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Designing, Technical Drawing and the Craftsman

Re-reading Christopher Jones's *Design Methods* recently provoked some speculation on the possible connections between design activity and familiar Technical Drawing practices in school. A former colleague of mine – a superbly skilful teacher working in the craft area of Design – used to refer to Technical Drawing as Technical Boring.

His light-hearted yet entirely serious comment occurred to me again when thinking about the validity of the craftsman-as-educational-model. I don't intend to go into that here; this note is only a part of it. But I raise it now because the comment was given additional point when I arranged it against comments of Bruce Archer's (from a quite different context I should say). The story (it is a very short story), goes like this.

If we follow one of the strands in the criticisms of conventional practices made by some innovative craft teachers, and in particular their critical comments towards the craftsman-as-educational-model, it seems to have appeared persuasive to some, and at least plausible to others, that the approaches, methods, and programmatic content that constituted conventional practices did not include other possibilities which they felt might be, and possibly should be, included.

Briefly then, and leaning heavily on Jones's interpretation, the evolution of this strand might reveal a path from 'the maker' in pre-industrial societies to 'the designer' in technologically-advanced societies. 'The maker' was anyone responsible for what we would now call craft-made objects, tools, and utensils. The essential feature of such production was that the maker was responsible for the entire processes involved in achieving the product: he was the form-maker. There were, generally, no separate 'planning' and production stages. The knowledge of the achieving was largely unselfconscious, the forms themselves changing by a process of very gradual development.

The whole process could be described as an organic process, the 'fitting' of form and context in evolution. In such form-making, the rules of making are largely unspoken and inarticulate – the unselfconscious process – yet they are of great complexity, and are maintained and passed on from one generation to the next. This is part of the nature of tacit knowledge, and of knowing how, in distinction from knowing that. The form-maker is close to his materials; his response to any mis-fit is direct. The size of mis-fit is usually small: the basic forms change very little and slowly in a traditional culture.

If we contrast this, admittedly simplistic, sketch with the conventional picture of the modern design activity, we find that the 'planning', or drawing-board stage, has become more wide-spread, more general. The process of planning – prior to and separate from making – is an organisational feature of large-scale production. (So this is not to say, incidentally, that large-scale and highly organised collective activities are new – consider the construction of Stonehenge – but rather to suggest

that we know little about their organisation and realization. Our present concern is with the now more-general manifestation of the separation of functions, and the possible effect in educational practices of that greater generality: alongside the existence of large-scale projects was 'the maker' who was entirely responsible for the production of an artefact.)

The drawing stage is carried out by a person who takes instructions, reformulates them in some appropriate notation, and passes 'the design' to the production team. What we have in the large-scale organisation or large-scale industry organisation is a formalised method of splitting production processes into specialised parts that are more accessible to mental handling; and a method of ensuring that these parts combine again in the end product. Drawing is the formalised method and language. The institutionalised separation of 'designing' (when designing means initial planning) from making contributes to their being understood as two separate stages.

In schools practice, the subject of Technical Drawing is probably the nearest to the equivalent of the professional and large-scale organisational feature. It exists particularly then in the crafts area. It does not exist in art work: we do not find the artist making cartoons to be passed on to someone else. The difference is important, for a possible reason that we shall come to. But, within the crafts area, we can find the subjects of Technical Drawing and Metalwork or Engineering separated, in spite of the possibility that the separation might have more to do with the organisational requirements of large-scale industrial practices than with the development of design capacity. That is, there is a considerable difference between the requirements of large-scale economics-orientated production systems and the requirements of learning activity.

The separation of design from making may be a necessary aspect of large-scale activities (and of the factory system and its development), but the effect of its more-general manifestation and acceptance was to undermine the craftsman's autonomy.

So far as the activity of form-making is concerned, Jones suggests that drawing is a means of increasing 'perceptual span'. The modelling — drawing — is the means of understanding the proposed result in advance of its making and use. In the field of professional design, he makes the point:

The designer can see and manipulate the design as a whole and is not prevented, either by partial knowledge or by the high cost of altering the product itself, from making fairly drastic changes in design.[1]

He goes on to make the incidentally interesting point:

Using his ruler and compasses he can rapidly plot the trajectories of moving parts and can predict the repercussions that changing the shape of one part will have upon the design as a whole. This may well be the reason why designers, almost alone among the specialists of modern industry, are 'wholeists' rather than 'atomists', defending their creations as single entities that must be accepted without modification or else must be reconsidered from scratch. A designer knows only too well the frustrating cycles of modification and remodification which have to be worked through before the delicate balance of his final design is achieved.[2]

But it is the scale and complexity of the interactions in cultural and technological transformation that make the craft tradition's unselfconscious process inappropriate and insufficient, and which leads to an increase of design-by-drawing in industry. In distinction from the craft tradition's organic evolutionary process of adjusting small mis-fits, in a culture which is generally grounded on advanced technology, the adaptations required are required more urgently, and are more unpredictable in their consequences. The steady state of traditional culture is absent. If the un-selfconscious process was generally proper to *its* cultural context, it is not clear that a sufficient replacement or expansion of it has yet been articulated, in either the professional fields of design activity or in the educational practices of general education. What is being asked for is the conception, together with the production of forms that will fit their changed and changing context — with an urgency that does not match the quality of time in natural evolving.

Now, we can move to the consideration of an inherent weakness in the Technical Drawing model of design, found especially in Technical Studies or in activities biased towards engineering practices, when that model means, in practice, the separation of planning and making.

A comment by Archer may be used in order to relate Jones's conception of the designer being a 'wholeist' (with its implications for practice) to the point noted on the preceding page: that the separation of form-making into two discrete stages, those stages being carried out by different people, does not exist for the artist as form-maker.

In *Design Awareness and Planned Creativity in Industry*,[3] Archer writes on the management of innovation in industry. He writes on the sequence of events as being conducted in

. . . the manner of a relay-race. Research people conduct their research tasks and hand over their results — like the baton in the relay-race — to design people. Design hands over a roll of drawings to development people. Development hand to production, and production to sales.

Degradation

It is not at all unknown for the marketing department to invent selling points at the end of the sequence, which contain not the slightest trace of the use concept and product idea which went in at the beginning. There is a double degradation of the information content of the project package at each hand-over point. When research workers pepare their reports, not everything which they know or think or feel about the project gets into the report — probably because some conclusions would be unsustainable and others would be too tortuous. The spelling is corrected and finger marks erased and the finished report is seen as the end, rather than the means, of their contribution.

Loss

The recipient of the report cannot read what is not there, and misses the point of much that is. There is a two-fold loss of information. Design people prepare sketches, drawings, schedules, models. Again, not everything they know or feel can get into the record, and much that is recorded gets overlooked or misunderstood. From design to development, development to production, and production to marketing, the loss of information and the introduction of noise continues.[4]

If we can hold this in our minds, while considering a comment he later makes on models, we may find a useful pointer. Archer writes:

The advantage which the art-trained industrial designer brings to bear is not, as many people seem to believe, the capacity to conceive more or brighter ideas, but the ability to express himself through a wider range of models, especially the low definition models so necessary at the outset of a design programme. Moreover, the weakness in the practice of conducting product development projects on the relay-race principle (. . .) (where research people run their course and hand over a roll of drawings to development people, and so on), is that it forces people to commit themselves to high-definition models or statements at times when such models are quite inappropriate.[5]

This points towards some of the possible differences between the designer-like activities of schools practice and the practices of professional designing (especially those in the field of industrial designing). In school, the 'designer' — that is, the learner — is in a position to control the whole of his form-making activity, or, at least, he is potentially in that position far more often than is generally allowed to be the case. No middlemen need be allowed to introduce noise and degradation of information.

The introduction of noise, the degradation of information, and the distortion of intention, which Bruce Archer suggests as being intrinsic to the conventional management of large-scale innovation in industrial design practice — in steps which are carried out by different specialists — might also suggest another significant aspect.

That aspect is the possibility of making a too-rigorous identification of technical drawing with the 'wholeness' of design activity. Further, the concern with technical drawing as being a preliminary, and separate, stage to the design activity proper may innocently encourage mis-timed high-definition modelling in the practices of the crafts subjects in general education.

High-definition of the already-anticipated end product, without any conversation over the initiating problem state of affairs, might disable subsequent change. Indéed, the high-definition might not acknowledge the possibility of changing. Common practices that are embodied in the 'technical drawing approach' to designing may, in their initial assumption of high-definition models, be inimical to cognitive development; that is, they may be inappropriate to learning.

What may be required, in contrast to this practice, is a time of relative re-structuring of the familiar, leading to the emergence of structure. This is not to say, of course, that technical drawing is entirely out of place, but rather that its nature and content might better be grounded in a model of the development of cognitive structuring capacity in relation to the achieving of tangible artefacts; and not to industrial production methods whose organisation may legitimately require the draughtsman's activities.

Now to return to the beginning.

Might Technical Boring be an indicator of a perceived absence of connection between the conventional activities of the typical Technical Drawing agenda and designing-as-educational-activity? If it *is* the case that there is a separation and an absence of over-all coherence in the design activity, then the curriculum development task is not to do with 'reforming' Technical Drawing by, say, 'updating' its constituent activities in terms of content: in effect, more of the same. It is to do, rather, with looking at the restructuring of the relations between the activities of Technical Drawing and design activity as a whole. To put it bluntly, the proposition is that unless some of the typical *practices* (and this involves a conception of curriculum theory and practice quite different from one based on what is 'supposed' to happen or is thought to happen) are developed along with their institutional context and educational rationale, much 'reform' may be positively antithetical to the development of design-educational activity. It would add to the phenomenon known as 'innovation without change'. For educational researchers incidentally, one methodological implication is clear enough: begin from what people *actually* do.

References

1. J. Christopher Jones, *Design Methods*, Wiley-Interscience 1970, p.22.
2. ibid., p.22.
3. Design Council, 1974.
4. ibid., p.41.
5. ibid., p.91.