

## SCHEMATA AND THE TREATY OF WAITANGI

### AN ATTEMPT TO DESCRIBE ( PART OF ) THE PROBLEM.

In my earlier note<sup>1</sup> I outlined an approach to a study of different views of the Treaty of Waitangi. The distinctive feature of the approach was to be the use of artificial intelligence techniques to moderate the investigation; the aim was to construct a computer model at a level of detail sufficient to illustrate how different interpretations could arise, in the hope that a better understanding of the origins of the differences could contribute to their eventual resolution. In this note I try to begin to fill in some detail. I offer this material for discussion : it should be taken as a question, not an answer.

### BACKGROUND.

What we are doing : A first statement of our aim in this work might be to develop a way to represent, as a computer data structure, the content of a document, and to provide software which can ascribe a meaning to the content under defined assumptions. We wish to do this in such a way as to distinguish between the different interpretations of the document which result from changes in the language of the document, the cultural background of the reader, and perhaps other factors of a similar nature.

About meaning : So we shouldn't talk about "the meaning of the document", unless we first define rather carefully what we want that phrase itself to mean. I shall assume from here on that "the meaning of the document" is a function of three variables : the document, the version of the document, and the reader.

Contributory factors : That leads us to identify two subproblems, with the reader as the link between them. First, there is what the reader receives : the text of the document. Second, there is what the reader does with the material : the reader's interpretation. That suggests that we shall be interested in ways of comparing the contents of the original texts, and also in ways of exploring how different people attach meanings to the texts.

Consistency : In addition to these two problems there may be another, which may be yet more significant. Because of this fundamental importance, I shall call the zeroth requirement. It has to do with the document itself; it is a requirement for an assurance that the document is self-consistent, and, if not, an agreement on how inconsistencies should be resolved. Of course, it is not independent of the other two, for it must depend on interpretation. I shall not explore it any further here, because I'm not sure whether it is really important, or what to do about it if it is. As an example of what I have in mind, though, consider the apparent incompatibility between the crown's "exclusive right of preemption" of land and "all the rights and privileges of British subjects", which presumably included the right to dispose of land in any way at all.

( This is a remark on the further exploration which I'm not doing. However, if I were, I'd probably remark on the possibility of putting the substance of the Treaty into more precise terms, and checking it for consistency using some logical processor such as Eli<sup>4</sup>. I'm not sure whether this more precise form would count as yet another translation; and I don't know whether questions about the application of the treaty could similarly be made more precise. People have worked for quite a while on attempts to express legal material in precise computer terms, as in the Legol project<sup>5</sup>, and in more recent discussion of the British nationality act<sup>6</sup>. My immediate guess is that we're dealing with more subtle matters of interpretation than can be handled by such techniques, but it may be worth discussing. The authors of the work on the British nationality act met with some criticism on these grounds<sup>12</sup>. )

### ACCURACY OF THE TRANSLATION.

The first requirement is for a way to express the accuracy of a translation - or, perhaps better, a way to bring out any differences in meaning which result from a translation. It may be impossible precisely to preserve the sense of a passage during translation, but if it is claimed that the sense is different, then it should be possible somehow to describe the difference in question.

We need to find a technique which can express a passage of text in some language-independent representation, then we can compare the results of applying this operation to different versions of the Treaty. Sowa<sup>9</sup> discusses essentially graphical representation techniques, grouping a number of techniques under the heading conceptual graphs. Perhaps the most notable example of these is conceptual dependency notation, largely identified with Schank<sup>7</sup>.

Schank has demonstrated the power of conceptual dependency notation, but in his formulation it cannot be said to be easy to read. As his claim is that the notation in some sense captures the primitives of meaning, that is perhaps not too surprising; but it isn't helpful. Other graphical notations, such as semantic networks, are perhaps easier to comprehend, but semantically far less rigidly defined. For our purposes, where it is possible that many people from different disciplines will be interested in the material, the clearer the representation the better. It therefore seems to me that a representation which could combine precision of expression with the comprehensibility of everyday language would be better - even though we are concerned with two everyday languages.

A notation based on formal logic is the obvious first choice, if only for experimentation, because this form of notation has already been widely used in many branches of artificial intelligence. I have already mentioned the Eli logic processor, which implements propositional ( zero-order ) logic. Predicate ( first-order ) logic is more commonly used in artificial intelligence work, and its provision for handling quantification may be important in reasoning in which statements of general principles must be applied to particular circumstances. To give some idea of how it works, here is a possible, partial ( and probably wrong ) encoding of part of the first article of the Treaty :

X is a chief  
& before 1840 X could do Y  
→ after 1840 the queen could do Y  
& after 1840 X could not do Y.

( I can only give English language examples : here, and wherever appropriate, I assume that a parallel development is conducted in Maori language. )

I remark that in preferring a formal logic representation I am not necessarily rejecting graphical methods. Sowa<sup>10</sup> makes it clear that the approaches are essentially equivalent in many ways; my preference is based on comprehensibility, not on effectiveness, and to some extent on computational convenience. It is certainly likely to be easier to construct a textual interface to a computer programme than a graphical one, even with the sort of assistance available nowadays ( though that would make an interesting minor project ), so even were a graphical representation chosen, my preferred mode of attack would be to devise an equivalent textual notation.

How should the representation be generated ? The ideal ( for a project based on computing ) is perhaps to devise computer programmes which can read Maori and English text, and convert it into the preferred language-independent representation. A project along these lines would be interesting, but it is not easy to capture fine details of natural language text in machine translations. I believe that it would be sensible to begin with a manual translation into the precise form rather than to spend time developing machine translators of mediocre quality. If there is any spare effort, it would be a useful subsidiary project. A successful conclusion to the project would result in software which could then be used to translate other material - other legal documents, agreements, and so on, which might be important in matters related to the treaty - in a form guaranteed to be consistent with that of the Treaty itself, but it's a longish shot.

However the encoding is managed, it must be tested. I think that the obvious way is to see whether it gives the right answers to questions. This requires a simple interpreter. At this stage, we do not wish to deal with complicated questions, but straightforward matters of fact. For example, the question "Can the queen catch fish in the Waitemata harbour ?" might reasonably elicit the response, "Give the name of a chief who, before 1840, could catch fish in the Waitemata harbour" - or, if that information had already been given to the system, the answer "yes" ( or "no" ) as determined by its knowledge, with reasons if required. Then, if the response is judged to be inappropriate, we must look again at the encoding of the Treaty. Alternatively, the fault may lie in the machinery of the interpreter, but one reason for using a very simple interpreter at this stage is to reduce the chance of getting it wrong. We'll have quite enough trouble with problems like this later on.

## INTERPRETATION.

The second requirement is for a way to describe how a passage of text is interpreted by a reader. I restricted the interpreter I mentioned above to deal with "straightforward matters of fact", which I carefully didn't define. My intention was to stop well short of matters which depend on personal interpretations of less well defined, and therefore more controversial, ideas - governorship, ownership, dominion, and so on - for their elucidation. In fact, the first step must avoid relying on the schemata which we aim to develop; and that is the problem to be faced at the level of interpretation.

How do we develop a schema which in some sense encapsulates someone's view of the world ? A simple view of such a schema is as a set of definitions. I don't know whether that's too simple or not; if it is, we'll find out. They differ from universal definitions in that they can only be used when the person who "owns" them is concerned. The schemata and universal definitions are to be viewed as complementary rather than exclusive : there is no reason why some notions should not be represented in both. For example, the notion of land has a purely geographical component which might well be seen as a universal definition; but some people may find other connotations inseparable from their notions of land, and these would properly be included in their personal schemata. Indeed, it is in exploring - and, all being well, clarifying - this area that the value of the work may to a great extent reside.

How can we tell how someone interprets a message ? Somehow we have to get the information we want out of the person's mind - and the only way to do that is to ask the person to tell us, either verbally or in actions. My first impression is that we will get a more useful answer by asking specific questions rather than by giving an open-ended invitation to talk : for example, to define ( or, perhaps better, circumscribe ) what someone means by ownership, we can ask questions like "If you own X, are you permitted to destroy it ?". Different answers to questions like that should be a basis on which we can characterise different ways of understanding words - provided that we can find the right questions to ask, and can analyse the answers ( perhaps assisted by explanations of how the answers were derived ) in useful ways. In this analysis, we must first determine the person's chain of reasoning, then classify each component - which may be a step in the argument or a piece of information used - as a piece of the Treaty, or as a fact or assertion sufficiently basic to be taken as an axiom, or as a personal interpretation which must be included in the person's schema.

The main function of the computer in all this is to keep track of the facts, assertions, axioms, and other items of information, to classify them as appropriate, and to check, so far as may be possible, that the collections remain self-consistent. In addition, the computer system should be able to reproduce the arguments put forward by the people.

## WAYS AND MEANS.

Just as a way of starting off, I present what seems to me to be the obvious procedure for tackling the problem. It could be possible to work on the first two parts in parallel; certainly the SECOND part is independent of any knowledge of the Treaty, and could be pursued as a pure computing project. The THIRD part, though, depends on both earlier parts.

FIRST : express the Treaty in a form suitable for computer treatment. We have to be sure that we can do this adequately before continuing. Test the representation as far as possible on topics which don't require detailed interpretation.

SECOND : work on implementing schemata. It would probably be best to use some area other than the Treaty of Waitangi for preliminary experiments, to make sure that the method will work in principle. Any topic where there is a spectrum of views will do; as a suggestion, try music. The aim is to develop a collection of facts and a collection of schemata for different people, and an interpreting system which will derive the people's opinions on various questions about music. The experience gained in developing this system should also lead to a formulation of a technique for constructing the schemata.

THIRD : now apply the techniques from the second part and the representation of the first part to the real problem. From here on ( perhaps even earlier ? ) an iterative approach is needed. At each stage, a question on the Treaty is asked and answered by some subject ( person or group ) with a schema. The same question is then put to the computer implementation, using the appropriate schema. If the computed answer agrees with the subject's answer, move on to the next question. If no answer can be derived by the computer system, then some addition must be made to the schema, or possibly to the universal definitions. If the answers from the subject and from the computer disagree, then the schema or universal definitions must be changed in some way. The subject should work through the computer's chain of reasoning to find the faulty step, then apply suitable

corrections. ( With a well designed system, much mechanical help in this operation is possible : compare the performance of Teiresias<sup>11</sup>, the "front end" of the Mycin expert system. ) After any such change, any previous arguments which may be affected must be checked to ensure that the schema continues to give the right answers to all the questions.

Care must be taken in this development to avoid introducing inconsistencies into the computer's knowledge. To some extent, these can be checked automatically; but the computer can only check to the extent of its knowledge, and cannot be expected to notice conflicts between statements which require extensive world knowledge for their interpretation. For example, an assertion that land owned by Maori people could be confiscated by the crown without payment or due legal process would ( presumably ) conflict directly with the "rights and privileges of British subjects" guaranteed by the third article of the Treaty, but unless this fact had been explicitly presented to the computer programme in some form it would not be noticed by the programme as an inconsistency. That is not to say that the computer system is of no use in this respect : it can still identify unsupported statements, and list them for scrutiny, so that such assertions cannot be hidden in a fog of words.

#### A PERSONAL STATEMENT.

I offer this statement not because I consider I have any deep insights which must be taken into account, but to make my position clear in case it should affect my perception of the problem to be solved.

The first version of the Treaty to which I gave serious attention ( I think it was the first one I saw, but can't be certain about that ) is this one<sup>2</sup> :

##### **First Article**

The Chiefs of the Confederation of the united tribes of New Zealand, and the separate and independent Chiefs who have not become members of the Confederation, cede to Her Majesty the Queen of England, absolutely and without reservation, all the rights and powers of sovereignty which the said Confederation or individual Chiefs respectively exercise, or possess, or may be supposed to exercise, over their respective territories as the sole sovereigns thereof.

##### **Second Article**

Her Majesty the Queen of England, confirms and guarantees to the Chiefs and tribes of New Zealand, and to the respective families and individuals thereof, the full, exclusive and undisturbed possession of their properties which they may collectively or individually possess, so long as it is their wish to retain the same in their possession, but the Chiefs of the united tribes and the individual Chiefs yield to Her Majesty the exclusive right of pre-emption over such lands as the proprietors thereof may be disposed to alienate, at such prices as may be agreed upon between the respective proprietors and persons appointed by Her Majesty to treat with them in that behalf.

##### **Maori Translation**

The Queen of England accepts the principle that the Chiefs, sub-tribes and all the inhabitants of New Zealand shall exercise complete domination over all their lands, houses and goods.

##### **Maori Translation**

The Chiefs of the Confederation and the rest of all the Chiefs as well who have not become members of the Confederation have truly given to the Queen of England forever the governorship over all lands.

### Third Article

In consideration thereof Her Majesty, the Queen of England extends to the natives of New Zealand her Royal protection, and imparts to them all the rights and privileges of British subjects.

### Maori Translation

In fulfillment hereof of the agreement to accept the sovereignty of the Queen, the Queen will take care of all the Maori people of New Zealand. She extends to them the same rights and privileges enjoyed by Englishmen.

Except for the omission of the preemption clause from the Maori version of the second article, I was then, and still am, unable to discern any significant difference between the two versions presented.

Later I came across the following version in E.J. Wakefield's *Adventure in New Zealand*<sup>3</sup>. He gives the same English version ( augmented by the preamble and the declaration preceding the chiefs' signatures ), but offers this "exact and literal translation of the Maori version which is also published officially" :

" Here's the first.—Here's the Chiefs of the Assem-  
" blage and all the Chiefs also who have not joined  
" the Assemblage mentioned cede to the utmost to the  
" Queen of England for ever continually to the utmost  
" the whole Governorship of their lands.  
" Here's the second.—Here's the Queen of England  
" arranges and confirms to the Chiefs, to all the men  
" of New Zealand, the entire Chieftainship of their  
" lands, their villages, and all their property. But  
" here's the Chiefs of the Assemblage, and all the  
" Chiefs besides, yield to the Queen the buying of  
" those places of land, where the man whose the land  
" is shall be good to the arrangement of the payment  
" which the buyer shall arrange to them who is told  
" by the Queen to buy for her.  
" Here's the third.—This, too, is an arrangement  
" in return for the assent to the Governorship of the  
" Queen. The Queen of England will protect all the  
" native men of New Zealand. She yields to them all  
" the rights one and the same as her doings to the  
" men of England.

This version includes the preemption clause; once again, the translations seem to me to mean much the same thing.

Other people have denied the identity which I perceive. The reasons for this difference of opinion must ( if my analysis is correct ) be rooted in one of the factors which I discussed earlier.

If we are looking at the same English texts, then the difference must be one of interpretation. That's far from impossible; my understanding of terms like sovereignty, governorship, and domination is vague, because I rarely need to use them. No doubt they have more precise legal definitions, leaving other views open to people who care to apply these more precise interpretations. Alternatively, the same terms may have different connotations to people with different backgrounds, so that shades of meaning imperceptible to me may give rise to significant differences of interpretation for others - or, of course, vice versa.

This essential identity between translations of very different style ( and from sources of very different intentions; Wakefield was by no means advocating support for the treaty ) suggests to me that the translation itself is unlikely to be a root of misunderstanding. That is not to say that the meanings are identical, but it does suggest that the meaning of the English version is as close as it can be to the meaning of the Maori version. If that were not so, then surely one of the translators would have found the better translation.

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- 3 : E.J. Wakefield : *Adventure in New Zealand* ( John Murray, London, 1845; in a facsimile edition by Wilson and Horton )
- 4 : G.A. Creak : *The Eli manual* ( incomplete, unpublished, 1989 ).
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( There are more recent references, but I don't have access to them at the moment. )
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- 7 : Reference 13, pages 325ff.
- 8 : J.F. Sowa : *Conceptual structures* ( Addison-Wesley, 1984 ).
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- 10 : Reference 8, pages 127ff, with a particularly clear statement on page 149.
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