

THE FREE AND THE COMPROMISED

John Constable

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Science and Poetry

The record of relations between scientific thought and poetic form, particularly verse-form, is often seen as a process of gradual estrangement, a sad tale of hot love gone cold. In the beginning, or somewhere near it, the Greeks drafted the philosophy of physics in verse, and a little later Lucretius anticipated scientific materialism and evolution in much admired latin hexameters, and then, somehow, there wasn't so much of this sort of work in poetry any more. In English, of course, there were a few alchemical pieces in the seventeenth century, a steady fall of leaden panegyrics about Newton in the eighteenth, and a lot of educational poems by doctors, but after that only a disgust at those who would probably botanise on their mother's grave, and a Tennysonian anguish at the harsh and aimlessly driven world the laboratories were representing and creating. Latterly, poetry has gone through a 'shabby curate' stage, when it tried to keep its end up by doing good work in the community, and now seems content to magpie technical terms, and ally itself, in a half-hearted way, with 'new age' research. There is, persistently, a vague feeling that this state of affairs isn't desirable, and that poets ought to be more involved with the scientific thought of their time, and scientists more alive to the riches of the most powerful means of human expression. This rapprochement is, many now think, badly needed, and not far beyond our grasp, if only we could bring about a sufficiently frank dialogue.

I shall suggest that this view is mistaken. Poetry and science are irreconcilable and have never, in any case, been close, even in the very earliest stages of proto-science. The history of poetry should be seen as the use of various techniques, namely structural restrictions such as verse-form, special deployments of metaphor and ellipsis, and mind-altering narcotics or behaviours, to increase the likelihood of producing low levels of disruption to the structure of implications in linguistic output. This disruption is sufficient to cause irresolvable ambiguity in an utterance, but insufficient to stimulate rejection, and readers or listeners thus experience an interpretative illusion suggesting infinite riches. On this view poetic means are not simply expressive options that have, for a number of historically contingent reasons, come to be neglected by modern science, but, rather, are fundamentally incompatible with the procedures that ensure intersubjectivity and accurate conceptual modelling of the world.

In presenting this view I shall begin with a discussion of verse form and its effects on composition, and then turn to the causal relationship between metrical restriction and the impression of infinitely rich meaning with which it is often associated.

Verse Form and its Restrictions

The use of non-metrical language in poetry is now so well-established that it is easy to forget that for the largest part of human history metre has been very closely linked with rich poetic effect. Indeed, due to this historical accumulation, an absolute majority of the compositions regarded as the pinnacle of poetic achievement are in metred language of one kind or another. For convenience we may divide traditional explanations of this association into two camps. Firstly, there are accounts which stress the communicative power of metre:

Prosody enables the poet to communicate states of awareness, tensions, emotions, all of humanity's inner life that the helter-skelter of ordinary propositional language cannot express (Gross and McDowell 1996, p.8)

Secondly, the suggestive excellence of verse may be emphasised:

Regular rhythms and rhyme schemes work for me as a kind of drilling-rig to mine for meanings that lie beneath the original idea of the poem. By seeking words for the sake of their music one can discover new and unexpected thoughts. (Adams 1997, p.45)

Subsequently, I shall offer hypotheses to explain why these positions are occupied, and why their strength seems, to many who hold them, to be so overpowering. However, at this stage in the argument it will be necessary to show that, taking them literally, they cannot in fact be adequate explanations for the global and historically stable use of verse, however accurate they are as reports of experience.

The restrictiveness of metre is self-evident, but the details have gone largely unexamined, and their consequences are usually ignored. We can remedy this by isolating one particular feature, isometric lineation, which is easy to study and is thought to be universal across human populations. A line in English may be defined as a string of complete words totalling a specific number of syllables, or a number within a specified range of syllables; 9-12 is the normal range for the familiar five beat duple rhythm line (See Attridge, 1982, 1995 for an explanation of these terms). Sometimes this restriction is specified directly, as in pure syllabic verse, and sometimes it arises as an implied rule present in the restriction of other linguistic features, such as the patterning of stressed and unstressed syllables to realise a beat pattern. The number of these strings of words available at any moment of time to a particular writer is finite, though of course 'astronomically large' (Youmans 1989, p.9). However, as a fraction of all the possible word strings which are available in the unmetred set, it is an infinitesimal. This puts the two explanations quoted above in considerable difficulties. Imagine an author with something to communicate. In which set is it more likely that they will find the most effective word strings for their purpose, in the finite set of, for example, ten syllable lines, or in the infinite set of unmetred language? The answer is, clearly, in the infinite set (for an extended presentation of this argument see Constable, 1997, and Constable and Aoyama, 1999). Similarly, if you are looking for clues to the ramifications of your thoughts the infinite set is more likely to contain sequences of words that are intellectually

stimulating. Thus we can conclude that the hypothesis which proposes verse as better suited to particular general types of communicative purpose, emotional communication for example, is untenable. Equally, if an author is after new connections for their thoughts, then the verse set available within a chosen form is a surprising place to seek them. It should be emphasised, though, that these considerations do not rule out the possibility that verse is well-designed for certain sorts of narrow-band communicative purpose, for example the communication of evidence of verbal intelligence (several such hypotheses are discussed in Constable, 1997). It is also possible that its limited suggestiveness has compensating features.

Given these restrictive difficulties it will not be surprising to find authors trying to make the most of their limited options, and this can be demonstrated by considering the effects of lineated composition on word length. Constructing lines is a pattern-matching exercise, where the author searches through a pool of source language held in short term memory, and selects strings of words that either fit the specified pattern or are suitable components for the pattern. An author is thus seeking sequences of words which either total the specified number of syllables or are smaller than that total. The number of such sequences of a given length available in a source language pool or in any text, is given by dividing the total number of words by the mean word length in syllables. This fact, which can be substantiated empirically and mathematically (Constable, 1997, gives a brief account, and Aoyama and Constable, 1999), leads us to expect that when composing in isometric lines authors will tend decrease the mean word length of the source language used, thus increasing the number of word strings available to them during composition. Therefore, we should expect that when authors choose to write in verse they will tend to use words of a shorter length than they would otherwise have employed. Examination of matched texts, confirms that this in fact the case. We find, for example, that Milton's *Paradise Lost* has a mean number of syllables per word of 1.35, whereas his *History of Britain* scores 1.46 (these and other results are reported in Constable, 1997). This distortion of the normal word length frequency distributions, which are very stable across authors and output types, usually takes the form of an increased proportion of monosyllables and a reduction in the frequencies of all polysyllables.

It may be objected here that authors don't always adhere rigorously to a specified line length, and that therefore the observations made so far are, if sound, not the result of line restriction. However, it has now been shown at length (Aoyama and Constable, 1999, Constable and Aoyama, 1999) that the segmentation into lines is a mathematically detectable phenomenon even when there are variant lines present, and that lineated text is ordered on an axis, the distribution of spaces between syllables, which is randomly arrayed in what we agree to call prose. This ordering puts considerable strain on syntax, and one very simple way to regain some of this liberty, is to reduce word length.

This is to say that by choosing to write in isometric lines authors tend to relinquish much of their freedom in the choice, combination, and conjugation of words, a point which goes a long way to explaining why so little scientific or technical philosophical work has been composed in

verse, and would be true even if those fields were not more than ordinarily polysyllabic, which in fact they are. The question remains, however, as to why output in these restrictive forms should seem so often to be immensely rich in meanings. To address this issue we need to take a brief excursus through contemporary theory in pragmatics.

Infinite Relevance

Communication, it is now widely believed, is not principally a matter of decoding an utterance, but results from a two-stage process of decoding followed by inference construction, the inferences being drawn in accordance with our assumption that a speaker or writer will not require more processing effort of a reader or listener than is merited by the communication (Sperber and Wilson, 1995). A crucial part of this process occurs when an individual selects certain of the implications of an utterance, of which there are very large numbers, and decides that these were manifestly intended by the composer to be retrieved by a receiver (to distinguish them from other implications these are referred to as implicatures). The process by which the composer manipulates these retrievals are what we know as style. That is to say, syntactical and dictional choices will tend to structure the implications in certain ways, thus leading the receiver to draw certain conclusions as to which are to be assigned to the category of implicature. Slightly different choices will lead to very different conclusions. Sometimes, often in fact, composers will deliberately arrange for a reader's uncertainty about the strength of an implicature to produce delicate and flexible communicative effects.

The bearing of this on the description of verse given above is straightforward. Verse form forces syntactical and dictional choice and causes the hierarchy of implications to be to some degree ordered randomly with regard to communicative intent. It will thus, sometimes, be peculiarly difficult to decide which implications are to be assigned to the category of implicature. Such uncertainties, of course, also occur in day-to-day circumstances, as for example when we mishear something or misread a word, but, and this is crucial, such cases usually result in extreme incoherence and in grammatical flaws which stimulate the reader either to recover the error or to reject the utterance as irretrievably damaged and undeserving of further interpretative effort. However, the disruptions which occur in verse are of a slighter, subtler kind, and are not usually accompanied by grammatical damage. Readers, believing that the author would not put them to unnecessary labour, will conclude that they have yet to expend sufficient effort on the work to produce a clear interpretation. Consequently, they dig deeper into the hierarchy of implications in search of a still richer resolution. The process is endless, and with every unsuccessful attempt the reader will, instead of abandoning the project, assume still greater but as yet undiscovered rewards. This theoretical description may be compared with one of the clearest statements of reader experience in the critical literature, A. C. Bradley's pleasantly unguarded observation to the effect that:

About the best poetry, and not only the best, there floats an atmosphere of infinite suggestion. The poet speaks to us of one thing, but in this one thing there seems to lurk the secret of all. He said what he meant, but his meaning seems to beckon away beyond itself, or rather to expand into something boundless which is only focused in it. (Bradley, 1901, p.26).

Or, as we might now put it, the explicit statement of poetry seems clear, but its implications, which are numberless, are of uncertain status, and, with no final interpretation in view, we are led to expect nothing less than transcendent meaning. For readers this results in the conclusion that metered language, which is strongly correlated with these effects, is the most powerful communicative means, and for writers it results in the impression that the suggestiveness of metrical structures during composition is both strikingly fresh and impersonal. To those accustomed to different means of conceptual generation it may appear in a different light, and we are now in a position to see why verse, and poetry, in-so-far as verse is identified with poetry, has been as suspect to generations of scientific thinkers as it was to Barrow and to Newton, who found it 'ingenious nonsense' (Osborn, 1966, p.350), or to the contemporary physical chemist Peter Atkins who has referred to poetry as a self-deluded titillation (Atkins, 1995, p.123). Verse is a mechanism by which we can create interpretative illusions suggesting profundities of response and understanding which far exceed the engagement or research of the writer.

Science and Verse and Science and Poetry

We have now seen that science and verse are incompatible, but it has yet to be demonstrated that the same is true of science and poetry, for it is obvious that much of what we call poetry is not in verse. Firstly, let us remember that the strong association between verse and rich poetic effects is the result of disruption to the implicative structures of the utterance, not the presence of verse itself. Therefore, anything which causes similar disruptions will also be associated with such effects. As it happens, verse appears to be by far the most reliable means for randomising the hierarchy of implications in a manner which does not stimulate rejection, or allow the reader to infer some probable solution, but this should not blind us to the fact that many other means are conceivable. The recent history of literary experimentation can, in fact, be seen as a search for alternative techniques, whose success, or lack of it, can be explained as a result of the character of the disruptive procedures employed. For what it is worth, I would venture the suggestion that non-metrical verse is less frequently successful than isometrical lineation precisely because it is less mechanical, and its disruptions are, on the one hand, more transparent, and therefore fail to prevent interpretation, or, on the other hand, so chaotic that they stimulate rejection. Nevertheless, these and related experimental attempts are very widespread and very significant, though their long-term permanence is a matter of conjecture. Amongst them we can list word games of the 'Exquisite Corpse' variety, formal, mathematical, experimentation of the *Oulipo* type, the use of narcotics, or, even, of abnormal brain states induced by exhaustion

or other extreme experiences. More conventional literary varieties include the systematic reduction of a text until what remains is highly elliptical, and the very common device of running with a metaphor and so bringing about correspondences at many more points than would be required for normal explication. All these cases, I submit, are incompatible with the intersubjective aims of science, indeed in some sense they are incompatible with communicative plain-dealing of any kind.

For the sake of argument let us assume that my reasoning here is correct. Is there anything left for writers of verse and writers of poetry, particularly for those ambitious to handle scientific material? For the first of these the opportunities are modest but ample. Verse has powerful mnemonic functions, and is still in common use. Even with calculators it is sometimes convenient to be able to remember π to more than three places, and the unforgettable jingle 'How I wish I could calculate pie' allows one to do this by counting off the letters in each word. Verse is also, partly because of these mnemonic effects and partly by virtue of its difficulty and the status it can confer on the author, a fairly effective channel for satire, that genre in which we attempt to manipulate, however improperly, the perceived value of an object or a person.

A review of the writing of the last two hundred years would reveal that this latter satirico-humorous application has been fairly lively, and continues to be so. Many of the most scornful criticisms of Darwin are cast in verse, and this century has produced enough highly coloured scientific limericks to cover the walls of a lavatory as big as the Sistine Chapel. A plain-man's resistance to the lure of science turns up frequently in the writings of Robert Frost ('They do not scare me with their empty spaces'), John Updike has written defenses of a non-scientific worldview which are appealing even to those who do not share his opinions, and one of the most readable assaults on reductionism, Robert Graves's 'Warning to Children,' is as funny as it is unjust. These humorous possibilities have often been exploited by scientists themselves. Walter Garstang's highly ingenious verses on phylogeny and ontogeny (Garstang, 1951) are still well-known amongst biologists, Richard Cowen has punctuated his *History of Life* with limericks (Cowen, 1995), John M. Burns has produced an entire volume of *Biograffiti* (Burns, 1981), and the physicist Piet Hein's many volumes of poetic squibs, which he called Grooms (Hein, 1969), were at one time close to being best-sellers. There are also many self-mocking scientific songs, and *vers d'laboratoire*, most at present unpublished and likely to remain so.

It will be noticed that none of this pretends to be poeise, and it must also be conceded that the aims of these writers, even when hostile to scientific thought as Frost, Updike and Graves clearly are, remain intellectually modest. Perhaps there is nothing wrong with this, and the example constitutes a valuable lesson which can be applied to poetry as a whole. The pressure of competition with the sciences, broadly conceived in Quine's terms as that network of propositions stretching from history on the one hand to mathematics on the other, has revealed poetry for what it always has been, a *trompe-l'oeil* of cognitive and emotional depth. In the face of this there seems no other course but to embrace the conclusions. Poetry can be, like verse, a 'civilised amusement,' but no stronger claims are likely to be valid. Contemporary writers of poetry

who neglect this condemn themselves to futile conflicts which they cannot win, and which, conscious as they are that ‘praise undeserved is scandal in disguise,’ they do not even want to win. This is a spirit-breaking burden, and poets should shed it as soon as possible. Happy is the beggar, for he passes thieves and laughs.

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