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Specifying intent at the Museum of Childhood

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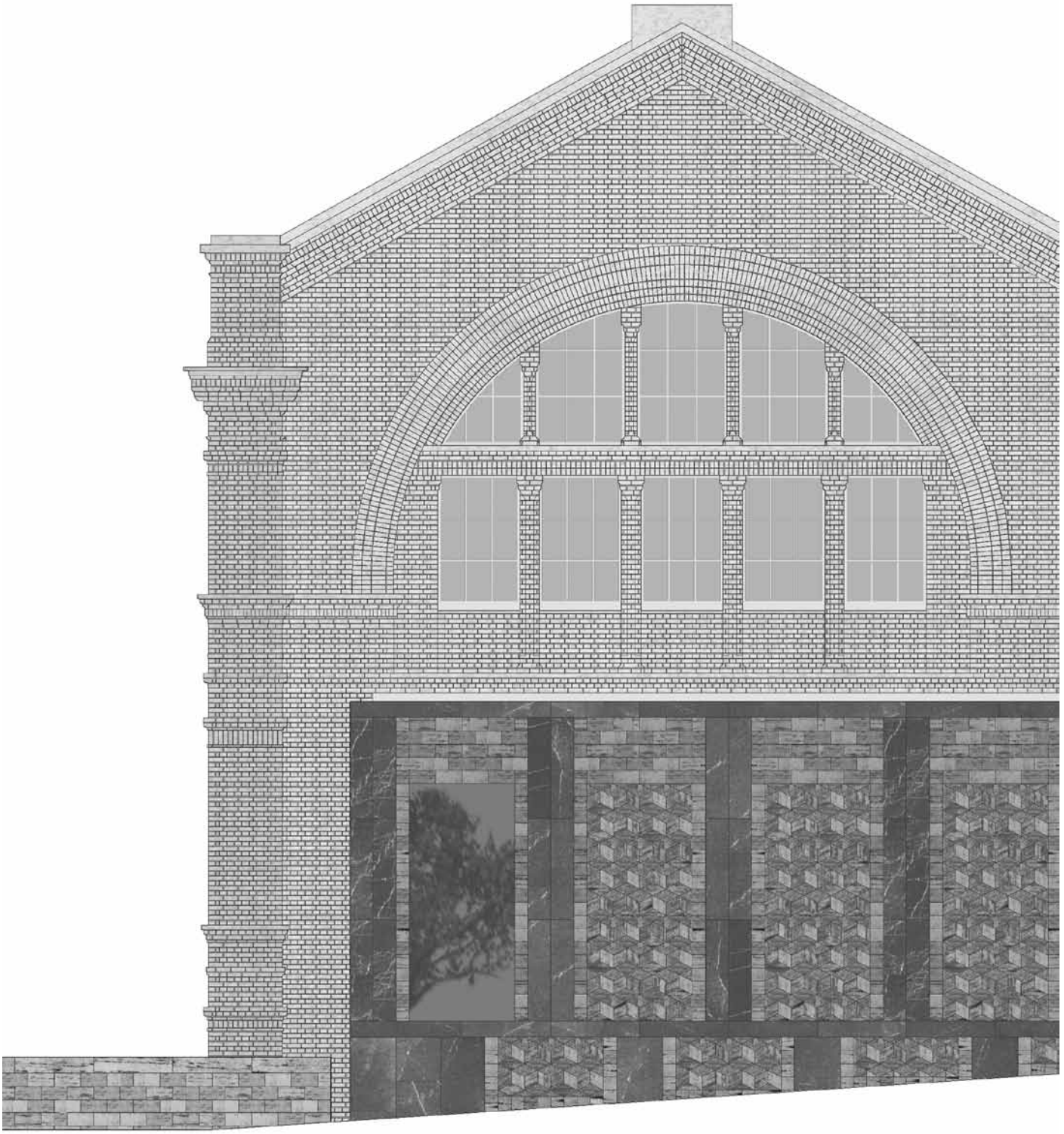

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A mastic joint on the facade of Caruso St John Architects' 2006 Museum of Childhood addition reveals ambiguities between architectural intentions and precise technical specifications.

Specifying intent at the Museum of Childhood

Mhairi McVicar

In a 2009 interview, architect Peter St John of Caruso St John Architects defined a good architect as one who makes few compromises, highlighting precise instructions as imperative in achieving this. An architectural project, St John stated, 'is far more likely to work well if you put an enormous effort into defining what you want, to achieve quality'.[1] At Caruso St John Architects' 2006 entrance addition to the Victoria and Albert Museum of Childhood in Bethnal Green, London *[1]*, the precise specification of mortar and mastic joints throughout a cut-stone facade was employed to define expectations of quality in the constructed facade. These specifications, written in accordance with the recommendations of professional practice, set out stringent expectations of dimensional perfection. When dimensional variations during design development and construction threatened to disrupt these expectations, the precise definition of quality shifted, becoming less defined by dimensional perfection and more reliant upon the 'architectural intentions' underpinning the project. In referencing conceptual, ideological, historical and technological intentions which were difficult definitively to express, this critical phrase – 'architectural intentions' – is examined here in terms of its ambiguity in the context of the written specification *[2]*.[2]

Ambiguity in the written specification is emphatically rejected by regulatory and advisory bodies in the architectural profession, which frequently advise that the written specification must provide, above all else, certainty.[3] In *The Architects' Journal* in 1989, author Francis Hall went as far as describing the properly drafted specification as the 'one certain opportunity' for an architect to set down a 'definitive and enforceable expression of standard and quality'.[4] 'Properly drafted' is typically translated as a prosaic language, specifically devoid of poetic content. The ability of the unambiguous written specification to convey adequately the poetic content of architectural intentions has, however, been under critique since its inception.

Ambiguity, this paper suggests, may not only be unavoidable, but also instrumental in conveying the poetic meaning of architectural intentions. William Empson's *Seven Types of Ambiguity* rejected definitions of ambiguity as merely inconclusive or weak, focusing instead on the ability of ambiguity effectively to convey several complex poetic meanings at once. Alberto Pérez- Gómez has similarly portrayed the ambiguity within poetic narrative as more effective than prose in conveying the multiplicity of architectural intentions. A close reading of the written specifications for a 6 mm mastic movement joint on the west facade of the Museum of Childhood suggests that the presence of ambiguity, in supporting even the most precise of specifications, contributed a critical role in 'defining what you want, to achieve quality'.

2

A Nitoseal MS100 mastic movement joint

Caruso St John Architects' thirty-five page written specification for the stone cladding facade of their entrance addition to the Museum of Childhood contains a specification for a mastic sealant forming movement joints throughout the facade:

> *Z22 Sealants / Joint Dimensions: Within limits specified for the sealant.*[5]

The specification for the sealant – in this case a 'Fosroc Nitoseal MS100 Mastic' – appears to be straightforward, using a system of categorisation derived directly from National Building Specification (NBS) standards.[6] Following the instructions in this specification, Fosroc Nitoseal's own product specifications state that 'Nitoseal MS100 may be applied to joints between 5 and 35 mm wide'.

1 Caruso St John Architects' concept development elevation M176-feleA for the Victoria and Albert Museum of Childhood entrance addition

2 Caruso St John Architects' concept sketch for the Victoria and Albert Museum of Childhood entrance addition

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Additional guidance to establish the permissible tolerances of the mastic joint is offered via a mathematical formula describing a 'Movement Accommodation Factor (MAF)' which establishes 'the theoretical / minimum joint width knowing the expected maximum working movement of the joint'.[7] For further qualification of standards and tolerances, Fosroc directs us to British Standards BS 6093:1993, 'Design of joints and jointing in building construction', which allows that the designer should 'e) Modify the design of the joint to meet all the requirements at the positions where it occurs'.[8]

All appears clear, certain and unambiguous. Affiliated construction drawings for the Museum of Childhood specified two, 6 mm mastic joints framing either side of an illusionistic column, with the column itself bifurcated by a 4 mm mortar joint. When a sample panel submitted by the contractors revised this specified rhythm of 6–4–6 mm to three equal joints of 5 mm, the sample was emphatically rejected by the architects. 'It is imperative', David Kohn, project architect for the Museum of Childhood, faxed to the contractor in September 2006,

> *that the 6mm mastic joints are located on the outside edges of the red quartzite columns, and not in the middle of the column, in all instances. The joint in the middle of the column should be a 4mm mortar joint.* This is central to the architectural intent of the project.[9] [Author's emphasis]

In addition to precisely defined dimensional standards, these joints were required to meet additional requirements: those of achieving the 'architectural intent' of the project. This key phrase remained critical in defining expectations of quality as the project moved from concept to construction; yet to define 'architectural intent' according to NBS's direction that all wording be 'precise, concise, unambiguous and clear' would appear to be difficult at best.[10] This phrase, referencing multiple meanings from historical precedents to ideological concepts, applied to demand dimensional perfection and yet accept dimensional deviation within a definition of quality, is understood here to be *ambiguous*.

The pleasure of precise buildings

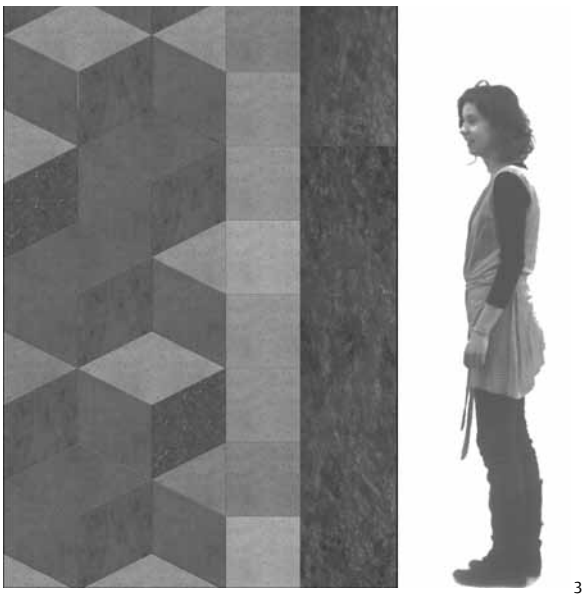
The constructed and written work of Caruso St John Architects (formed in 1990) expresses an ideological stance which acknowledges contextual and historical precedent through critical engagement with contemporary materials and construction technologies. In pursuing quality, architecture, the practice has argued, must demonstrate 'a critical relationship with its situation' in which 'its construction is somehow communicative with the existing physical and social context'.[11] In accordance with statements that the practice resists 'off the peg construction',[12] each constructed project reinterprets a key material in a subtly unconventional manner, resulting in construction which is simultaneously familiar and new, reassuring and challenging. A recalibration of 'off the peg' materials and construction systems demands particularly close attention to specification and detailing; above all, the practice's work is shaped by precise control. Kohn notes that he gets 'a huge amount of pleasure out of a precise building. You recognise care, thought, energy, enthusiasm out of things well made. They give pleasure.'[13] Quality, here, is defined not only by the objective precision of a constructed result, but through subjective concepts of care, enthusiasm and pleasure, concepts which critically shaped definitions of quality of the facade at the Museum of Childhood.

Fine joints

In 2002, Caruso St John Architects received a commission from the Victoria and Albert Museum of Childhood at Bethnal Green to renovate and develop the Museum through a phased masterplan, including a new entrance structure to front Victorian architect J. W. Wild's 1872 brick facade. Charged with the task of signifying the value of the Museum as a major civic institution to its local context and beyond, Caruso St John focused upon decorative facades, culminating in a proposal for a rectangular one-storey volume, tautly wrapped in a patterned stone skin, to sit in front of Wild's brick facade *[3]*. Caruso St John outlined their intent in a design statement:

> *The facades are to be clad in different coloured stone tiles with very fine joints, like marquetry. The smooth flat finish will be given depth through the use of repetitive illusionistic patterns in the infill panels.*[14]

Fine joints, 'like marquetry', were repeatedly highlighted as central to the architectural intent. An August 2004 planning report referred to illusionistic decoration at the sixteenth-century Colleoni Chapel in Bergamo, ceramic floral tiles on Auguste Perret's 25 bis rue Franklin, and Caruso St John's own proposals for 'a facade made like marquetry'[15] for the competition entry for the National Museum of Swiss Culture, Zurich. St John likens the rhythm of alternating illusionistic columns and bays to the patterned facade of Leon Battista Alberti's Santa Maria Novella, Florence, highlighting Alberti's fine joints as critical in conveying a sense of flatness, and recalling the intent for the Museum of Childhood



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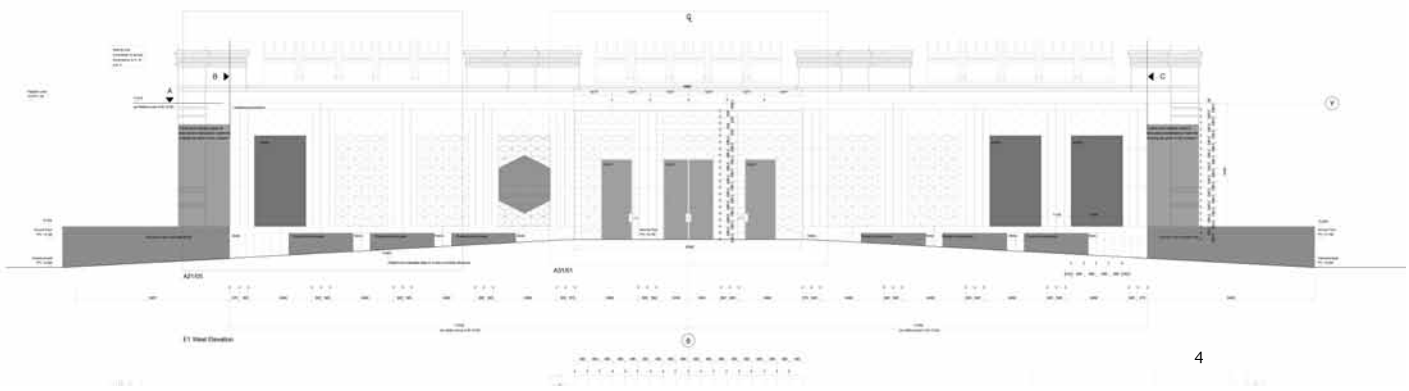

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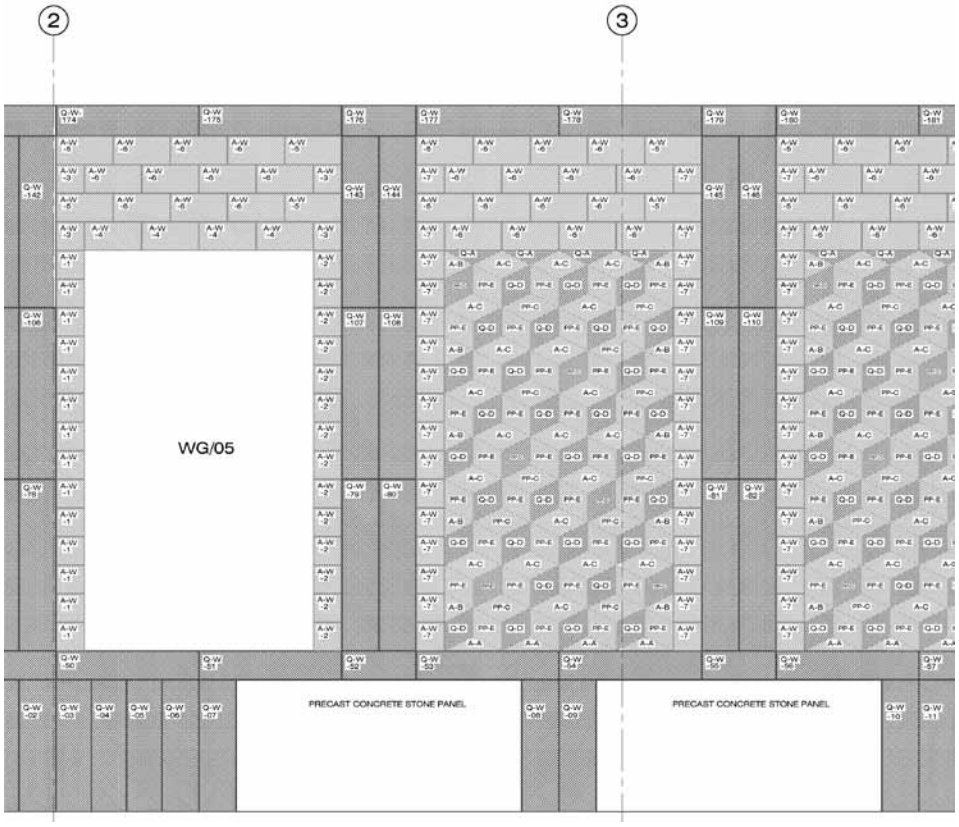

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3 Caruso St John Architects' concept sketch elevation 176_samplepanel for the Victoria and Albert Museum of Childhood entrance addition

4 Caruso St John Architects' Assembly drawing 176_L15_10P for the Victoria and Albert Museum of Childhood entrance addition

5 Stone Restoration Services' shop drawing of stone cladding for the west facade of Caruso St John's Victoria and Albert Museum of Childhood entrance addition

facade that 'it shouldn't be something heavy, where the individual stones are emphasised, which would be the case if you had big joints. It would be something shimmering and more decorative'.[16] Fine joints demanded a high level of precision, with implications for economic viability and quality control during construction. Caruso St John initially investigated CNC (computer numerically controlled) and off-site prefabricated technologies, noting that industrialised processes, which had once rendered decorative craft prohibitively expensive, could now permit an economical return to decoration as well as offering stringent control of construction processes.[17]

Early specifications called for prefabricated panels of 10 mm thick CNC cut stone tiles bonded to a fibreglass and aluminium honeycomb 'Fibrestone' substrate.[18] Assembled under factory conditions, this method allowed the specification of joints as fine as 3 mm *[4]*. Problems arose, however, when it became clear that movement joints between panels would be required to be substantial. Prefabrication, permitting fine tolerances within the controlled confines of an individual panel, would result in unacceptably large tolerances where individual prefabricated elements met each other on the construction site. In discussions with the project stonemasons, Stone Restoration Services Ltd, a more traditional construction system was agreed upon: that of individually hand laying individual cut stones in a construction method akin to that of a brick veneer wall *[5]*. This 'low-tech'[19] solution could theoretically retain the specified fine joints in accordance with Caruso St John's intentions: but it would now introduce dependence upon those physically constructing the wall.

6 mm vertical movement joints

The precision of each joint would now depend upon the care of each individual stonemason laying each stone by hand, a point emphasised by Kohn as he discussed the proposed revisions with the facade

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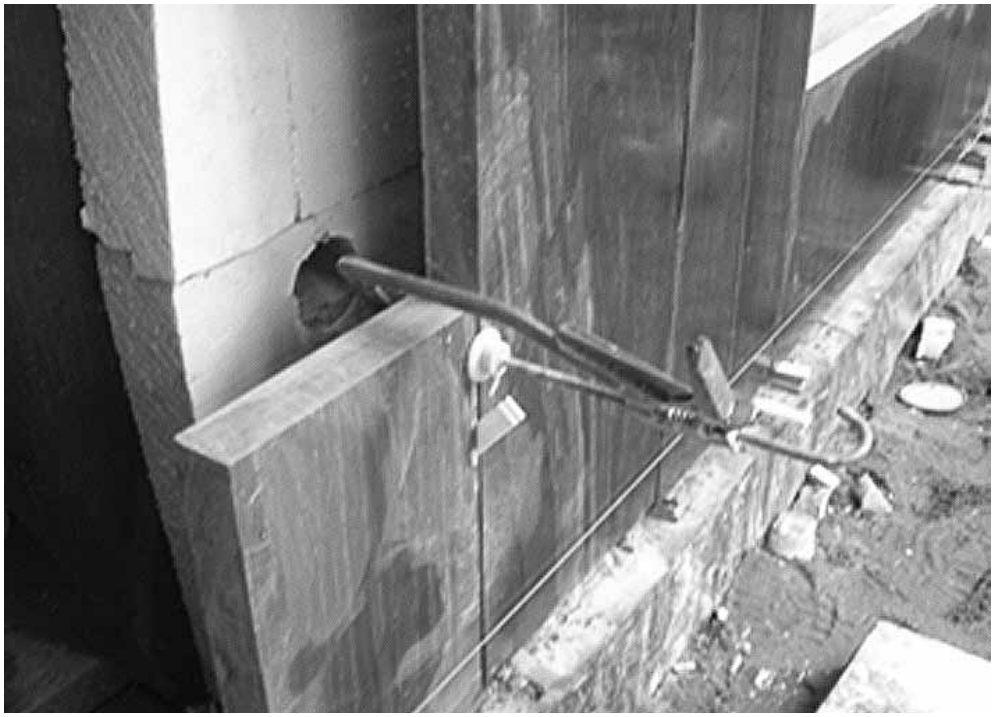
engineers by email. 'The only thing I would want to check', he wrote, 'is that the patterned stone sections at the facade could be made to as tight tolerances as the Fibrestone panels.'[20] Kohn sought to minimise the impact of any joints, investigating, at one point, whether movement joints could be eliminated altogether. 'We would like to work', project architect David Kohn faxed in March 2006, 'towards there being no vertical movement joints on the west facade.'[21] British Standards guidelines, however, necessitated movement joints, stating in BS 8298 Section 3.11.4.3 'Movement Joints', that 'the recommended allowance for joint width should not be less than 10mm per 6 metre length of cladding', a specification which could be practically accommodated by one movement joint per pier. When the construction team questioned the proposed layout of two movement joints framing the column – one more than physically necessary – the response from Kohn was unequivocal: 'As far as 6 mm vertical expansion joints are concerned' he faxed, 'they have always been shown on either side of the red quartzite columns with a 4 mm joint in the middle of the column. We will not accept changes to this'.[22] Expectations that the constructed facade would align perfectly with Caruso St John's specifications was further exemplified by a fax sent by Kohn in August 2006, which rejected a sample:

> *The joints between the* [sample] *stones are all 5 mm. The joints should be 4mm and 6mm at movement joints. This is critical given the number of joints there are in the facade.* [...] *we therefore ask that you erect a new sample that can demonstrate the workmanship and finish required.*[23]

Quality, here, was defined as dimensional perfection to a tolerance of less than 1 mm. The constructed facade does not, however, maintain the critical 4 mm and 6 mm joint dimensions specified. The joints vary, more or less, between 2 mm and 10 mm. The pre-cut stones are occasionally chipped at corners; corners of individual stones do not precisely align; individual joints vary in width. Constructed joints do not align perfectly with the specified layout, and do not comply with the degree of precision specified following the rejected site sample.[24] Natural inconsistencies in the cut edges and corners of the stones required subtle adjustments of joint widths across the facade, achieved by the stonemasons stepping back and viewing the panels during construction to balance one offset against another where required to individually, subjectively, intuitively, judge proportions and hierarchies of varying tolerances of irregular mastic joints, mortar joints and cut stones as a whole across a facade.[25]

The joints, as physically constructed, could not be controlled by the strictly specified tolerances of each joint as set out in specifications and drawings alone. A comprehensive and precisely written thirty-five page specification, exemplifying all recommendations of contemporary architectural practice, still struggled to convey the architectural intention of a precise relationship of mastic joints, mortar joints and stone panels when the realities of construction challenged the idealised conditions of the specifications. Constructing the facade in-situ, in a manner akin to a brick veneer, relied instead upon the individual discretion and judgement of each stonemason setting each stone in place, each working in accordance with an understanding of the 'architectural intent' of the project *[6]*. The control of quality depended not upon a perfect dimensional alignment between the specification and constructed result, but upon an alignment with the architectural intentions underlying the dimensions: intentions which the written specification struggled to convey.



6 Caruso St John Architects' construction site photo 176_ sitephoto_120906 _03 of the Victoria and Albert Museum of Childhood entrance addition

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'Every detail that will possibly happen'

While the specification is, as Katie Lloyd Thomas has observed, typically viewed as 'supplementary' to the drawing package,[26] Hall's insistence in *The Architects' Journal* that the specification offers the 'one certain opportunity' for architects to define quality highlights the specification as a primary document. Similarly, in the AIA journal *Architecture*, Christine Beall observed that, in the event of any dispute, the specification is the key document which 'attorneys on both sides pore over for quality standards'.[27] The ability of the written specification, however, to adequately translate expectations of quality was under debate in the UK even before its widespread adoption in the nineteenth century.

Amid the vast output of the industrial revolution, the development of new materials, new transport infrastructure for materials, and new building typologies and construction systems required both architect and builder to engage with an unprecedented variety of materials and construction systems, challenging the historical familiarity each had once enjoyed with largely localised materials and systems. Concurrently, civic works built with public funds led to demands for increased accountability of costs, resulting in widespread, if not popular, adoption of the 'Contract by Gross' through which one builder would guarantee all costs for a project in advance of construction. The master builder – a new organisational structure employing and controlling costs of all individual trades[28] – now began to demand that the architect provide precise instructions from which costs would be predicted. The written specification emerged as a key instrument in a context which could no longer rely upon shared understanding of standards and quality, and in the face of increasingly antagonistic relationships between architect and builder.

The written specification had, of course, existed in some form for centuries. Franklin Toker's 'Gothic Architecture by Remote Control' describes an 'illustrated building contract' of 1340 which combined drawings and written instructions.[29] Historically, specifications had relied upon shared but largely unwritten understandings of standards and quality, dependent upon what Howard Davis termed 'human discretion':[30] the discretion of an individual craftsman to determine many of the details of a project, working within commonly understood expectations. Even up to the nineteenth century, the specification could take a narrative form. Harold Reeve Sleeper's *Architectural Specifications* describes early American specifications as taking the form of a short story.[31] Such specifications came under severe criticism as an increasingly fragmented building culture focused its efforts upon certainty, turning to the specific question of precision within a series of Parliamentary Select Committees in the early nineteenth century which considered the impacts of the Contract by Gross. In 1823, architect John Nash testified that the Contract by Gross, in requiring an architect to provide precise specifications, could only engender thoroughness and certainty;

> *an architect before he can make a contract in gross must make a specification, in which specification he must set down every thing that can possibly occur* [...] *Before an estimate in gross can be made he must digest his plan, and every part of it must be made out, and he must put down on paper every detail that will possibly happen.*[32]

Despite these comprehensive aims, doubts had previously been raised over the ability of the written specification ever adequately to convey 'every detail that will possibly happen'. Davis describes a 1734 contract for 19 St James's Square which observed that 'it is next to impossible to enumerate or insert every particular work and thing requisite to be done in and about the building'.[33] Little had changed a hundred years later when architect George Saunders testified before an 1812 Select Committee that,

> *No specification for a contract in the gross, however long, has ever yet been found sufficient to ensure a due execution of what is requisite; except in very small, plain or rough Works.*[34]

This lament was echoed yet again one hundred and eighty years later by authors Osamu A. Wakita and Richard M. Linde who concluded that 'Architects involved in Quality work find that there is never enough information.'[35] 'Quality' work – as opposed to 'small, plain or rough Works' – is consistently highlighted as presenting particular difficulties for precise specifications. While a written specification might convey the requisite information for consistently adequate standards – and British Standards categorically define Quality not as a degree of excellence but as 'fitness of purpose'[36] – it is when architecture moves into the more ambiguous realm of Quality that the specification approaches its limits.

This difficulty is not eased by a prevailing contractual culture in the UK which frequently cites a lack of precision in the specifications when disputes arise on site. NBS quote a 1994 *RIBA Journal* article which reported that 'poor specifications are the underlying cause for over 25% of architects' Professional Indemnity insurance'.[37] Despite the specification's exponential growth from a one-page document in the nineteenth century to the dozens of pages which regularly make up a twenty-first century specification,[38] the ongoing practice of increasing the degree of precision in a specification still appears to be unable to compensate for the wider problem of a context which regularly places certainty above all other aspects of quality, which distrusts human discretion, and in which the written specification is commonly acknowledged by practitioners as serving as a back-up in cases of dispute.[39] In a mistrustful, litigious culture, any error, omission or ambiguity in the specification may be seized upon as ammunition in a dispute; yet every specification inevitably contains errors, omissions and ambiguities. Even Sleeper's exhaustive effort to provide a comprehensive set of clear guidelines for USA specification writers to follow might, he admitted, contain errors:

> *No claim to perfection can be made, and there may be errors of omission and commission. It is the author's hope that, as these are found, they will be brought to his*

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7 Caruso St John Architects' construction site photo IMG_0395 of the Victoria and Albert Museum of Childhood entrance addition

> *attention so that they may be corrected in future editions. Checking, correcting, re-checking and editing might well consume another year, and still inaccuracies and deficiencies might be found.*[40]

This admission is a far cry from Sleeper's self-described aim of creating ready-made specification forms to ensure that the actual work of compiling a specification would be 'a simple and orderly process which could be safely and expeditiously performed under stress'.[41] In opposition to a claim that ever more precise specifications could ever guarantee an absence of errors, omissions or ambiguities, alternative viewpoints suggest that these could be accepted, even celebrated. In *The Idea of Building*, Steven Groák specifically redefined errors and omissions as 'characteristics of buildings or building processes, the condition of the industry, at times to be relished'.[42] Groák argued that an approach focusing on 'wholes' rather than 'parts' could better address the often conflicting conceptual approaches to construction created by the separation and specialisation of the architect and the builder. Meanwhile, Davis described a Japanese building contract which states:

> *'The Owner and the Contractor shall perform this contract sincerely through co-operation, good faith and equality', general conditions of construction contract, revised Sept 1981.*[43]

Japanese construction practice, Davis related, expects parties to work together on site, instead of 'simply seeing the construction process as the fulfilment of a contract that had already completely specified the building'.[44] Rather than attempting to specify 'every detail that can possibly exist' in advance of construction, expectations of close and collaborative relationships between the architect and builder anticipates the resolution of questions as they are raised on site. In other alternatives, Katherine Shonfield envisioned the scientific, practical and rational car-manual style of the written specification rewritten in the style of a cookbook – a season-to-taste approach which might better describe the realities of the messy, intuitive, adaptive construction process.[45] The specifications as they stand indeed often have little bearing upon the realities of the construction site: sociologist Darren Thiel's extensive studies of the construction site suggested that the specifications play a relatively minor role as tools on the construction site, 'acting as guides rather than orders or tight templates' as the work on site inevitably veers from the idealised world of the specification,[46] and human discretion takes over in resolving the hundreds of decisions which need to be resolved every day on site *[7]*.[47] The indefinable, unwritten understandings which emerge between architect, builder and site inevitably contribute to the constructed quality of any project. Such understandings contain multiple meanings and interpretations; are difficult to clearly define or translate; and are often ambiguous.

Definitions of ambiguity

Ambiguity in the technical specifications is typically portrayed within the architectural profession as negative, derided for vagueness and a lack of clarity: an antithesis to the certainty which the specification must provide. Other interpretations, however, suggest that ambiguity, in interpreting poetic intentions, could offer greater clarity and efficiency. In *Seven Types of Ambiguity*, William Empson defined ambiguity as occurring when 'a word or a grammatical structure is effective in several ways at once',[48] viewing the multiplicity of ambiguity as potentially efficient rather than inconclusive: one poetic word may convey an intended meaning far more effectively than several prosaic words. 'In a sufficiently extended sense, any prose statement', Empson argued, 'may be called ambiguous. In the first place it can be analysed.'[49] Analysis opens up ambiguity, in that any individual reader may interpret the same statement differently, no matter how precise the statement may appear to be, a point famously raised by Roland Barthes in 'The Death of the Author'.[50] In Empson's analysis, ambiguity is defined in several ways. It can, he writes, 'mean an indecision as to what you mean, an intention to mean several things, a probability that one or other or both of two things has been meant, and the fact that a statement has several meanings'.[51] Rejecting ambiguities which are indecisive, weak, thin or inconclusive – a rejection similar to that employed by technical specifications – Empson instead focuses upon the potential of ambiguity to convey a complex meaning effectively:

> *In so far as an ambiguity sustains intricacy, delicacy, or compression of thought, or is an opportunism devoted to saying quickly what the reader already understands, it is to be respected (in so far, one is tempted to say, as the same thing could not have been said so effectively without it, but, of course, in poetry the same thing could never have been said in any other way).*[52]

Ambiguity is here understood as a mechanism to effectively express complex poetic meaning in situations where shared understandings can take place. Observing that 'meanings of this kind, indeed,

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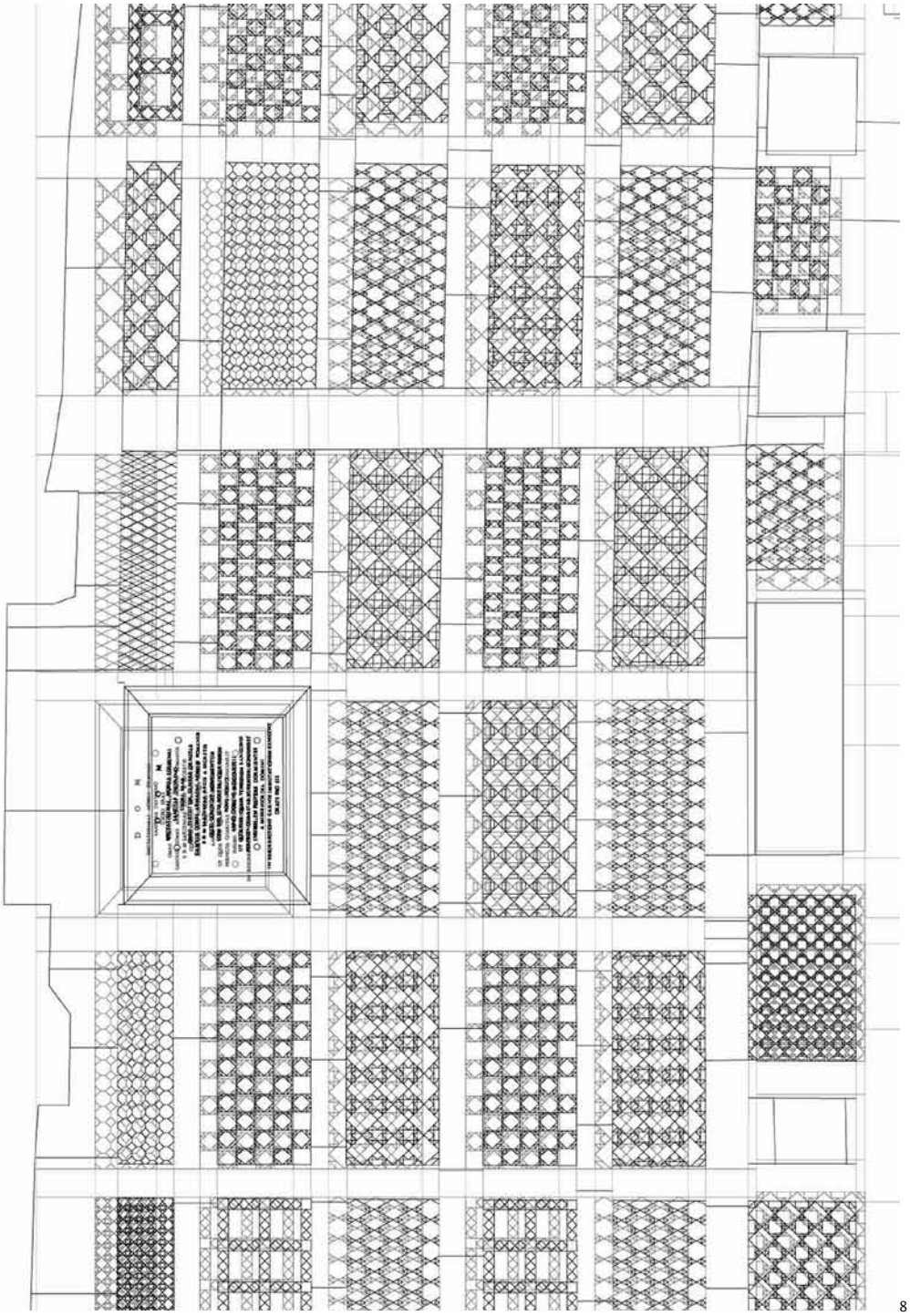

8 'Perfect / Imperfect' overlay drawing of the differences between the geometric ideal and the 'as built' conditions of the twelfth-century Cosmati pavement in Santa Maria in Cosmedin, Rome, surveyed by Louise Hoffman, James Paul and Sabine Rosenkrantz in 2004 for David Kohn's Undergraduate Studio 5 at London Metropolitan University

are conveyed much more by poets than by analysts',[53] Empson seeks a reconciliation of scientific analysis and poetic appreciation, proposing that each is critical in approaching a holistic understanding of a poetic intention. 'It often happens that', he reasons, 'for historical reasons or what not, one can no longer appreciate a thing directly by poetical knowledge, and yet can rediscover it in a more controlled form by prosaic knowledge.'[54] Here, the critic must simultaneously act as a poetic appreciator and scientific analyst. Prosaic knowledge is viewed as emerging from a desire to coherently structure a poetic intention. 'It may be said', Empson suggests, 'that the business of analysis is to progress from poetical to prosaic, from intuitive to intellectual, knowledge',[55] a definition which might similarly be applied to the process of writing a specification.

Poetic and scientific analysis depends upon, and critically informs each other, in understanding the meaning of a poetic intention – a point applied to architectural practice by Alberto Pérez-Gómez in *Architecture and the Crisis of Modern Science*. Gomez argued that the exclusion of poetry from technological understandings denies the breadth and depth of experienced reality. Reality, he wrote, 'is always ambiguous and accessible only through the realm of "poetics"',[56] yet the ambiguity of 'reality' is mistrusted in comparison to the laws of science.

Today, theory in any discipline is generally identified with methodology; it has become a specialised set of

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9 Measuring the constructed joints on the west elevation, Caruso St John Architects' Victoria and Albert Museum of Childhood entrance addition

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> *prescriptive rules concerned with technological values, that is, with process rather than ultimate objectives.*[57]

In denying poetic content, the ambiguity of experienced reality is itself denied; in insisting only upon technological process, the methodology becomes a goal in itself. A scientific framework which denies poetic content is not, Pérez-Gómez charged, compatible with reality, in that it 'rejects, or at least is unable to cope with, the richness and ambiguity of symbolic thought'.[58] Pérez-Gómez warned of the loss experienced when poetic content is denied in technological frameworks. Just as Empson warned that an entirely scientific analysis, devoid of poetic appreciation, may strip words of meaning, Davis implied a similar impact upon the built environment, suggesting that,

> *the increase in the quantity and specificity of abstract documents of control, and the growth of a litigious atmosphere in the construction industry and in the building culture as a whole here developed hand in hand. Together they have removed people's ability to carefully apply human discretion to the making of building.*[59]

'It is a battle', Peter St John concurs of contemporary relationships in the UK between the architect and builder, 'we want good working relationships with the builder, but we also want things to be perfect.'[60]

Meticulous in specifying precise dimensional tolerances as a measure of perfection, project architect Kohn also acknowledges the impossibility of achieving dimensional perfection, an understanding demonstrated by his research into the dimensional irregularities of a twelfth-century Cosmati pavement in Santa Maria in Cosmedin, Rome. Surveying the pavement in 2004, Kohn and his undergraduate studio students produced a drawing titled 'Perfect / Imperfect' *[8]*, overlaying the geometric ideal with the actual construction. Crucially for Kohn, the discrepancies between the ideal and the actual demonstrated neither a lack of care nor a lack of skill, but rather served as a confirmation that dimensional perfection, even in the most widely acclaimed works of art and architecture, can never, quite be attained. 'Reality', Kohn suggests, 'is nothing like the intellectual construct [...]. That difference is being human. The drawing by the students showed this difference.'[61] Kohn suggests that the quality of the Cosmati pavements was guided by a commonly understood meaning embedded within the pattern. 'For a contemporary stonemason, one wonders to what degree the pattern is of great importance', he concludes, suggesting that, at the Museum of Childhood, the forcing of the 4 mm and 6 mm joints

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through precise specifications served as a means of elevating the importance of the facade to those who would build it. These precise specifications – insisting upon 4 mm and 6 mm joints and permitting no deviation – were written and drawn in a context of understanding that, not only was this degree of perfection unlikely to be achievable throughout the final construction, but also that dimensional perfection would not, in itself, define the quality of the project. The ambiguity present here, between demanding dimensional perfection, yet defining quality as lying outwith dimensional perfection, is a constant condition of architectural production. No matter how precise the specifications and how complete the drawings, ambiguity exists at all levels of architectural production as it moves between ideal and reality, a fact which is evident when examining the precise instructions contained in the path from NBS specifications, to Fosroc product specifications to British Standards.

Ambiguity in the written specification

Fosroc's specification allows the word 'theoretical' – 'the theoretical / minimum joint width knowing the expected maximum working movement of the joint' – amid otherwise quantitative instructions. The inclusion of this conjectural and speculative word confirms a degree of speculation which exists in any quantitative specification. No matter how precisely specified an idealised geometric dimension may appear on paper, the actuality of the constructed result can never – quite – align perfectly with the geometric ideal, a reality which has been in place as long as ideal geometries have been employed to inform construction processes.[62]

British Standards also note that the design of the joint must be modified to meet 'all the requirements' at the positions where it occurs. This might, at face value, simply reference the physical tolerances of any movement joint and the requirement to comply with regulations and standards. If, however, this phrase is read literally, its meaning expands to consider all possible requirements including the architectural intent which underlay the project, as referenced by Kohn. At the Museum of Childhood, an outright reference to 'the architectural intent' perhaps came closest to communicating the ideological values which underlay expectations of precise mastic and mortar joints. Despite Hall's insistence that the specification provides 'the one certain opportunity' to lay down 'definable and enforceable expressions of standard and quality', the definition of quality as applied to these joints shifted as the project progressed, from dimensional perfection to a mutually agreed understanding of quality based on the subjective, intuitive relationship of imperfectly dimensioned joints.

Ambiguous quality

A precise, comprehensive thirty-five page specification, exemplifying recommendations for professional practice, could not communicate the nuances embedded in expectations of standards and quality. As this project progressed, innumerable conversations, letters, faxes, sketches, meetings and phone calls between architects and builders slowly, incrementally, developed a multilayered, indefinable, ambiguous definition of quality. What really mattered at the Museum of Childhood was that the joints supported the illusion of a taut, flat pattern of columns and infill panels; that the facade read as a conceptual construct drawn from historical precedents and critical interpretations of contemporary construction processes. It was conceptually critical that the joints remained subservient to the stone; that the relationship of mastic to mortar to stone simply looked *right*, an ambiguous relationship of precision and imprecision which a thirty-five page specification could not convey. Far from being the 'one certain opportunity' to set out expressions of standards and quality, the written specification could act as no more than a starting point.

Understanding ambiguity, not as vague, but as conveying many complex meanings simultaneously; moments of ambiguity embedded throughout the specifications for the Museum of Childhood teased out definitions of quality which could not easily be dimensionally described. In addition to precise dimensional instructions, ambiguities contained within precise instructions referred to far more than dimensional perfection, contributing towards, as Peter St John stated, 'defining what you want, to achieve quality' *[9]*.

Notes

1. Peter St John interview with the author, 11 May 2009.
2. The *New Shorter Oxford English Dictionary* defines ambiguous as 'indistinct, obscure, not clearly defined' (early sixteenth century); 'admitting more than one interpretation or explanation' (mid sixteenth century); 'doubtful as regards classification; indeterminate' (early seventeenth century). By the mid eighteenth century the definition includes 'unreliable'. *New Shorter Oxford English Dictionary on Historical Principles* (Oxford: Oxford University Press, 1993).
3. In the construction detailing manual, *The Professional Practice of Architectural Detailing*, Osamu A. Wakita and Richard M. Linde set out a framework of eight rules for dimensioning in construction drawings, within which they emphatically advise against the use of 'approximate' dimensions, warning that such instructions 'are ambiguous and thus have no place in architecture'. Osamu A. Wakita and Richard M. Linde, *The Professional Practice of Architectural Detailing,* 3rd edn (New York: Wiley, c. 1999), p. 51.
4. Francis Hall, 'Specifying for Quality', *The Architects' Journal*, 199 (1994), 38.
5. Museum of Childhood at Bethnal Green Specification Revision C December 2005, 16.12.05, p. 125.
6. NBS are a UK master specification system dedicated to providing 'concise, technically accurate and up-to date' specifications. NBS downloaded 5 May 2011.
7. Fosroc Nitoseal MS100 Product Specification sheet 14 CI/SfB:YT4 January 2006.

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8. British Standards BS6093: 1993 Code of Practice for Design of Joints and Jointing in Building Construction.
9. Fax from David Kohn to Wallis / Kevin Bain 27 September 2006.
10. <http://www.thenbs.com/topics/designSpecification/articles centuryBuildingSpecification Practice.asp> [accessed 2 March 2010].
11. Adam Caruso, 'The Tyranny of the New', *Blueprint* (1998), 24–25.
12. <http://www.carusostjohn.com/practice/> [accessed 7 February 2011].
13. David Kohn interview with the author, 1 May 2009.
14. Caruso St John Architects, *Stage E Report*.
15. Kohn interview, 2009.
16. St John interview, 2009.
17. Caruso St John Architects, *Stage E Report*, 12.
18. <http://www.fiberstone.com> [accessed 7 February 2011].
19. St John interview, 2009.
20. Fax from Kohn to Arup, 18 October 2005.
21. David Kohn, fax to Kevin Bain at Wallis, 20 March 2006.
22. Undated fax from David Kohn.
23. Fax from Kohn to Wallis / Colin Powell, 22 August 2006.
24. As measured by the author on 23 November 2009.
25. Stone Restoration Services in discussion with author, 12 February 2010.
26. Katie Lloyd Thomas notes, 'Not only is the specification apparently too mundane to be of interest, but, as Jack Bowyer writes, it merely "supplements" the drawing package.' Katie Lloyd Thomas, 'Specifications: Writing Materials in Architecture and Philosophy', *Architectural Research Quarterly*, 8.3+4 (2004), 277–83 (p. 277).
27. C. Beall, 'Of Specifications, Liability, and the Process of Construction', *Architecture: The AIA Journal*, 78.8 (1989), 110–12 (p. 110).
28. See E. W. Cooney, 'The Origins of the Victorian Master Builders', *The Economic History Review,* 8 (1955), 167–76.
29. F. Toker, 'Gothic Architecture by Remote Control: An Illustrated Building Contract of 1340', *The Art Bulletin,* 67 (1985), 67–95.
30. Howard Davis, *The Culture of Building* (New York: Oxford University, 1999), p. 188.
31. Harold Reeve Sleeper, *Architectural Specifications* (New York: J. Wiley; London: Chapman & Hall, 1940), p. viii.
32. 'Report from the Select Committee on the Office of Works and Public Buildings' (The House of Commons Parliamentary Papers Online, 1828).
33. Davis, p. 192.
34. 'Report from the Commissioners of Inquiry into the Conduct of Business in the Office of Works', House of Commons Parliamentary Papers Online, 1812–13), p. 194.
35. Osamu A. Wakita, and Richard M. Linde, *The Professional Practice of Architectural Working Drawings* (New York; Chichester: Wiley, 1984).
36. British Standards Institute, *British Standards BS 4778–2: 1991, Quality Vocabulary – Part 2: Quality Concepts and Related Definitions* (London: British Standards Institute, 1991) p. 3.
37. <http://www.thenbs.com/products/nbsBuilding/index.asp> [accessed 8 May 2011].
38. See the one-page specification for the original incarnation of the Museum of Childhood as the Iron Museum at Brompton Park House. John Physick, *The Victoria and Albert Museum: The History of Its Building* (Oxford: Phaidon, 1982), p. 281, Appendix 1.
39. 'The first thing an architect will grab when there is a problem during construction is the specs, hoping that he or she is "covered".' Beall, p. 110.
40. Sleeper, p. viii.
41. Ibid., p. vii.
42. Steven Groák, *The Idea of Building: Thought and Action in the Design and Production of Buildings* (London: E & FN Spon, 1992).
43. Davis, p. 134.
44. Ibid., p. 253.
45. Katherine Shonfield, 'Purity and Tolerance: How Building Construction Enacts Pollution Taboos', *AA Files* (1994), 34–40.
46. Darren Thiel email correspondence with the author, 8 July 2010.
47. Darren Thiel, 'Class in Construction: London Building Workers, Dirty Work and Physical Cultures', *The British Journal of Sociology,* 58 (2007), 227–51.
48. William Empson, *Seven Types of Ambiguity*, 3rd edn (London: Chatto and Windus, 1953), p. 2.
49. Empson, p. 1.
50. Roland Barthes, *Image, Music, Text* (London: Fontana Press, 1977).
51. Empson, pp. 5–6.
52. Ibid., p. 160.
53. Ibid., p. 4.
54. Ibid., p. 252.
55. Ibid., p. 251.
56. Alberto Pérez-Gómez, *Architecture and the Crisis of Modern Science* (Cambridge, MA; London: MIT Press, 1983), p. 5.
57. Ibid., p. 5.
58. Ibid., p. 6.
59. Davis, p. 200.
60. St John, 2009.
61. Kohn, 2009.
62. See Nigel Hiscock, *The Wise Master Builder: Platonic Geometry in Plans of Medieval Abbeys and Cathedrals* (Aldershot: Ashgate, 2000) for discrepancies between idealised geometries and constructed results.

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