Tenser, said the Tensor

April 23, 2006

The Embedding by Ian Watson

[This post is part of an occasional series about linguistics in science fiction. Fair warnings: this bloomed into a very long post, and there are spoilers throughout.]

Ian Watson's 1973 novel *The Embedding* is, of all the science fiction about linguistics that I've written about so far, the story that most directly addressed ideas from theoretical linguistics. Where most SF authors have been content with simple ideas from the shallow end of the field, Watson dives right into the deep end, displaying some familiarity with then-current ideas about Universal Grammar and the phenomenon of center-embeddings in syntax.

The Embedding consists of three interwoven plot threads, each of which deals with a different aspect of the idea of center-embedding. These three threads are often quite separate, although there are certainly characters and events that cross over between them. I'm going to summarize the three threads separately, then discuss the linguistic speculations they contain together at the end.

A Forbidden Experiment

Chris Sole is a linguist who works at a hospital in England. The hospital specializes in the treatment of aphasic children—the public part of the hospital, at least. Sole doesn't actually work there; instead, he works in the Unit, a secretive project researching the boundaries of the human language faculty. In the Unit, orphaned war refugee children are raised in isolated "worlds", dosed with a learning-enhancement drug, and taught languages that are...unnatural. The facility is visited by a mysterious and somewhat sinister American named Tom Zwingler who is to be briefed about the work. As Sole explains it to him:

> "Well, ever since Chomsky's pioneer work, we all assume that the plan for language is programmed into the mind at birth. The basic plan of language reflects our biological awareness of the world that has evolved us, you see. So we're teaching three artificial languages as probes at the frontiers of mind. We want to find out what the raw, fresh mind of a child will accept at natural—or 'real'." (p. 45)

One of the three artificial languages tests whether our notions of "logic" are universal. Another is taught in a world containing many perceptual illusions and is intended to test "alternative reality states" (whatever that means). The third language is Sole's project. It's a variant of English that contains multiple center-embeddings, a structure that is easy to define but which humans seem to have trouble processing. Sole describes it like this:

> "Self-embedding is a special use of what we call 'recursive rules'—these are rules for doing the same thing more than once when you form a sentence, so that you can make your sentence any shape and size you like.... 'The dog *and* the cat *and* the bear ate.' 'They ate the bread *and* cheese *and* fruit, lustily *and* greedily.' You've never heard these particular sentences before—they're new—but you have no trouble understanding them. That's because we've got this flexible, creative programme for language in our minds. But self-embedding pushes the human mind pretty near its limits—which is why we can use it as a probe at the frontier—" (p. 47)

As an example, he gives the nursery rhyme about "the house that Jack built". This rhyme is an example of what linguists call *self-embedding* because it consists of a series of relative clauses, each of which is nested inside another relative clause. It's easy to understand, but what if the relative clauses were rearranged so that each one came in the middle of the one above it instead of at the end—a pattern called *center-embedding*? (I should note that Watson doesn't make this distinction clearly, using *self-embedding* to describe both phenomena, but more on that later.) A sentence with multiple center-embeddings rapidly becomes incomprehensible:

> "...'This is the malt that the rat that the cat that the dog worried killed ate.' How about that? Grammatically correct—but you can hardly understand it. Take the embedding a bit further and...the most sensitive, flexible device we know for

> processing language—our own brain—is stymied." (p. 49)

When asked by Zwingler to explain why this is so, it seems to me that Sole actually gives two conflicting explanations. He first mentions constraints on processing that prevent the listener from keeping the whole sentence in short-term memory. Immediately thereafter, though, he appeals to Universal Grammar:

> "...The other permanent level [besides words in the lexicon], deep down, contains highly abstract concepts—idea associations linked together network-style. In between these two levels comes the mind's plan for making sentences out of ideas. This plan contains the rules of what we call Universal Grammar—we say it's universal, as this plan is part of the basic structure of mind and the same rules can translate ideas into any human language whatever—"
>
> "All languages being cousins beneath the skin, in other words?"
>
> "Right again. They resemble each other like faces in a family. But each cousin's face has its own individual outlook on reality. If we could simply stack all these 'faces' one on top of another to work out the rules of universal grammar that way—well, we'd have a map of the whole possible territory of human thought—everything we can ever hope to express, as a species."
>
> "But you couldn't just stack all these languages, could you? Some have died out and disappeared—"
>
> "And a whole lot more might exist, but they haven't been invented."
>
> "Which is why you're using artificial languages as frontier probes?"
>
> "Exactly." (pp. 49-50)

Damming the Amazon

At the same time Sole is having to explain his work to Zwingler, he is mulling over a letter he has received from an old friend and rival, a French anthropologist named Pierre Darriand. The letter describes both Pierre's work with an Amazonian tribe called the Xemahoa and his despair at the current political situation in the region. With the help of sinister Americans (see a pattern?) the Brazilian government is planning to dam the Amazon and flood a large portion of the Amazonian basin, including the area where the Xemahoa live. The Xemahoa, however, refuse to believe that they must relocate before their land is flooded by the dam. Pierre believes this would be a particular loss, beyond the obvious human cost, because there is something unique about the Xemahoa's language, or rather languages.

Pierre mentions a poem by Raymond Roussel called *Nouvelles Impressions d'Afrique* (see here for an English introduction) that consists of extremely long sentences with many nested parentheses. Because of its structure, it is largely incomprehensible. At least, that's the case in normal human languages, but Pierre thinks the one of the Xemahoa languages might be different:

> "...And oh what a zany similarity to Roussel's poem too! What an amazing similarity to the mind-sanctuary that our French dilettante built for himself. This is what astonishes me. When I am not livid with rage, I toy with the idea of somehow translating *Nouvelles Impressions d'Afrique* into Xemahoa B.
>
> "I say Xemahoa *B*, since apparently there's a two-tier language situation operating here—and in Xemahoa B, if in any language on this vicious globe, Roussel's poem might at last be made comprehensible." (pp. 16-17)

The two-tier language situation that Pierre alludes to is the use of Xemahoa A, a language that is exotic but not astonishingly so, in everyday life. The other language, Xemahoa B, is used only in ritual circumstances by the tribe's shaman, the Bruxo, during ceremonies where the tribe is under the influence of a drug called *maka-i*:

> Only a drug-tranced Bruxo can fully articulate it. Only a drug-tranced people dancing through the firelight can grasp the gist of it.
>
> Their myths are coded in this language and left in safe-keeping with the Bruxo. The Deep Speech and the Drug-Dance free these myths as living realities for all the people in a great euphoric act of tribal celebration—to such a degree that they are all firmly convinced that the flood is only a detail in the fulfilment of their own myth cycle, and that the Bruxo,

> and the child embedded in the woman's womb in the taboo hut, will in some as yet inexplicable way be the Answer. (p. 63)

The woman and child mentioned here are a pregnant woman, kept separate from the tribe, who has been continuously dosed with the mind-expanding *maka-i* during her pregnancy. This is unprecedented, and Pierre is unable to discover what effect it is expected to have on the child, but the Xemahoa seem to believe it will somehow solve all their problems.

Signal Traders

The mysterious American Zwingler reveals to Sole why he is so interested in his work. Recently, television transmissions from Earth have been detected being broadcast back towards Earth from deep space. The source is a decelerating spacecraft expected to arrive in about five days. The Americans and the Russians have decided to keep the spacecraft a secret. Because of his work with unnatural languages in the Unit, Sole is the closest thing they can find to an expert on alien languages, so he's invited to travel to the landing site in Nevada and act as a consultant.

The first thing the alien representative (tall, thin, big eyes) says takes everyone by surprise:

> "Nice planet you have here. How many languages are spoken?" (p. 129)

[Note: not, "We wouldn't want anything to *happen* to it." Whew!]

> We call ourselves collectively the Sp'thra. You do not hear the ultra and infrasonic components of the word so I drop them. It means Signal Traders. Which is what we are—a people of linguists, sound mimics and communicators. We have individual names too—mine is Ph'theri. How did I learn your language so quickly? Besides being expert communicators in many modes, we use language machines." (p. 132)

These machines can directly read and write the portion of the brain that deals with language, allowing the Sp'thra (who clearly got the memo about science fictional languages and apostrophes, by the way) to imprint a language directly into the brain, as long as it "conforms to...the rules of Universal Grammar!" (p. 130)

The Sp'thra are linguistic typologists on a grand scale. They have converted a natural satellite, the Language Moon, into a titanic library of information about languages from all over the galaxy—the WALS project on an astronomical scale. They maintain a strong version of Whorf's linguistic relativity hypothesis, believing that each language represents a way of seeing the world:

> "'Their-Reality', 'Our-Reality', 'Your-Reality'—the mind's concepts of reality based on the environment it has evolved in—all are slightly different. Yet all are a part of 'This-Reality'—the overall totality of the present universe—"
>
> His voice rose shrill with emphasis.
>
> "Yet Other-Reality outside of this totality assuredly exists! We mean to grasp it!"
>
> His eyes blinked rapidly. He licked his lips in a lizardly way.
>
> "There are so many ways of seeing This-Reality, from so many viewpoints. It is these viewpoints that we trade for. You might say we trade in realities—"
>
> ..."We mean to put all these different viewpoints together, to deduce the entire signature of This-Reality. From this knowledge we shall deduce the reality modes external to It—grasp the Other-Reality, communicate with it, control it!"
>
> "So then," broke in Sole, getting excited himself, "what you people are doing is exploring the syntax of reality? Literally, the way a whole range of different beings 'put together' their pictures of reality? You're charting the languages their different brains have evolved, in order to *get beyond* this reality in some way? That's the idea?"
>
> "Nice," conceded Ph'theri. "You read our intention well. Our destiny is to signal-trade at right angles to This-Reality. That is the tide of our philosophy. We have to journey out at right angles to this universe. By superimposing all languages. And our language inventory for This-Reality is nearly done—" (p. 137)

In exchange for information about Earth languages, the aliens offer to teach humans about the galaxy and space travel. What they want in return, though...

> "The Sp'thra made the following offer for what we want to buy," he said to Sole. "We will tell you the location of the closest unused world known to us, habitable by you. The location of the nearest intelligent species known to us ready to engage in interstellar communication, together with an effective means of communication using modulated tachyon beams. Finally, we offer you an improvement on your current technology for spaceflight within your solar system—"
>
> "In return for which you want more tapes and grammar books on microfilm?"
>
> "*No*. That has been your mistake all along. Tapes and books cannot provide a full model of language in action. We need six units programmed with separate languages as far removed from each other as possible."
>
> "Units?"
>
> "We need working brains competent in six linguistically diverse languages. Six is an adequate statistical sample—" (p. 143)

They're not talking about living human volunteers, either—they just want the brains (delicious brains!), which they'll store and eventually integrate into the database on their Language Moon. Yipes!

Because they're sinister, the Americans seem pretty eager to give the aliens what they want, but Sole wants a better deal. He questions Ph'theri about why exactly the Sp'thra want to escape this universe. He discovers they had contact thousands of years before with a species they call the Change Speakers, who could manipulate reality, shifting between dimensions, using language alone. The Sp'thra mean to follow them, escaping from this universe, which they call "The Embedding". Sole hears the term, and makes an intuitive leap:

> "Ph'theri—I've tried to achieve a kind of 'embedding', to test out the frontiers of reality, using young human brains. Maybe it's a coincidence of words? No, I don't think so. You think it's impossible to test out reality with one species on one planet. Tell me this, Ph'theri, would you be willing to miss the [interstellar] tide if it was worth your while? If it brought your search to an end? If it saved *all* time for the Sp'thra?"
>
> Sole fished Pierre's letter out of his pocket.
>
> And began to tell the tall alien all that he knew of the Xemahoa tribe of Brazil... (p. 161)

Ph'theri agrees that this would be worth more, including the secret of interstellar travel, but his ship has to leave soon. The race is on to kidnap and murder half a dozen speakers of genetically diverse languages and deliver their brains to the aliens, along with the brain of the Bruxo of the Xemahoa. This involves all sorts of nastiness. To prevent the flooding of the Amazon, sinister (and foolhardy) American agents travel to Brazil to blow up their own dam with tactical nuclear weapons. ("Nuclear's just a word, Chris—don't get all worked up about a word. They're only one kiloton apiece.") Sole, who has traveled to Brazil to meet up with Pierre and secure the Bruxo's brain, arrives just as the baby dosed with *maka-i* is born. It's a horrible mutant, and after a truly distasteful scene where one of the Xemahoa eats its (apparently delicious) brains, Sole's group discover that the dam demolition plan has gone horribly wrong. The Americans and Russians fall back on Plan B: they announce the Earth is under attack and destroy the alien ship in orbit, sacrificing the stars for short-term political gain.

After this mess resolves itself to no one's satisfaction, Sole returns to England to discover that one of the subjects in his embedding experiment, Vidya, has apparently undergone some kind of cognitive breakdown under the strain of learning and using massively center-embedded language structures.

> "For Chrissake, Chris, listen to me—the language programme broke down. The kids accepted the overload on short term memory up to a certain point. But it's broken down now like a dam bursting." (p. 242)

Sole doesn't appreciate the metaphor, and resolves to free Vidya to live a normal life. Somehow, though, Vidya's madness seems to infect Sole—the child has somehow become a "projective empath". Before anyone can do anything about it, though, the child breaks his own neck in a seizure.

And that's it. No happy ending, no escapes into other realities, no travel to the stars.

Comments

I was disappointed in *The Embedding*, in part because its reputation is so good. In his review on Special Circumstances last year, for example, Anoop Sarkar wrote that it is "a true classic" and that "of a handful of sf novels that bases its speculations on the scientific study of human language, and it well might be the best of the bunch." It was tied for second place in 1974 for the John W. Campbell Award, and it received the Prix Apollo in when it was published in France in 1975. I guess I let my expectations get too high. I thought that the linguistics in the novel was somewhat confused, and that as a novel it suffered from too many redundant plot threads.

The opening certainly seemed promising, raising an idea from the dark side of linguistics. The so-called Forbidden Experiment has probably occurred to every linguist who considers the question of possible human languages. Suppose, says the little devil on the linguist's left shoulder, we could prevent a child from acquiring a normal language, instead substituting a cleverly-designed artificial language. Think what we could learn about the human language faculty! If it weren't for these pesky ethical standards and Human Subjects Approval committees...

The idea of the Sp'thra as interstellar linguistic typologists is certainly a fun one, too, and particularly appealing to me. I'm trying to figure out if I can wangle a research fellowship for a quarter or two at the Language Moon. Um, will I be able to travel there in person, or do you only accept disembodied brains? The Sp'thra do seem a little bit naive about language sampling, though—they don't seem to mind that they're going to receive the brains of speakers of English, Russian, Japanese, Eskimo, Vietnamese, and Persian, even though three of those are Indo-European. I guess the humans pulled a fast one.

Watson's choice of center-embedding as the key phenomenon to wrap his novel around seemed promising as well. It's easy to explain to a non-specialist audience, and it's a great example of what seems like an unexpectedly hard constraint on human language processing. It's an appropriate subject for the kind of inappropriate experiment Sole is conducting, too: trying to see if the limit really is a hard one, or whether it can be broken by giving a child input with lots of center-embeddings.

As I mentioned above, though, Watson has conflated two related phenomena: self-embedding and center-embedding. It's center-embedding that produces impossible-to-process sentences, while sentences with multiple self-embeddings can be perfectly comprehensible. Take for example the nursery rhyme about Jack's house mentioned above, or my favorite example, "There's a flea on the wing on the fly on the bump on the log in the hole in the bottom of the sea," which contains deeply nested prepositional phrases but still makes sense.

More importantly, though, I think Watson also didn't have a clear understanding of the role that the center-embedding phenomenon played in syntactic theory in the late 60's and early 70's, particularly in the theories of Chomsky (the only linguist he mentions by name), leading him to ascribe such structures an importance in Universal Grammar they didn't have. Such embeddings have been mentioned (although not called "center-embeddings") in connection with processing as early as the claim by Chomsky and Miller (1963) that "the English sentence (*the rat* (*the cat* (*the dog chased*) *killed*) *ate the malt*) is surely confusing and improbable but it is perfectly grammatical and has a clear and unambiguous meaning." (p. 286) Notice the distinction being made: center-embeddings are claimed to be *grammatical* but hard to process in some way. If they are grammatical in a particular human language, they must surely also conform to any proposed Universal Grammar. Chomsky (1965) expands on this point when he makes a distinction between the *acceptability* and *grammaticalness* of sentences like "the man who the boy who the students recognized pointed out is a friend of mine". He writes:

> The notion of "acceptable" is not to be confused with "grammatical." Acceptability is a concept that belongs to the study of performance, whereas grammaticalness belongs to the study of competence. (p. 11)

In Chomsky's conception, ascribing the difficulty of such sentences to performance means that they do not violate any principle of the language-user's implicit knowledge of language (competence, in his terminology), but only that they somehow exceed the user's capacity to apply that knowledge in actual sentence processing. Again, this means that center-embedded sentences aren't violations of Universal Grammar, only that they overflow a buffer or something.

The apparent hard limit between acceptable single center-embeddings and unacceptable double center-embeddings led some researchers to develop theories of sentence processing that were explicitly designed to exclude such sentences (e.g. Reich (1969), who by the way actually uses the term "centrally embedded"). However, strong evidence supporting the idea that center-embeddings are just hard to process, not ungrammatical, was presented by De Roeck et al. (1982):

> Our doubts about Reich's hypothesis were first aroused by a small experiment having to do with reception rather than production. In the course of discussion at a seminar conducted by one of us (Sampson) and which concerned centre-embedding among other topics, another of us (De Roeck) made the following remark:
>
> (1) Isn't it true that example-sentences that people that you know produce are more likely to be accepted?
>
> It contains two levels of centre-embedding relative clauses, and thus violates [all variants of the proposed constraints]. The hearers (all the other co-authors) immediately responded to this remark as a relevant and true contribution to the discussion; they all confirm that they were unaware of anything unusual about the remark until its utterer pointed it out to them (and this despite the fact that the seminar might have been expected to sensitize them to such examples). In other words, they found the remark fully 'acceptable'. (pp. 331-2)

In Watson's defense, this last paper was published years after his novel, so he can't be expected to have taken its arguments into account. Still, I think he was writing under the misapprehension that multiple center-embeddings were supposed to be ruled out by UG, so that a being capable of processing them would somehow be violating the laws of language.

He also seemed to subscribe, like so many SF authors writing about linguistics, to Whorf's linguistic relativity hypothesis, an idea that probably had more currency outside of the field than inside. The sections about "This-Reality" and "Other-Reality" being accessible only through particular languages are clearly Whorfian. Notice also how he has subtly broadened the definition of Universal Grammar by merging it with Whorfian ideas. In two places quoted above, he writes that "[t]he basic plan of language reflects our biological awareness of the world that has evolved us" and about "the mind's concepts of reality based on the environment it has evolved in". Universal Grammar, for Watson, isn't the limitations on language processing that are peculiar to humans as a result of our evolutionary history. Rather, Universal Grammar is really *universal*: everywhere in the universe the physical and logical laws are consistent, and since all language-using species evolved under those laws, all languages spoken by all them must conform to it. He also conflates the constraints Universal Grammar places on what *linguistic forms* are possible with the constraints the strong Whorf hypothesis places on what *thoughts* are possible. These misconceptions about UG are crucial to Watson's depiction of the Sp'thra's research program—they could not otherwise expect to be able explore the limits of "This-Reality" through interstellar linguistic typology.

I'm not sure, however, that this "universal" definition of UG has ever been proposed or maintained by anyone in the field of linguistics. It certainly can't be squared with UG as conceived by Chomsky, who regularly cites the hypothetical example of a Martian scientist who, upon observing Earthlings, concludes that we have only a single human language with only minor variations. Chomsky wouldn't use that example if he thought the Martian's language would also be constrained by the same UG—the whole point is that the Martian comes from a perspective *outside* the constraints of UG.

In addition to the misunderstandings about linguistic theory, I was also disappointed by what strike me as some weaknesses in *The Embedding* as a novel. It contains three separate threads (Sole's, Pierre's, and Ph'theri's) concerning center-embedding, but I think two would have done the job. The central thread is the one concerning the Sp'thra and their quest for center-embedding brains. To supply such a brain, Watson needs one of the other threads, in which a drug-enhanced (or possibly -addled) human becomes capable of performing this cognitive backflip. But he's got *two* such humans: the Xemahoa Bruxo and Sole's experimental subject Vidya. It already seems like a bit of a coincidence that the embedding human should have been discovered just as alien typologists arrive looking for one; it strains my suspenders of disbelief that two should be found simultaneously and independently. Notice how this complicates Sole's counter-proposal to Ph'theri above. In effect, he says, "I've been researching this 'embedding' myself. See, here's a letter from a friend who says they're doing it in the Amazon." Um, what was the part about your research, again?

What's more, Sole's thread isn't even necessary to the plot. Look at the structure of the novel:

1. Sole and his unethical project are introduced
2. He's spirited away to Nevada to meet Ph'theri
3. The main action involves trying get the Sp'thra the brains they want
4. This goes badly
5. Sole returns to England, discovers Vidya has snapped like a rubber band, and experiences projective empathy for a page or two before the kid dies.

What does the Vidya thread add to the story? It seems largely disconnected, though I think it might have made a fine short story about the Forbidden Experiment and the limits of human cognition—in fact, I wonder if it started out that way and then grew into a novel.

Watson also resorted to stereotype several times in *The Embedding,* using stock sci-fi tropes and characters from central casting:

- Secret government projects committing crimes against humanity while researching Things Man Was Not Meant To Know? Check.
- Aliens who came to Earth for our ~~women water~~ brains? Check.
- Brutish military men who nuke first and ask questions later? Check.
- And because it was the 70's: Drugs that really do expand your mind instead of leaving you a stuttering Leary-esque burnout? *Double-check*.

It's also worth mentioning, as Anoop did in his review, that the novel is relentlessly cynical—I might go so far as to call it mean-spirited. The humans are *really stupid*—at one point, in fact, Zwingler's dialog veers into Ed Wood territory:

> "We buy a stinking little peace by sacrificing the stars, when we could have bought the stars with half a dozen brains. It's so STUPID. *Stupid!*" (p. 231)

Watson reserves special venom for his American characters, who are little more than tissue-thin stereotypes. For example, when Ph'theri is describing how only his species has met the Change Speakers, one of the audience speaks up:

> "Surely we humans have, in the person of Our Saviour!" an evangelical Southern voice cried out. "I swear it's God he means, in his alien way—" (p. 159)

Silly excitable Americans, always yelling about Jesus in their evangelical voices. (Is that even an accent?) Even better, in the next paragraph a "Jewish specialist in Abnormal Psychiatry from New York" starts trying to psychoanalyze the Sp'thra. I was hoping for an Italian mafioso to show up and make it a hat trick, but no such luck.

I don't mean to be too down on the novel. It's full of neat ideas about language that aren't usually found in SF novels: the limits of human language processing, speculations about Universal Grammar, myths encoded for safe-keeping in an unintelligible language, and star-traveling alien linguistic typologists. The Sp'thra remind me, by the way, of both Niven's Outsiders from the Known Space series, who preceded them, and his Chirpsithra from the Draco's Tavern series, who came later. I wonder if this was actual cross-pollination or just a coincidence.

In *The Embedding*, Ian Watson's speculations about linguistics were more ambitious than a lot of other linguistically-oriented SF, and I think he did a good job of introducing and describing some pretty subtle notions from theoretical linguistics. Unfortunately, I think he got a few of the details wrong and that reduced my enjoyment of the novel, but perhaps we should see the glass a half full—after all, it's not often that characters in novels are plausibly-characterized card-carrying linguists, let alone *two* linguists and a shipful of alien typologists.

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14 Comments

This review makes the happiness in me. I read *The Embedding* a few years ago and was mildly disappointed, too, but I didn't have a real critique; now, I do have. Sweet.

Nitpickiness: You want to *wrangle* where I think you want to *wangle*, above. No?

Posted by: Carl Caputo | April 23, 2006 at 10:48 PM

Note that center-embedding is standard in mathematics, e.g. x * ((z * w) + y) or f(g(h(x))).

Also, I suspect that one gets better at parsing center-embedded English (e.g.) with practice. The first time I encountered the rat and cat and dog, I had to think carefully to get clear on which beastie had done what. But when I encountered "the man who the boy who..." for the first time (here), I grasped its meaning immediately and confirmed it readily.

I'll leave it to the linguists to speculate on whether center-embedding is enough trickier than the alternatives that its absence on the natural-language scene is unsurprising. But as a non-linguist, it seems to me that some of the real languages I've heard horror stories about aren't that much less weird.

Posted by: Andy B | April 23, 2006 at 11:37 PM

Andy B: "But when I encountered "the man who the boy who..." for the first time (here), I grasped its meaning immediately and confirmed it readily."

Maybe that was partly because of the fact that the rat cat dog example was a familiar nursery rhyme and your brain was stumbling over its rearrangement.

Posted by: Steve | April 23, 2006 at 11:54 PM

You want to wrangle *where I think you want to* wangle*, above.*

I'll be damned. I've been using the word *wrangle* for both of those meanings for years. Embarrassing. It's fixed now. Thanks!

Posted by: The Tensor | April 24, 2006 at 12:59 AM

I'm glad you've got around to *The Embedding*, Tensor. Your reaction seems to have been similar to mine - as I said in my comment on the *Pao* post, I didn't really like it, but it's *really* about linguistics.

It's my impression that there's the suggestion, in Chomskyan linguistics, that in principle it *ought* to be possible for performance to match competence. The interesting idea being that universal grammar permits arbitrarily deep centre-embedding, not that it forbids it, and I interpreted Sole's experiment in these terms. I'm not sure if that's what Watson meant, though - I guess I tend to ignore what I can't understand in this kind of explanation, and in any case it's some years since I read the book.

Incidentally, I'm pretty confident that no ordinary speaker of English can follow a phrase like "the house that the malt that the rat that the cat that the dog that the cow that the maiden that the man that the priest that the cock that the corn that the farmer sowed kept woke married kissed milked tossed worried killed ate lay in" in real time, regardless of the familiarity of the material.

Posted by: Tim May | April 24, 2006 at 03:07 AM

Apparently, it's contagious, though: http://specgram.com/CLI.2/03.bakery.disorder.html
:)

Posted by: Trey | April 24, 2006 at 05:34 AM

Thanks for another great review! I've linked to it from http://www.langmaker.com/db/The_Embedding .

Posted by: Jeffrey Henning | April 24, 2006 at 05:58 PM

I fail to see how the standard classical-latin method of shaking a paragraph-long sentence, complete with dependent clauses, until all the verbs in it fall to the end isn't center-embedding, of some sort (and for rhetorical or poetic purpose, one can even jumble the verb order if one wishes!).

Contemplating the minds of people who could stand in the Forum and listen, with good comprehension, to Cicero orating the speeches I had to translate in high school, is the closest I've ever come to touching an alien intelligence.

Posted by: Almeda | December 20, 2006 at 11:37 AM

Here is an embedding that was current around 1960: "anti-anti-anti missile-missile-missile." (Can be expanded as much as you like).

Posted by: george_shem | January 28, 2007 at 12:27 PM

Wasn't it (anti-)^N(missile)^N+1? That would produce:

missile
anti-missile-missile
anti-anti-missile-missile-missile
anti-anti-anti-missile-missile-missile-missile
...

I find one nesting perfectly reasonable, two nestings marginally comprehensible with some priming and intonation, and three nestings impossible. Those are, probably not coincidentally, the same judgments I have about center-embedded sentences about rats, cats, and other small animals.

Oh, and now I'm having a *missile* word moment—that can't be how it's pronounced and spelled, can it?

Posted by: The Tensor | January 28, 2007 at 03:16 PM

It does sound disappointing - to completely sidestep the revelation about realities. But then, it would have been impossible to write about it if it did happen - always the problem with that type of superhuman concept.

I also agree that the linguistic "science" does sound muddled (though I am not a linguist, nor do I play one on TV). I suppose the ideas had to be twisted a bit to try and link the threads. To be honest, the idea of an SF novel focussing so much on apparently trivial linguistic constructions seems a bit dry to me - apologies if I am dismissing something as trivial which I shouldn't. But I mean specifically the centre embedding, which seems minor in comparison to the concepts which the aliens describe.

Posted by: Dominic Wilson | March 08, 2007 at 10:57 AM

Nearly 2 years ago, Jeffrey Henning wrote:
"I fail to see how the standard classical-latin method of shaking a paragraph-long sentence, complete with dependent clauses, until all the

verbs in it fall to the end isn't center-embedding, of some sort (and for rhetorical or poetic purpose, one can even jumble the verb order if one wishes!)."

English basic word order is Subject - Verb - Object, or SVO. We're so used to it that we feel that the verb BELONGS in the middle, but really that's just us. Latin has a default SOV order, but in general Latin word order is much freer because of all their noun inflection and verb agreement. The words "puella" "puerum" "videt" mean "the girl sees the boy" (or "a girl" and/or "a boy"), whatever order you put them in, possibly with slightly different nuances of contrast but the identical truth-value.

And the Romans were as comfortable with that as we are with our system, where we need the order to keep the arguments straight. I can almost hear the ghost of a Roman grammarian muttering something about "inferior barbarians who can't make themselves clear to each other unless everything is lined up just so."

Dr. Whom, Consulting Linguist, Grammarian, Orthoëpist, and Philological Busybody
Posted by: Mark A. Mandel | March 10, 2008 at 10:55 AM

Does it make sense to comment on a post over two years old?

I have only recently read this book. I found Tensor's review very helpful indeed. I needed and wanted to know more about the background to the linguistics. I have a thought though - it seems to me that the review concentrates on the use by the novel, of ideas from linguistics at the expense of considering its use - via Roussel - of literary-philosophical themes.

From the perspective of the latter what is interesting is that the book proposes a mode of language that arranges the world not primarily according to the rules of temporal narrative but according to timeless spatial relations. He describes the Brazilian Indian's language as serving to 'abolish the spread-out through time of the statement'.

For instance, the cat, rat and malt example, is a sentence that actually describes the 'location' of one thing (the malt) by placing it in relation to all the other things and in such a way that where those relations involve actions (which we would expect to be in a verb form locating them temporally) it spatialises the relation (by making them attributes of objects located in relation to other objects actions upon which are also attributes them and help to specify them and their location in relation to yet others.

What, then, would an ever more extended embedding be like?

It would specify the location of something in relation to all other things that had been or will be by spatialising the whole into one instantaneous and permanent entity. In this respect Watson is not merely being stereotypical when he has an 'evangelical' mention God in relation to the aliens search for change maker - after all, a being that can see all that is, was and will be in a single glance, and that constitutes the world in the word is a pretty good definition of most religions' idea of a God.

That said, the book is indeed ultimately cynical. It seems in the end that the aliens bring nothing but a shoddy trade deal they want to conclude in a hurry, that the promise of the universe is easily turned down in order to shore up threatened political regimes and the elaborate games of the Indian shaman are a piece of political manipulation by the one seeking to replace him - none have time to stop and perceive the universe as one in an instant, all have some short-term future interest to satisfy.

But there are very interesting ideas at the interface of linguistics and neuroscience with literature and philosophy.

James

Posted by: James | August 18, 2008 at 06:17 PM

Sorry for coming to this so late in the day, but I have only just finished Watson's novel. I take on board everything you say about the book being informed by linguistic theory but getting it partly wrong, but I actually think this doesn't matter. It's a work of imaginative fiction first and foremost; that it failed to allow you to suspend your disbelief means that for you as a reader, the book and author have probably failed to some extent. But for many others, myself included, with less of a grasp of linguistic theory, the book did succeed. The linguistic storylines were for me only ever a metaphor. The book is about linguistics, but it is also about power, politics, myth, social anthropology and of course its science fiction speculation. The book is cynical, because it was representing a very cynical age of the Cold War and does so rather well I feel. The human race is offered a chance to expand its knowledge exponential to the stars, but local political infighting and the (in-)balance of power prevented this. I did find it fascinating what he had to say about realities being constructed from and through language, but yes thinking about it, I agree with you about the unlikelihood of Universal Grammar existing out in space in order to construct those alien realities. I really felt the book was successful to a lay reader like me, but can appreciate where you thought it fell down. But readers always

go into books with different expectations, different levels of knowledge and even different views and values about the world, all which will influence 'how' they read the book.
Posted by: marc nash | April 21, 2012 at 02:15 PM

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