement: In addition to menu choice Paras→List paragraphs, need the same for one speaker and for a span of paragraphs.

2011-12-13 Modelling the aggregation or example, including para 52107. Source is fine, but I lack a way to say "givendes derfor den raison...". Doerr's argumentation system?

2011-12-27 Hand fixing map mapFirstPara42735HandEdited.gml:

- Move "Landskabet væsten for Nyebyggerne her" to a place in the middle between the other two.
- Added the two disconnected layers and put the places above and below "Landskabet væsten for Nyebyggerne her".

2012-01-10 Making a full map for person378.

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Direction	**min**	**middle**	**max**
north	$348\frac{3}{4}^\circ$	0°	$11\frac{1}{4}^\circ$
north-northeast	$11\frac{1}{4}^\circ$	$22\frac{1}{2}^\circ$	$33\frac{3}{4}^\circ$
northeast	$33\frac{3}{4}^\circ$	45°	$56\frac{1}{4}^\circ$
east-northeast	$56\frac{1}{4}^\circ$	$67\frac{1}{2}^\circ$	$78\frac{3}{4}^\circ$
east	$78\frac{3}{4}^\circ$	90	$101\frac{1}{4}^\circ$
east-southeast	$101\frac{1}{4}^\circ$	$112\frac{1}{2}^\circ$	$123\frac{3}{4}^\circ$
southeast	$123\frac{3}{4}^\circ$	135°	$146\frac{1}{4}^\circ$
south-southeast	$146\frac{1}{4}^\circ$	$157\frac{1}{2}^\circ$	$168\frac{3}{4}^\circ$
south	$168\frac{3}{4}^\circ$	180°	$191\frac{1}{4}^\circ$
south-southwest	$191\frac{1}{4}^\circ$	$202\frac{1}{2}^\circ$	$213\frac{3}{4}^\circ$
southwest	$213\frac{3}{4}^\circ$	225°	$236\frac{1}{4}^\circ$
west-southwest	$236\frac{1}{4}^\circ$	$247\frac{1}{2}^\circ$	$258\frac{3}{4}^\circ$
west	$258\frac{3}{4}^\circ$	270°	$281\frac{1}{4}^\circ$
west-northwest	$281\frac{1}{4}^\circ$	$292\frac{1}{2}^\circ$	$303\frac{3}{4}^\circ$
northwest	$303\frac{3}{4}^\circ$	315°	$326\frac{1}{4}^\circ$
north-northwest	$326\frac{1}{4}^\circ$	$337\frac{1}{2}^\circ$	$348\frac{3}{4}^\circ$

Table 1: The sixteen directions used in Schnitler, names translated to English. In the model, the middle value is used.