RICHARD FORSYTH
SENSE AND SENTENCES:
ON GETTINC A COMPUTER TO WRITE POEMS

In front of me I have a question -- "where can his dark thoughts want some dream?". It was posed by a computer, and I can't answer it.

Half the fun of meddling with computers is in the unanswerable questions they pose, especially when you try to force them outside the arithmetical rut in which they are tirelessly efficient. Then they show you exactly what you do not know.

The poems printed here -- you can call them 'compositions in grammatical English and iambic pentameter' under your breath if you wish -- were produced by the Oxford University KDF9. It is not a very large or fast machine by present-day standards, and it is currently being made redundant. However it is still good for a few unanswerable questions. The most interesting of these is quite an old one, in new technological garb: "how is a poem to be made?" which the computer raises only indirectly, by not answering it.

Let us attend to this. A poem is made usually by writing or speaking sentences in a natural language. Simple. We can all do that. But the computer teaches us to ask just how. Well, the program used here has a subroutine that constructs sentences. (A subroutine is simply a series of operations or fixed procedures.) It constructs a sentence in several ways; one of these consists of calling (setting into operation) a further subroutine which constructs a noun-phrase, and then calling another subroutine whose job is to construct a verb-phrase. These lower-level subroutines in turn call others until one is reached that prints out a particular word. Control then returns up the hierarchy until the sentence is complete. This whole process is supervised by a metrical routine that works out what words from the available vocabulary conform to the requirements of the stress-pattern as well as being in the right grammatical category. If it can't find a suitable one, it produces an irregular line.

That, then, is the gist of it. The principle is that for each replacement-rule of a generative grammar, there is a subroutine that embodies the effect of that rule.

Now I don't promise to come up with answers, and clearly this isn't one. It's just the beginning of a problem: the machine writes abominable poetry. Although I have used only a subset of English, the real trouble is not any paucity of vocabulary or syntactic rules: it is a lack of coherence. The computer happily churns out sentence after sentence; they are nearly all in acceptable English; some of them are quite striking in their own right. e.g.: "some animal time destroys his beautifully impossible roses"; but they are hopelessly disjointed. There is no flow of ideas. At present I attempt to combat this by restricting the list of words: each poem chooses from a limited group of words within the total vocabulary, and each stanza from a smaller set within that group, while the first and last sentences and title are composed from an even smaller set. Also, by carefully arranging the words in storage, I have ensured that certain words tend to crop up together more often and others less often. It is not good enough. And it is at this point that the machine forces us to start defining our requirements.

We can say something like -- "a poem must have a spiritual integrity or wholeness that only arises out of experience" -- but the computer won't appreciate it. The first step is, more modestly, that the

sentences should link together, instead of being almost completely isolated. This entails that the computer should construct not single sentences but paragraphs, stanzas or entire poems, paying attention to the organization of parts within the whole. Furthermore this means that it should know something about what it is writing. That sounds banal, but what we are looking for is a number of rhetorical rules, and at first I thought these could be purely formal -- like syntactic rules only on a higher level. However, we cannot just say that a poem is, for instance, a beginning, a middle, and an end in the same way that we say a sentence is a subject, a verb, and an object, because an end is only the end of what was begun in the beginning and continued in the middle. That is to say: the terms we are going to have to use to describe rhetorical classes are not absolute, they are relative. 'Beginning' and 'end' obscure the issue slightly -- they sound firm and definite -- but, if we take 'build-up' and 'denouement', the necessary interdependence is clearer: a climax is not just a big explosion, it is the explosion of what was put together as a bomb; an end is not just an end, it is the end of something. And so our sentences must be interrelated, and they can only be interrelated through their meanings. I'm sorry to take so long to show that a computer can only make poems if it can make sense, and only make sense if it knows what it's talking about; but it's quite an important point since it means that a computer cannot compose poetry unless it has some kind of inner world to describe -- in short, an imagination. To sum up: so that it can relate sentences and groups of sentences, they must mean something to it, and so that they can mean something to it, it must have some internal 'ideas' (probably only arrays of numbers) to which they refer. (I am taking it for granted that it cannot relate sentences only on their face value -- in which case 'vision' and 'eye' would have no connection whereas 'waste' and 'taste' might.)

Therefore I am working to provide the machine with some sort of internal system operating according to its own rules, to which the grammatical apparatus that was the main body of the previous program is merely an adjunct enabling the computer to express the workings of its tiny mind. The utterances will be connected, as with humans, by being a report on a connected sequence of happenings.

But what kind of events do we choose to build a model imagination? It seems likely that making a consistent system of varying patterns should not be difficult. Yet when the machine describes the goings-on of such an abstract system, although it may startle us with surreal freshness, it may equally print nonsense -- and the main intention was to introduce meaningfulness. In other words, the 'imagination' will have to be the 'image' of something, not just an abstract design. There are two ways of making this little mechanical 'world' correspond to things in the big human world: either we equip the machine from scratch with a deliberately-planned analogue or representation of physical (and maybe social and mental) events, or give it a more or less blank memory-structure and allow it to develop this by contact with an environment. This latter course is beyond the edge of modern computing techniques (though even today it's feasible to have a computer interact with and learn from its surroundings to a limited degree), and it seems the more exciting of the two alternatives -- letting our computer poet learn, maybe even suffer!

For of course what we have arrived at is a mechanical poet rather than a machine for writing poems. We started with a sentence-generator, and to give its sentences coherence we decided on the need for a dynamic but regular data-structure for which the sentence-producing mechanisms only acted as commentator; while to make this system comprehensible it appeared that it should not merely operate arbitrarily but should be tied to the real world, preferably via some kind of sensing and learning equipment -- it should be, in effect, the computer's picture of its environment (almost a fully-fledged imagination). And naturally, if it can talk about its conception of its world it can tell the truth, as it sees it, as well as concocting fiction.

Well, this is enough speculation. No such program has been written, and it will be an awesome feat to write one. Meanwhile, is it important that the exigencies of programming should convince us that a poem requires a poet for its creation? That even a machine to write poetry requires the rudiments of capacities other than those directly involved in writing poems -- abilities to perceive, learn and ruminate? I think it is. You see, you've got to have soul. And I'm glad the computer reminds us that: a poem must have a spiritual integrity or wholeness that only arises out of experience and suffering.

You may not be persuaded, but at least this foray shows a new approach to the lost art of rhetoric, perhaps even foreshadows its revival. And apart from promising us new views on old problems and teasing us with insoluble ones, these cybernetic excursions hold out the eventual possibility of inhumanly beautiful poems.

        COMPOSITION ENTITLED
        THIS

A FEW CASCADES TODAY OBSTRUCT THE WOUND
TO SEAS BECAUSE SOME WAY REMOVES SOME TIME.
OUR BULLET ENTERS WOUNDS. SOME FLANK WITHDRAWS
A WHOLE AORTA. THIS RETREAT OF YELLOW
INVASIONS STARTLES SEAS. YES. SEAS COME FAR FROM
SUCCESS OF BULLETS.

THE SAND OBSTRUCTS JAPAN. THE SEA PREDICTS
THE SEA AGINST MY SAND. NO WOUND AT PERSONS
SHOULD ENTER EVERY WOUND. YOUR FLANK REMOVES
SUCCESS. YOUR BULLET STARTLES BULLETS. MANY
ONES ON THE BULLETS HAUL THE SAND OF PERSONS.

SOME SUDDEN HEART DIRECTLY SAW THE THING
UPON HIS WASTE. A WHOLE ESCAPE PREDICTS
HIS EYE. MY FLANK OBSTRUCTS THE SEAS. THE PERSON IS
SOME FLANK THAT MANY SHAPES UPON THE BULLET
ASTOUND. COULD IT AGAINST THE ACID TIME
OBSTRUCT THE SAND. 100 WASTES REMOVE
THE FLANK. THE SHAPE INSIDE SOME FLANK CONTROLS
MY HEART WHEREAS AN OLD ESCAPE ALLOWS
A WHOLE LAGOON. SOME WASTE OBSTRUCTS NO BLUE
RETREAT. THIS WASTE OBSTRUCTS THE CLOSED ONE. LOVES
WILL COLOUR WASTES. YOUR FLANK CONTROLS HIS BULLET
AND SO THE SAND THAT IS PROFUSE PREDICTS
SOME FLANK THAT IS ACUTE.