

DISCUSSION ON PAPER 10

PROF. OETTINGER asked what hopes Dr. Matthews had of the practicality of doing analysis by synthesis, in comparison with more direct recognition techniques.

DR. MATTHEWS stated that it would be hopelessly impractical for even a battery of machines to do analysis by synthesis. His hopes lie in developing his short cuts and in better programming techniques.

PROF. LAMB asserted that each short cut was a step nearer direct analysis and away from analysis by synthesis. At what point in adding short cuts does the process become direct analysis?

DR. MATTHEWS. The direct analysis and analysis by synthesis portions of the procedure are quite distinct. The great advantage of analysis by synthesis is as part of an existing programme to make sure that all the analyses are obtained, in this part, if not elsewhere.

PROF. LAMB then asked if it was Dr. Matthew's contention that only by analysis by synthesis shall we get all analyses.

DR. MATTHEWS answered positively and said that he felt his paper was an assurance that, in principle at least, we can do this work of recognising sentence structures.

PROF. YNGVE. There are experimental observations which indicate that humans behave at least partially by synthesis. We frequently anticipate the words of a speaker and sometimes are surprised. Isn't there also some synthesis inherent in a predictive system, for in it you start a synthesis based on what you already know about the system?

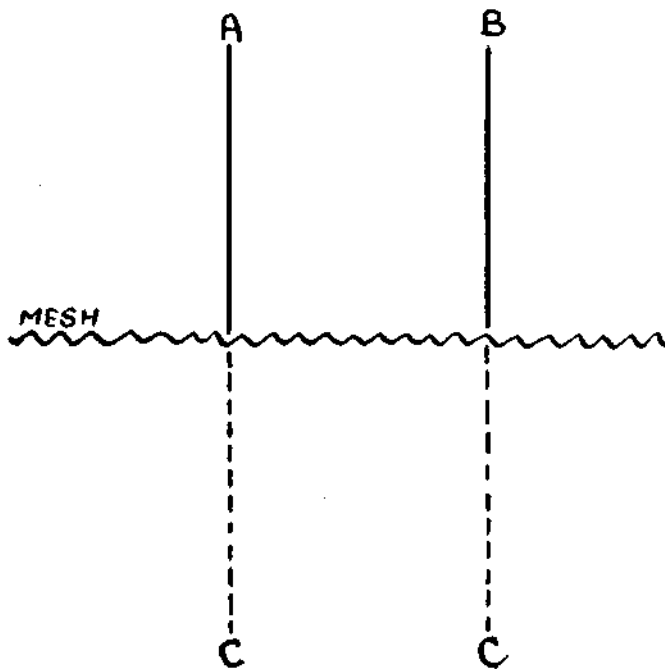
PROF. OETTINGER thought there was a strong distinction for, in a generative grammar you are at liberty to assume that a given form is unambiguous (e.g. "bank" as verb, noun or adjective) but in analysis the selection of the intended form for such a word is much more difficult. However, there are certainly similarities, and synthesis could be an independent check on analysis. He thought also that all possible analyses are obtainable by analysis.

DR. MATTHEWS said that when used as a check on analysis, synthesis would not check that all analyses had been obtained.

DR. HAYS thought that Mr. Sakai's method looks as though it should produce all analyses, *by analysis*.

DR. BROWN asked if anybody had shown that analysis by analysis and analysis by synthesis were fundamentally different. Perhaps predictive analysis is a bridge between the two.

DR. MATTHEWS attempted a demonstration, using this figure:-



We can write analysis programmes which say that C can come from A or from B, or we can write programmes which start off with things which we know exist, the real things A and B, and then determine what A and B look like after going through the mesh and then match them with the C we are analyzing. He feels that the A's and B's are the real things in sentences (e.g. subjects and predicates) and whether they look alike or not (e.g. as C's they are both nouns, perhaps), they are really separate things.

DR. BROWN had to disagree. The C's were the reality. It is a very interesting exercise to invent the A's and B's and the mesh, but C is the reality.

PROF. LAMB agreed in general with Dr. Brown and added that dealing with A's and B's involved a lot of messing around with what is not in text. As to Prof. Yngve's point about humans doing some synthesis, the brain does lots of things simultaneously and we can only do one process at a time with a computer.

DR. MATTHEWS ended the discussion of his paper by prophesying darkly that by the time we tie-up the machine translation problem there will be all sorts of machines available, doing many things simultaneously.

J. McDANIEL