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The quality debate

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The paper argues that there are intrinsic difficulties in defining quality. This is particularly true of construction in view of the endemic uncertainty to which it is subject. However, an institutional framework comprising a balance between technical, occupational, contractual/legal and economic orders was developed making possible the equitable negotiation of quality. This balance has been disturbed and the current debate within the industry concerns the way a new balance can be achieved. Two major tendencies in the debate about what quality is and how it is to be achieved are identified. One argues the need for market forces to operate at all levels, for tighter specification and quantification of quality standards and for the development of formal control procedures. The other argues the intrinsic limits of specification, quantification and formalization of procedures and therefore the ineluctable need for occupational discretion to be exercised at the point of production.

Keywords: Quality, quality assurance, professionalism, occupational order, economic order

Introduction

Quality in construction is both a complex and pressing issue. With 1992 looming, what has hitherto been a far-reaching debate within the industry seems to have resolved itself into a single question: how do firms 'convince customers that what they get is what they bargained for?'[1] Quality Assurance, or QA, promises to answer the question. It is understandable that many in the industry should want such a clear-cut answer; however, there is great disquiet among many others concerning the assumptions which inform the whole QA philosophy and therefore doubt as to whether it will indeed solve the quality problem.

In this paper, we will attempt to make these assumptions explicit contrasting them with those counter-assumptions which form the basis of a conflicting view of what the quality problem is, what its origins and remedies are. Thus, our purpose is to describe what we see as two opposed tendencies in the welter of commentary, analysis and prescription which composes the quality debate. We will suggest that it reveals deeply rooted differences about the extent to which quality can be reduced to the level of calculable fact as opposed to its being a matter of judgement and interpretation. However, we will also argue that this conflict of outlook has been tacitly recognized and dealt with within a set of complementary control mechanisms that the industry has evolved; that there has never been a serious problem of defining quality, just of achieving it! Poor quality, in other words, is not necessarily the result of an inability to define it precisely. We do not propose, therefore, another definition.

As will become apparent, we are critical of certain of the assumptions which underlie QA, proposing that it betrays far too mechanical a view of the quality problem. We share the belief that there can be no absolute definition of quality nor can there be simple unequivocal stan-

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dards that will always satisfy the myriad circumstances in which the quality issue has to be dealt with. Each of the various definitions that have been advanced like 'conformance to specifications' or 'fit for purpose' are only ever partially adequate, each implying a way of addressing quality but always needing to be modified and supplemented in particular circumstances.

We repeat, the curious thing is that the construction industry has evolved a set of institutional arrangements (described in the next section) that tacitly accepts this view while, at the same time, many persist in searching for a single, all-embracing definition or system that will eradicate uncertainty and ambiguity. Of course, some features of a material, a product or a service can be closely defined and quantified: the relationship between cause and effect clearly calculated, be made subject, in other words, to rational analysis. But what has characterized the contruction industry is the recognition that it is not possible simply to determine the limits of rational analysis as it is similarly not possible to clearly distinguish between objective and subjective. For this reason it has developed rational techniques but has also recognized the need for judgement and interpretation to be vested in occupational specialists. It has recognized that quality lies in the eye (and the pocket) of the beholder as it has also recognized the need to tie people contractually to the commitments they make by the threat of economic and legal sanction.

Our analysis of the industry's institutional framework, thus, proposes the existence of four sets of regulatory mechanisms or what we will call 'orders', the technical, the occupational, the economic and the legal/contractual, each of which complements the others and none of which is in itself adequate. Central to the way they interact is the fact of 'negotiated consensus'.

The phrase comes from Powell and Brandon's paper, 'An editorial conjecture concerning building design, cost and profit' (1984), where the crux of the argument, for the present writers, at least, is that quality criteria and preferred definitions of quality must be recognized to originate in different social groupings and will reflect these origins. Thus, though they talk of 'common yardsticks' these are not so much finite or single scale criteria as a set of procedures within which consensus may be negotiated. They set out a cultural model which describes five logically possible strategies that people may adopt in managing their affairs. The model is confessedly exploratory, appears complex and is likely to be daunting to the average practitioner; however, it is the contention of this paper that the institutional framework of the UK construction industry has developed precisely on the principle of the negotiated consensus which they recommend.

We will argue that this framework is currently under considerable strain, and that the origin of the strain lies, in part, in the belief that the unquantifiable can be quantified, that all matters of value can be reduced to the level of economic value and that human conduct can be regulated and controlled, given sufficiently fine tuning to the framework which is designed to control it. While not advocating complacency or uncritically endorsing the conservatism for which the industry is renowned, we would urge recognition of the delicate balance in the regulatory framework that the industry has achieved in providing a complex product and, in particular, the important role that occupational specialists have played – trades and professions alike – in achieving it.

The institutional structure of the construction industry

It is often pointed out that construction has been slow to embrace the techniques based on precise measurement and strict calculation apparent in some other industries. But it has also

been pointed out that in construction measurement and calculation have been nicely adjusted to the practical exigencies of situation and people. The fact of heterogeneity of clients and their needs, variability of product, changing composition of the workforce and endemic uncertainty of site conditions has led to a sophisticated awareness of the practical limits (and costliness) of ultimate precision, a preparedness to negotiate and a willingness to settle for what will satisfy in the circumstances.

Importantly, in the evolution of this culture it has always been tacitly recognized that to adopt any single basis for evaluating quality is bound to favour some interests at the expense of others. Thus, though strictly technical criteria may go a long way in defining quality there are limits, hence contracts are entered into on the understanding that they distribute rights to determine whether and how the strictly technical has to be interpreted, supplemented and adjusted to circumstances.

The framework within which negotiation and mutual adjustment have taken place is based on a few quite simple principles that can be readily stated. The actual process is, of course, far from simple.

1. First, the client is sovereign and has two sets of requirements:

(a) To get his construction needs translated into a design which specifies technical characteristics, performance criteria, quality standards and so on.
(b) To get it built within a specified time and in the most cost effective manner.

To secure these objectives two quite different principles have traditionally been invoked thus.

2. Secondly, *independent professionalism*, through which a design is furnished on the assumption that all the currently available technical know-how is brought to bear on the client's need, consistent with what he is willing to pay, and consistent with the public good.

3. Thirdly, the forces of *free-market competition*, it is assumed, will ensure that the design is implemented within the budget allowed for. There then follows the process by which the initial abstraction arrived at through conceptual manipulation is realized through progressive compromises among the parties involved as the exigencies of real constraints are encountered.

4. Fourthly, it is recognized that if this process is to be carried out to the satisfaction of all parties concerned, there must be common points of reference, to some extent objectively statable. These points of reference include both technical and contractual provisions prepared by, monitored and applied by the various construction professions and occupations.

This traditional framework, now under strain, has hitherto been accepted, by and large, as fairly reflecting and safeguarding the respective interests, benefits and risks of the parties involved, notably clients, the consultants and the contractors. Certainly, there have been complaints; contractors for example have argued that standard contractual forms favour clients. Clients and consultants, in their turn, have accused contractors of spending more energies looking for extras than building the job within the tender price, while consultants were accused of complacency as a result of being protected from market forces. Thus, though it was taken for granted that the differential power of the parties involved influences the 'rules of the game', the rules were generally honoured. Of late, the traditional balance has been disturbed, the rules have come under closer scrutiny and pressure applied to alter them. Significant changes have been the more assertive and informed involvement of powerful

clients eroding the status of the free professions; the abolition of scale fees; novel forms of construction procurement breaking down traditional roles and responsibilities; attempts to allay risk by spreading it ever more thinly across an increasing number of separate economic entities. Such changes, then, have highlighted the fact that the rules of the game originate in the participants and if existing rules are undergoing change then it is necessary to share in their reformulation. Central to this is the way quality shall be defined and how it is to be achieved.

Traditional framework and the achievement of quality

Within this framework (see Fig. 1) definitions have been provided (e.g. 'fit for purpose', 'conformance to requirements') and means developed (e.g. specifications, standards, method statements) for achieving appropriate quality.

Uncertainty is a condition of any organizational arrangement. Depending on the extent to which uncertainty can be reduced then it becomes possible to plan, coordinate activities, reduce slack, specify and control quality standards closely, and so on. Low uncertainty is the condition that one associates with large capital-intensive manufacturers producing for mass and stable markets, a condition, as is well recognized, absent in construction. The arrangements developed in construction have reflected this condition of uncertainty.

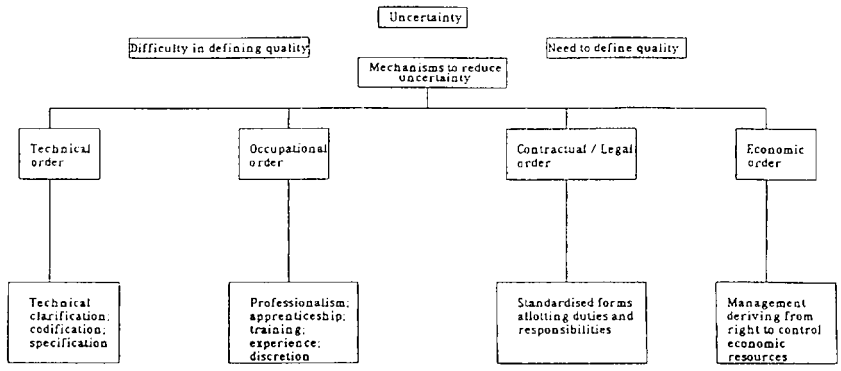

Fig. 1. Technical, occupational, contractual/legal and economic orders as uncertainty-reducing mechanisms

Thus, while it was axiomatic that an appropriate level of quality was to be achieved, the difficulty of defining exactly what this level was in variable circumstances was always recognized. The compromise, as we have just seen, was that the design and, subsequently, the monitoring of its implementation was secured by the client on the basis of a trust relationship. Implementation was secured on the basis of a competitive market relationship. Negotiative relationships ensued; they were based on a frank acceptance of different interests, and for them to work, the need for goodwill and compromise was accepted by all parties.

As we have argued, this was a sophisticated recognition of the root fact of uncertainty though, of course, means were developed to reduce uncertainty, where possible, to facilitate

planning and coordination, and in the attempt to ensure that appropriate quality standards would be met in the most economical way. In other words, in construction uncertainty has been reduced and organization has been achieved, through the agency of what may be referred to as four 'orders': technical, occupational, legal/contractual and economic.

We use 'order' in its common sense meaning, i.e. 'a condition of normal or due functioning; a regular or suitable arrangement' (Chambers, 1983). Thus, we speak most generally about the 'social order' to mean all the habits and conventions underwritten by rules and norms pertaining to a particular society which are, by and large, recognized and upheld by anyone who claims to be a member of that society. Within this general social order we also recognize different aspects of life and different spheres of activity as being governed by distinctive sets of rules and norms.

The technical order

Though perhaps not so readily recognized as, say, the legal order, the technical order derives from a fundamental understanding that some people, by virtue of study and training, have special knowledge in some sphere or other whose nature and operation they are able to give an account of in terms that have been specially developed for that purpose. The technical order recognizes special modes of understanding, (e.g. engineering), which are developed by acknowledged experts. In the present discussion, we see the technical order as providing acknowledged definitions of the physical and performance properties of materials and artefacts. We note that progressively it has been possible to refine definitions as to what is required as standards of performance and acceptance, resulting in the possibility of more exact specification and codification.

The occupational order

Associated with the technical order is the occupational order. It recognizes, given the existence of special areas of knowledge and competence, the bodies of people who possess them, that is, occupations, and their rights to make judgements on the basis of that knowledge. It implies rights which occupations have with respect to each other and with respect to those who make use of their knowledge and competence. In construction, more so than in most industries, the occupational order is of prime significance since in variable work situations close control of the work process is difficult and costly. That everyone can be relied upon to conform to his/her occupational conventions without being made subject to the elaborate controls characteristic of mass production methods, is the construction industry's prime uncertainty-reducing mechanism. Most simply understood, the occupational order is what enables tradesmen and specialists in any given amalgam of individuals and groups present on a construction project to proceed with the work in a more or less coordinated fashion. Engineers have a particular input to make as have bricklayers and plumbers. These inputs are not fixed over time. As technology changes some occupations erode the province of others while all are subject to the changes that occur within the economic order, as when, typically, it does become cost effective to replace occupational control with forms of economic control, the process known as 'de-skilling'. However, at any particular time engineer, bricklayer and plumber each recognizes the province of the other and acts accordingly while an employer respects the discretionary scope of the specialist employee.

The legal/contractual order

It will quickly be recognized that while in principle it is possible to assemble the necessary occupational skills and competence to complete a construction project, additional mechanisms must be introduced to reduce uncertainty further. Thus the legal/contractual order has evolved to tie individuals and groups to the commitments they have undertaken – to increase the probability that people will actually do what they can in principle do, and what they say they will do. A key development within the legal/contractual order has been the standardization of contractual forms and the allocation of duties and responsibilities. Of note, on the question of quality, are such terms as 'to the architect's satisfaction'.

The economic order

Finally, uncertainty may be reduced in the total process to the extent that the various parties can exact compliance from others by offering or withholding economic reward. Thus, clients may withhold monies if the necessary quality standards are deemed not to have been achieved, likewise contractors with subcontractors.

More fundamentally still it is the economic order, understood to comprise those mechanisms – buying, selling, hiring, employing and borrowing – by which the exchange and consumption of scarce resources are regulated, that informs the whole idea of management. That is, management may be understood as that process which coordinates and controls the capability for work, present in the occupational order, in the most economical or cost effective way to the extent of eroding it, that is, reducing occupational discretion, if an alternative technology can be economically justified.

These four orders, then, have combined to produce a regulatory framework within which construction takes place and the right level of quality is judged to have been achieved.

The operative word is 'combine' for none in itself is adequate. Thus, it is recognized that there are intrinsic limits in the extent to which the technical attributes of quality can be specified. This limitation is compensated for in the fact that, contractually, certain occupations are given rights *in situ* to determine whether just standards have been met. Similarly, given the impossibility of exact specification for all circumstances it is expected that parties may exert their economic power to get what they think they are paying for. But clearly, this subtle and complex framework, seemingly by common assent, is no longer adequate. An index of this, it is alleged, are falling quality standards. We will now consider the debate within the industry concerning how matters can be remedied.

The current quality debate

We propose that contributors to the 'quality debate' can usefully be distinguished on the basis of two distinct tendencies apparent in the views they take on a number of key themes. We will propose that from a common point of origin – namely awareness of the limitations of a 'conformance to specifications' definition of quality, one tendency (T1) stresses the need for precise criteria, measurement and the application of a strict economic calculus to matters of

value and quality. While most of the commentators who exhibit this tendency look to delimit the scope of the issue, defining problems as essentially practical, immediate, technical, and matters of finite cost, the logical development of the tendency is the attempt to formulate an all-embracing, technical systems perspective. In contrast the other tendency (T2) emphasizes the intrinsic limits of quantification and measurement and rejects attempts to define issues as exclusively technical. It argues that there will always be irreducible elements which must be recognized as such, and means preserved or developed for handling them. Ultimately, we suggest the logical development of this tendency is the attempt to map out a socio-political systems framework that, as is evident in the cited work of Powell and Brandon, sets out to provide a model which acknowledges differentiation of interests and perspectives.

In the final section we will consider a number of practical developments that have occurred in the industry in the last 15 years or so highlighting what we see as the major trends. These trends, it is proposed, are a tacit judgement on the relative weight that the two tendencies in the quality debate carry – T1 is winning!

On the face of it, the most simple connotation of quality is 'conformance to specifications', the one most readily translatable into operational criteria. In the recent study by NEDO (1987) it was stated quite simply that 'Contractually quality is good when the work satisfies the specifications'. While it would be difficult to find a commentator who did not accept the need for specifications, opinion varies greatly on how far the logic of specification can be taken in truly defining quality. This logic, it is pointed out, is non-contingent; the emphasis is on separate elements rather than the totality. It assumes the possibility of exact measurement and the elimination of uncertainty.

In other words, to take 'conformance to specifications' as definitive of quality is far too limiting and can only provide an incomplete vocabulary of quality, however exact and however exhaustive it tries to be. There must always be, it is argued, judgement and interpretation. Besides, conformance to specifications excludes a consideration of quality in design since this process comes to be viewed as simply providing a neutral touchstone against which quality in implementation is assessed. It can also have the consequence of conservatism and over-specification since there is always an inevitable ignorance of circumstances as they evolve leaving, therefore, too little leeway for adjustment.

Having recognized these limitations the quality debate proceeds to address them. The two tendencies we have identified, T1 and T2, both acknowledge contingency and variability and therefore have recourse to the common sense definition 'fitness for purpose'. Frequently the argument is illustrated by reference to two cars, a Rolls Royce and a Mini, a Jaguar and a Montego, any of which may be spoken of as manifesting quality, given the purpose for which it was intended and its cost to the purchaser. Having established the appropriateness of the comparison any serious upholder of its relevance to construction is obliged to acknowledge the essential differences between construction and manufacturing. Thus, Ferry (1984) pursuing the second tendency (T2) quickly notes its shortcomings, arguing that though something may well be fit for purpose, purpose itself must come under scrutiny. For Pateman (1986) developing the other tendency (T1), it is requirements not purpose which is the key – finite statements that may be contractually upheld concerning the use to which the client intends to put a building. These requirements are to be stated with reference to what he is willing to pay.

Thus a dominant theme within (T1) is the need to accept, as these commentators see it, the realities of the market place. Quality is good business, it means the customer comes back. It also means adjusting the level of quality offered to what the customer is able to pay and

recognizing that in a competitive market quality is always effectively the second consideration after price.

> Ours is a cost driven business. Quality may be critical . . . but we have industry standards that have to be met or we don't sell anything. Once we've met those standards though customers only buy on price. So we can't afford to invest in quality because we can't get it back on price (Guiniven, 1985, p. 78).

While this may be rejected by some as unduly pessimistic or forthright, nonetheless it states the view which this tendency is at pains to emphasize. Quality is value for money. Thus, Juran and Gryna (1985, p. 445):

> The word 'value' is widely used in the market-place to connote the relationship between the price paid for a product and the useful functions performed by that product. In competitive market-places, users try to make price comparisons together with comparisons of functions so as to secure the best value for their money.

To the abstract questions 'what is quality?' and 'how do you define it?' as to the equally complex problem 'what is value?' the simple answer, so T1 commentators allege, is to be found in the market place. The value attached to something is reflected in the price offered. Though quality may be subjective and therefore defies absolute definition, effectively there is no problem, they say, at least none that can't be dealt with in the market. They concede that there are problems centring on the fact that a building, though it has features in common with and may be compared with any number of saleable commodities, is in totality quite distinctive. Within T1, however, the response to this fact is quite clear and Pateman provides an admirable though in our view, disturbing, summary of it.

Pateman's series of articles on quality assurance (August 1986–January 1987) may be seen as a realistic and tough-minded appraisal of the quality issue in the current economic climate but it is important to be clear about the principles he adduces as absolutes. First, 'quality must be expressed in money terms' (Pateman, 1986a, p. 18). Secondly, the building owner/user (he acknowledges that they may be different) is the sole determinant of quality; quality is achieved if he gets exactly what he pays for. The role of the professional designer is a limited and exclusively technical one, which is to get the user to define precisely what his requirements are and have these committed to measurable terms; 'If you can't measure it don't specify it' (Pateman, 1987, p. 20). Thirdly, the demise of the directly employed, properly craft-trained operative is a fact of life. While he concedes that something needs to be done about operative skill, this is beyond the control of particular firms and is 'something which only the combined efforts of the industry as a whole and the Government can solve' (Pateman, 1987, p. 32). It is the necessary price of entrepreneurship, 'characters' and 'bottom line' competition 'which we would not want any other way' (Pateman, 1986a, p. 18). Fourthly, in view of the long chain of contractor, sub-contractor, sub-sub-contractor that this gives rise to, his remedy is the specification of minimum acceptable standards and the insistence that they be adhered to. 'Say "no" more' (Pateman, 1987, p. 32), he urges.

In T1 a limited, exclusively technical role is assigned to the professions, quality is reduced to a matter of the client getting what he pays for and quality has to be expressed in money terms. These are the dominant principles which find their most complete expression in the technical systems approach.

This logical culmination of T1 recognizes the contingent nature of quality and therefore the need to address the totality. However the 'totality' in fact only comprises technical

considerations. The intention is to remove all uncertainty, elaborating a scheme where every conceivable factor and eventuality is to be included and, while human or social elements appear in the lists produced, they do so in an entirely mechanical way. Management and control procedures are treated as technical processes that are neutrally undertaken by robot-like functionaries who, book in hand, (the 'book' attempting exhaustively to specify everything) check the course of the work against it. It is perhaps the promise of an almost limitless data processing computer technology that seems to make this vision a possibility.

Parsons (1972) provides a good example of the technical systems perspective which, in its very thoroughness, shows up its limitations. One of his figures (Fig. 2), a flow diagram for quality control of concrete construction, becomes so complex (and of course it represents only one element in the entire process) that one doubts its practical application let alone the conceptual completeness to which it pretends. His approach, he says, 'is directed toward the treatment of the whole problem rather than its parts. It starts with objectives and mandates and ends with definable achievements. In between is a network describing interrelationships of methods, information and people' (Parsons, 1972, p. 21).

This indeed describes the Holy Grail; would that such precision were possible and that the vagaries of human affairs could be reduced to so many check lists.

Considering now the other tendency (T2), Ferry, in his article 'The role of building professions in the achievement of quality', (1984, p. 93) expresses doubt that it will ever be possible to measure quality though he concedes that it may be possible to measure some of its attributes. If this is to be accomplished, 'fitness of purpose is perhaps the most promising line to pursue, but', he goes on, 'the extent to which a building succeeds in meeting the aesthetic, functional and cost objectives that were set for it . . . poses the problem of the quality of those objectives'. Developing this reservation he looks to the building professions to set a general tone of concern where quality becomes simply the end product of properly qualified people taking care. Unless this care is present, quality, he believes, will not result 'no matter how lavish the specification or the budget'.

Ferry thus sees for the construction professions and occupations a role very different from the technicist or functionary one envisaged by writers of T1. As we have seen, for them designers and managers work within a clearly defined technical and contractual framework. Obligation to the immediate client is paramount: to provide him/her with value for money using their technical capabilities to this end. While one assumes that in principle they would accept Ferry's point that the professions have an obligation to the community at large, the system which they delineate tends to exclude these wider considerations. For those of T2, quality, far from being seen simply as a function of cost to the client or the result of mechanically applying finite criteria, is a byproduct which results when people take seriously their craft and their responsibilities.

Although Ferry goes on to discuss some practical implications of his argument, in contrast to, say, Pateman, he is likely to seem idealistic or even naive, perhaps the inevitable fate of all the T2 commentators. However, there seems to be something of the same sentiment expressed by Bennett (1984) though he goes on to present a limited set of practical proposals. Appropriately he begins his paper with a quote from Ruskin who held that quality 'is always the result of intelligent effort'. Bennett rejects the reductionism and myopia which make quality a simple function of cost, shifting attention to the actual practices of construction where 'craftsmen and specialists' will, he argues, work to high standards if they are given the wherewithal and opportunity to do so. For him management's task, in marked contrast to Pateman's view, for example, is facilitative, supportive and protective. Bennett might well

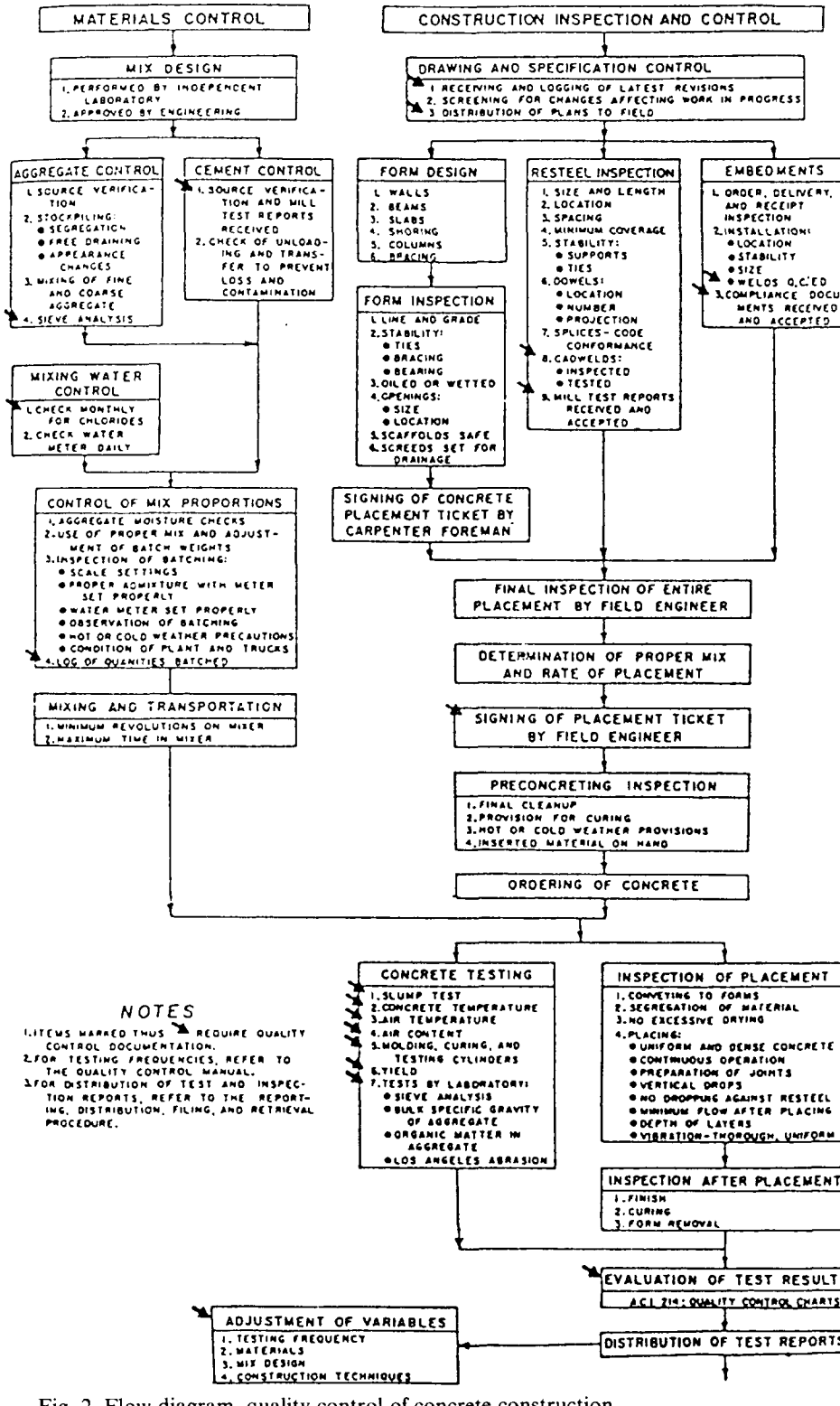

Fig. 2. Flow diagram, quality control of concrete construction

have concluded his paper with reference to Ruskin's heir William Morris, with whom Bennett seems to be in essential sympathy, who writes

manufacturers (so called) are so set on carrying out competition to its utmost, competition of cheapness, not of excellence, that they may meet the bargain hunters half way and cheerfully furnish them with nasty wares at the cheap rate . . . the handicraftsmen, who are not ignorant of these things like the public, and who have no call to be greedy and isolated like the manufacturers or middlemen; the duty and honour of educating the public lies with them, and they have in them the seeds of order and organization which make that duty easier (quoted in E.P. Thompson, p. 246).

Raymond Cecil (1984) also expresses concern about the increasingly consumerist society, regrets the passing of an older ideal of professionalism and emphasizes the architect's duties to others beyond the building owner. More than ever, he argues, there is a need for 'balanced advice' admitting that as a practising architect he is bound to advance the claims of his own profession to provide it. Whether one accepts his claim or not, Cecil's argument points firmly in the direction of the need for a more fully-developed socio-political system perspective where, given the subtleties and complexities that this perspective acknowledges, place must be left for the application of 'discretion, experience, judgement and foresight'. Attempts to reduce matters to 'arithmetical calculations' and 'scientific formulae' which offer to transcend uncertainty and doubt, and therefore trust, are, he concludes, to be resisted.

In reporting the position adopted by Brandon and Powell (1984), which in our terms points to the need to acknowledge a broad socio-political system perspective and to see the market as an expression of it, rather than as the ultimate provider of a quality measuring stick, it is appropriate to quote from them at length to provide a summary of their own position.

Our particular suggestions would be to develop a transactional evaluatory process which would attempt to understand and allow for social differences. This should lead to the development of designs which are more reflective of those differences; ideally 'good' design should reduce the gap between different groups (and hopefully remove them altogether) so that each can agree that a final design is 'good sense' but from their own perspective. The above are important issues to raise within a conference on this topic although they tend to fit rather uncomfortably within the commercial world in which we all work. Unfortunately, much of the preceding discussion may seem rather remote, or perhaps even irrelevant, to those who have come to listen to (or read) papers on pragmatic building-cost techniques. We clearly understand why that might be the case for those from whom figures are demanded at all stages of the design-construction process. Needless to say we feel that such an analytical framework of social interaction is important and would commend its use to you when reading the rest of this paper and indeed the rest of the proceedings. It is often very difficult to find words and visual images to counteract the weight of numbers and for this reason we felt the need to give over so much space in this paper to a full development of such an argument. However, the issue is, as already stated, a conjecture to promote discussion; we introduce it here as a kind of caveat to avoid 'blinkered' focussing on mechanistic solutions to the 'balancing' problem. Numerical techniques clearly have their place but the underlying assumptions should be challenged and the wider issues not discounted (1984, pp. 13–14).

Finally, a comment by Thomas Markus (1984) on what may be seen as a hidden agenda in the development of the second tendency: if, as the upholders of this tendency claim, quality cannot be measured, does this not leave too much scope for mystification on the part of the construction professions? He comes down very strongly, therefore, in favour of technical economic appraisal noting as he does so the paradox of his own position. However, it is not difficult to see the underlying consistency in his viewpoint. Rejecting commentators of what we have referred to as the first tendency for docile acceptance of the market and its negative

consequences for quality, more broadly conceived, (as, he argues, it should be), nonetheless he warns against the humbug that refusal to quantify can entail.

The two tendencies identified are not to be equated with practitioners on the one hand (T1) and academics on the other (T2). Certainly the closer a commentator is to commercial pressures the more likely he is to accept the market, as it is presently constituted, as a fact. In contrast, architects in particular, though practitioners, seem likely to embark on the second route (for reasons that Cecil discusses). What does seem apparent however, and not surprisingly, is that it is the non-practitioners who are inclined to develop total systems approach. What is of note here, the point that we have emphasized, is the scope of the systems envisaged in the two tendencies. In T1 the working assumption is that the quality problem is in essence a technical one. Its concern is to reduce issues to their simplest form. It therefore translates complicating factors like taste into its expression in the market, i.e. demand; de-skilling of the workforce is seen as a side effect of technical progress; neither does it enquire into the extent of the rights that ensue from the control of economic resources. The whole tendency is imbued with a sense that there is an intrinsic technological rationality at work that needs simply to be decoded and turned into practice which can be expressed in finite terms. There then appear successive attempts to incorporate into the model such complicating factors as are met with in reality. These attempts, however, taken to their logical conclusion are doomed to failure, since for practical purposes technical closure is never possible (witness Parsons). It is precisely in the complicating factors, which in T1 are assumed out of consideration, that practical resolutions of the quality problem are achieved.

In other words, complex bodies of knowledge possessed, for example, by engineers and architects, can only be partially recorded in books, manuals and the like ('expert systems' notwithstanding). As most practitioners are keenly aware, construction is a living process where technical knowledge exists in the specialist occupations which produce and apply it. But while it is recognized every working day that technical know-how is both abstract (formally stated) knowledge *and* practice, T1 writers ignore the full implications of this fact. There emerges the pretence that problems are being treated as matters of pure objective calculation ignoring the experience and judgement which are in fact applied. As Abdun-Nur notes,[2] engineers in particular, in trying to report their own practice, have been guilty of this.

The irony is, then, that socio-political systems approaches like Abdun Nur's, for example, which try to embrace the realities and practicalities become inevitably to appear so complex that they are rejected as impractical. Our view therefore is that the attempt to devise a system which is offered as complete, though perhaps admirable as a purely intellectual exercise, will have little practical application either because of the vital factors it ignores or because of the complexity which results from trying to include them. Any attempt at completeness and the elimination of ambiguity and therefore grounds for negotiation will always fail. Our finding is that existing technical and contractual provisions are already adequate; what is being eroded is the skill, judgement and knowledge which exists among practitioners, that is, in the occupational order, which enables the industry to negotiate ambiguity.

Quality assurance

Extending the model shown in Fig. 1 (see Fig. 3) we will now focus briefly on the phenomenon of quality assurance (QA) to illustrate in more concrete terms the changes we are discussing and to consider their significance in terms of the model we have proposed.

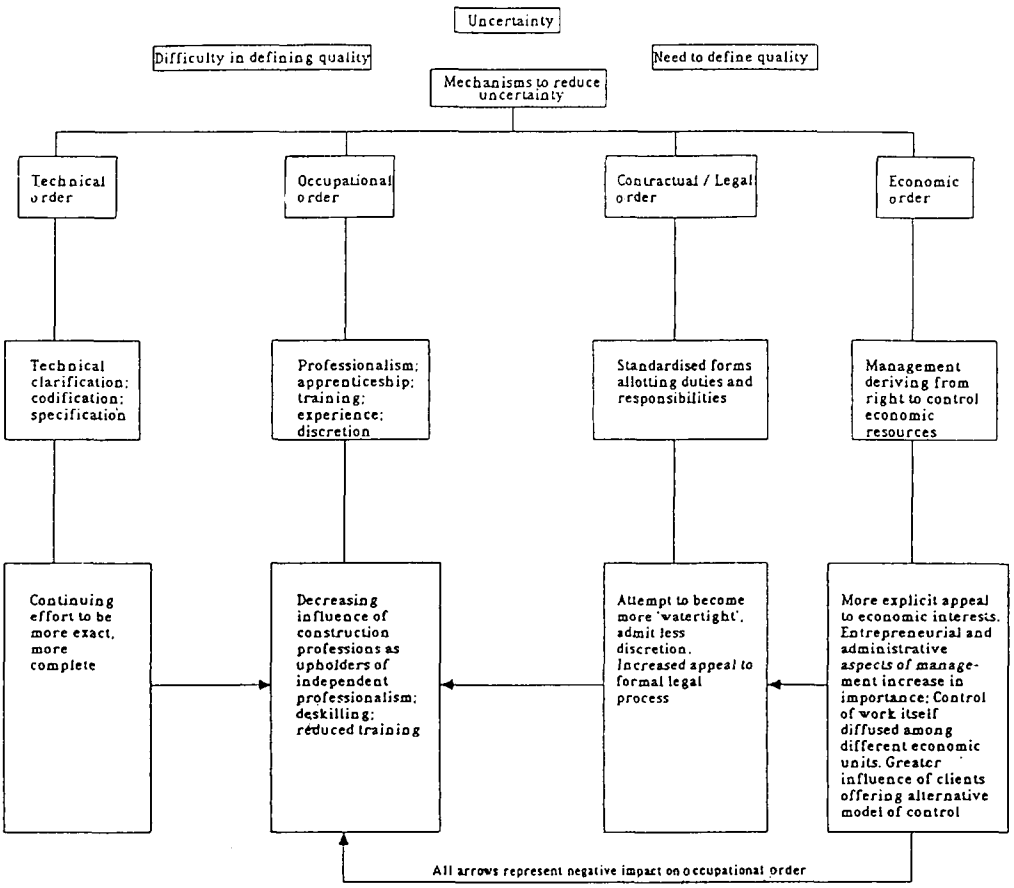

Fig. 3. Extended model of technical, occupational, contractual/legal and economic orders as uncertainty-reducing mechanisms

In essence QA rests on the belief that the probability of a firm's producing a good quality product – whatever it is – will be increased if distinct, formal and extensively documented procedures, administered by specialist quality managers, are used. The emphasis of QA seems to involve a shift from internally and organically generated concern with quality, by the actual producers, to a mechanically imposed set of procedures whose efficacy is guaranteed by external controllers and assessors.

It is generally agreed that the original initiative for QA came from large industrial and commercial clients who saw no reason why the strict standards and procedures developed in their own concerns should not be applied to construction. The conventions by which quality had traditionally been achieved in construction were deemed inadequate if not downright primitive.

Objectively there seems to have been substance to the charge of declining quality standards though cause and effect are difficult to disentangle. A major factor was the building boom of the 1960s and early 1970s which saw the rapid development of new materials and building techniques whose performance characteristics were not always fully understood.

Perhaps more importantly was the increasing use of lump and unskilled labour and the efforts by contractors to rationalize their operations. Traditional patterns of management, where great autonomy was vested in such figures as craft-trained general foremen, were replaced by more centralized and formal systems of control. Site autonomy was reduced as firms sought to integrate the totality of their affairs, while the move towards standardization weakened traditional norms concerning good working practices. Management came increasingly to be seen as a specialist activity which, while in most cases still having its roots in the occupational order, centred more and more explicitly on profitability.

The recession which followed in the mid-1970s stimulated what in one sense was a volte-face but which served none the less to intensify the same trends. As the market weakened, firms reduced the scale of their operations and went to the market to acquire those services they had hitherto employed directly. Sub-contracting became, and still is, the order of the day. On-site managerial staff was further reduced and efforts were made to tighten up formal control, especially those relating to costs. Supervisory responsibility was increasingly shifted to sub-contractors who, subject to fierce competition, have tended to compromise quality and training.

We would argue then, first, that a major impact of the 1960s and early 1970s boom was to encourage a model of the industry which originated outside it. This model was greatly influenced by that of the permanently based firm producing for a more or less stable market. It was in this context that the whole process of rationalization and the current definition of management, which are taken to characterize modern industry, developed. In this process a worker comes to be defined by the 'input' he makes to the employing organization. The content and nature of his skills are determined by the technological requirements of his employer, as interpreted by management, whose concern is to achieve the most cost effective mix of human and material resources. The worker, including those known as professionals, hitherto having an occupational identify beyond that of the employing organization, is required to sink his occupational independence and submit to what are defined as the best interests of the firm that employs him. As Elliot Freidson puts it: 'Rationalization in essence destroys occupation as an organization of men committed to a particular kind of work independently of the institution in which they happened to perform it: occupation was dissolved and reconstituted into general skill class and particular job titles' (p. 20).

Secondly, more recently the trend towards sub-contracting though commonly featuring traditional trades, that is, occupational labels, is essentially a device for economic control where the economic risk for various elements in the total project are passed on to economically independent firms. The fact that such firms may well be occupational specialists is of secondary importance to the fact that they are in competition with each other and economic viability becomes more important than promoting occupational standards. Though it is argued that these two imperatives need not conflict, the prohibition of competition among professional consultants, for example, assumed that they did, while the current quality problem would seem, at the very least, to reflect some measure of conflict.

The third factor we note, then, bears directly on this point. Since the dominant assumption is that overt competition brings greater benefit than allowing occupations some measure of protection from it, the remedy to the quality problems thereby created is seen to lie with greater formal regulation.

It may be said therefore and, indeed, proponents of QA argue just this, that there is nothing particularly new about the procedures which constitute QA. If this is so, it may be inferred that QA as a cure for the quality problem is a more developed form of the ills which caused

the problem in the first place – that is, over-reliance on formal, centrally administered control systems and a weakening of the discretionary powers at the work level itself.

While the control of working practices by the trades has been progressively weakened over many years the growing appeal of QA represents a weakening of the discretionary role of the construction professions too. Witness for example the increasingly important part to be played by the British Standards Institution in evaluating firms as to their QA procedures. In this, quality of the product itself is not considered and assessment panels may include no construction professionals. Further, Government is strongly promoting the idea that clients should only patronize firms who have won BSI approval. In other words, the traditional role of the professions, trusted to promote technical excellence and to uphold standards of honesty and fair play is being dismembered to be replaced by the market and centralized Government control.

In sum, the trends we have noted and QA in particular represent a weakening of the occupational order. Management becomes increasingly recognized as an abstract activity in both its entrepreneurial and administrative guises progressively dissociated from the actual business of construction. The attempt is made to make specifications ever more exact and comprehensive and their achievement amenable to routinized procedures; codification reduces discretionary scope and the construction professions become effectively de-skilled, a process that the manual occupations have been undergoing for some time.

Summary and conclusions

We have proposed that the institutional framework within which quality is defined can usefully be understood as comprising four orders: that there evolved a working balance between them which, while embracing the need for technical specification also recognized its limitations. The need was acknowledged for the industry's occupations to be given the right to make informed judgement as the occasion demanded. Thus, the occupational order is founded essentially on trust; on an acceptance that an occupational member, subject to being able to demonstrate that he is a bona fide member, will make an appropriate decision. Different levels of competence in members are, of course, recognized but in all cases if somebody is accepted as an engineer or a bricklayer certain decision-making rights follow from that acceptance. It is important to stress that the occupational order recognizes members of the occupational community rather than individuals. Occupational knowledge is as it were held in common; it is shared.

Co-existing with the technical and the occupational order are the legal and economic. Both of them recognize differentiation of interest. That is, individuals and the economic enterprises they form, in addition to being trusted to apply their occupational competence, must to some extent be bound by the threat of legal and economic sanctions. Thus, while the technical and occupational orders represent a generalized capacity to generate value or benefit, that is to make and do things, the legal and economic orders define rights to determine what exactly is to be done, who is to benefit and in what proportions.

We propose that the relative salience of these orders within the institutional framework of the industry is changing and that the quality debate reflects the nature of the changes involved.

What we have referred to as the first tendency (T1) accepts, and in some cases welcomes, the increasing dominance of the economic order. It assumes, following the logic of the

market, that in any transaction parties will promote their own economic interests and that in aggregate this promotes efficiency. It assumes that less and less can be left to trust since any uncertainty or ambiguity will be exploited for economic gain. Therefore uncertainty and ambiguity must be eradicated by exact specification and control effected through strictly applied procedures. Within this tendency management is seen as making the most cost effective use of material and human resources with respect to that enterprise which is to be managed. Occupations, including the professions, are seen as providing usable resources in the form of technical expertise and labour power to be secured on the most cost effective terms.

At the core of the model which promoters of the second tendency (T2) advance is recognition of the limits of exact specification and therefore the need for the compensatory mechanism provided by the occupational order. Given this need, it highlights the deleterious consequences of undermining trust and the occupational order by exposing all relationships to the pure logic of the market. Writers of this tendency whom we have cited are not blind to the fact that the professions have been complacent, have taken their occupational rights too much for granted, have defined them too narrowly, or indeed have helped erode the occupational order by promoting technical change with insufficient concern for the consequences. They would also no doubt accept that many have compromised their own occupational standards in the pursuit of economic gain thereby accelerating the change towards more extensive legal and economic control with the increased codification, formalization, and so on, which are their expression.

The purpose of this paper has been to highlight the crucial dynamic of the construction industry. Faced with endemic uncertainty it has developed an organizational framework supremely well adapted to coping with it. In this, the need for informed judgement vested in the occupational order has been recognized as a necessary counter-balance to the extreme forms of rationalization to be found in other industries. An irony is that as organizations in the manufacturing sector are faced with increasing uncertainty, more fluid organizational arrangements, which the occupational order has made possible in construction, are sought.

In our review of the quality debate we have argued that there are two very different conceptions of the role to be played by the construction occupations. In one, the occupational order is seen as a legacy of rules of thumb and guesswork, of work practices which are difficult to pin down and control. To remedy them everything must be exposed to unambiguous standards and the clear logic which the market is supposed to impose. The other tendency argues the intrinsic limitations of this vision; the impossibility of ultimate precision, the costs of its pursuit and the negative consequences of exposing everything to the market.

The current ideological climate clearly favours the former view. For the future we wonder if the progressively reduced autonomy of the construction professions will encourage them to challenge the technicist-functionary role they have been assigned within it. To do so successfully it would seem necessary to defend the logic of the occupational order as a whole rather than to promote their hitherto relatively privileged position within it. Such a strategy would involve resurrecting the currently tainted notion of professionalism and re-emphasizing such concepts as care, integrity and morality. It would involve taking a more positive attitude to practitioners at all levels; to their working conditions and to their opportunities for training. It would, finally, involve re-affirming the virtues of negotiated consensus in the conduct of relationships in the market rather than accepting unbridled competition and expecting just quality to be achieved through mechanical regulation.

Notes

1. At The National Forum on Quality Assurance, CIRIA, London, 18 February 1988 the lowering of European trade barriers and its effects on customers were the two dominant themes.
2. Writing in 1970 Abdun-Nur provided a 'systemic approach' to the control of quality. He presents his model in the form of a polygon which depicts the standards flow of information and control but importantly includes within the polygon those factors bearing on quality which are generally ignored. He writes:

   > The outer polygon divides the various technical activities, and the contractor's effect on quality, into various natural areas. But in the System Approach, these constitute only a fraction of the whole. In the center [sic] of the polygon is a list that attempts to bring out the various non-technical forces that determine in many cases, and at least effect in all cases, the quality of the finished facility. These are areas that the engineer has shied away from getting involved in, but which in today's society are at least as important as the technical areas, if not more so as parameters of the total engineering picture (p. 119).

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