

# Going into the mould

## Materials and process in the architectural specification

**Katie Lloyd Thomas**

To know the true hylomorphic relation it is not enough to go into the workshop and work with the artisan: one must go into the mould itself to follow the operation of form-taking at different levels and scales of physical reality.

Gilbert Simondon<sup>1</sup>

In the chapter 'Form and Matter' in *The Individual and its Physico-Biological Genesis*, Gilbert Simondon sets out a method for understanding form-taking in terms of a chain of processes, as opposed to the simple imposition of form on matter. To understand a technical operation such as the moulding of a brick in the terms of hylomorphism, he argues, is to have 'the knowledge of someone who stays outside the workshop and only considers what goes in and comes out'. To understand a technical operation in more adequate terms it is not enough to enter the workshop, 'one must go into the mould itself'. Simondon proceeds to rewrite the operation of moulding bricks, not in terms of form and matter, but as what he calls a 'clay/mould system'.<sup>2</sup> Through this redescription – this 'going into the mould' – he challenges the limitations of the hylomorphic schema and argues for alternative models of the technical operation.

Simondon's rethinking is particularly interesting in its detailed accounts of the clay 'at different levels and scales of physical reality'. He describes a range of processes from the clay's preparation in the brick-works to the dynamics of its colloidal structure. By going into the mould he shows that clay is no generic matter. Rather, it is a specific material prepared in a series of specific ways that make a particular kind of form-taking possible. His challenge to the hylomorphic schema may thus be understood to lie in the distinction between clay as 'matter' in general and clay as a specific material used in a specific context and practice.

It is this distinction between matter and materials that drives my appropriation of Simondon's method. I take it up in order to understand the ways in which the

practice of architecture treats and conceives building materials and the implications of these conceptualization. Rather than rewrite the technical operation myself, as Simondon does, I look at a variety of descriptions used by architects to specify the material aspects of building, and ask what kinds of conceptualizations of materials they suggest. My primary source is the architectural specification: a contractual document that describes in writing the materials and processes of building and is almost entirely neglected outside practical and technical literature.<sup>3</sup> It yields a number of rather different conceptualizations – some clearly structured in hylomorphic terms, some in terms of processes and others not encompassed by Simondon's two models, such as the recipe or the performance specification. Because of their role as part of architectural documentation these conceptualizations are particularly interesting. They not only reveal something about the way materials are understood, they are also part of the mechanism through which buildings are produced.

The historical and contextual variation between specifications is one of the document's most endearing and revealing features. Typically, at least until the 1960s when the Royal Institute of British Architects (RIBA) began standardizing the specification, they were documents which accumulated within architectural practices, keeping, repeating and modifying clauses from specifications for previous buildings, hoarding clauses whose significance no one could remember or dared to omit. The specification for a concrete house for a private client might run to thirty typed pages, while for a concrete factory built at the same time the specification is a simple list of what to do typed on to three sheets.<sup>4</sup> In the first edition of the journal *Specification*, published in 1898 to provide architects with exemplary clauses, the index of sections clearly reflects the trade-based nature of the contemporary practice of specifying. In the first edition of the standardized

version, the *National Building Specification*, published in 1973, these titles are substituted with abstract letters – building as alphabet – and the sections have been reconfigured in terms of objects and components.

*Specification*, Vol. 1, 1898

Excavator  
Well-Sinker  
Concretor  
Bricklayer  
Drainlayer  
Terra Cotta Worker  
Mason  
Pavior  
Carpenter  
[etc.]

*National Building Specification*, 1973

A Preliminaries and general conditions  
B Demolition Site clearance  
C Excavation Filling  
E Concreting Formwork Reinforcement  
Concrete finishes  
F Brick and block walling and paving  
H Structural steel and timber Metalwork Joinery  
Boarding Trims  
J Mesh Laminating  
L Foil, paper, plastics and felt sheet coverings and  
embedded membranes  
[etc.]

A study of the specification cannot avoid tracking these changes and their relationships to the context of architectural production; it avoids the idealism which Andrew Benjamin has observed in some material based accounts of architecture such as the tectonics of Kenneth Frampton.<sup>5</sup> An account of materials through an analysis of the specification is almost inevitably materialist. In addition, the specification offers a necessarily mediated encounter with materials that recognizes them as productions in themselves. Thus, a study of materials as they appear in the specification does not strive for a direct aesthetic experience of them of the kind to be seen in the material-based phenomenology of Peter Zumthor, Stephen Holl or Juhaani Pallasmaa. We need to be wary of such approaches, suggests Nick Coetzer, which can ‘bewilder our senses and subdue our critical faculties’. A ‘material-based phenomenology’ he goes on, ‘is political in its *erasing* of any overt political traces’.<sup>6</sup> Here the specification opens up a series of conceptual questions concerning the relationships of ‘matter’ and ‘materials’, but refuses to understand them as other than or simply prior to the conditions of architecture and building practice. Concepts of materials are understood as both contingent and productive.

## Understanding materials as matter

It is in part through its alliance with geometry and form that architecture established itself as a profession that was separate from craft and construction.<sup>7</sup> The other side of this separation was the relegation of materials to the practical underside of architecture, which leads to a tendency in both discourse and practice to conceptualize the form/materials relationship in the terms of the form/matter dyad. This slippage between matter and materials also appears in philosophical accounts of matter, as I will show. Within architecture it can suggest that building materials are mere substrate: inert, substitutable and prior to construction as matter. A hylomorphic understanding of form and materials can set up some very peculiar and problematic definitions of building materials.

The form/materials dyad clearly influences the arrangement of Table 2/3, one of four tables of categories in SfB, an indexing system used to organize information libraries in architectural practices. SfB was developed in Sweden in the 1950s and adapted for use in Swedish specifications with the aim of replacing the ‘outgrown’ trade-based arrangement of the specification with a logical, government-funded system.<sup>8</sup> It was adopted in the UK in the 1960s, first

### Table 2/3

### Construction form/materials

Table 2 **Construction Form** is never used without Table 3 **Materials**, and for this reason both tables are combined in this section as table 2/3. Table 3 is given separately commencing page 81.

Construction Indexing Manual, RIBA, London, 1969

for library classification. It was later adapted to provide the structure and categories of the first standardized National Building Specification (NBS) in the UK. Table 2/3 demonstrates the influence of the hylomorphic schema on the description of materials, and at the same time rewrites the form/matter dyad in terms of materials, as if they are simply positive instances of matter (see over).

In particular, we see that Table 2/3 is in fact the combination of two tables, ‘form’ and ‘materials’.

- No. 0 the built environment, [‘the what’]  
‘the final result of the construction process’
- No. 1 the different parts or elements of building, [‘the what’]  
‘parts which form in combination the building types and spaces in table 0’

- No. 2/3 'construction forms and materials' ['the how']  
 'construction forms and products (table 2) and materials (substances) (table 3) which form singly or in combination the elements in table 1'  
 No. 4 'activities and requirements'  
 'abstract concepts unlike the objects in Tables 0, 1, 2/3'<sup>9</sup>

Unlike the other three tables used in SfB, components of tables 2 and 3 can never be referred to independently. A term from both the horizontal axis 'construction form' and the vertical axis 'material' must always be used:

Table 2 *Construction Form* is never used without Table 3 *Materials*, and for this reason both tables are combined in this section as table 2/3.<sup>10</sup>

This results in two curiously abstract general categories in the table – lower case 'y' or 'Any and all materials' and upper case 'Y' or 'Products in general'. These appear at the end of each axis and must be used to index literature which is concerned with a material such as clay, but not with any one form of it, or with forms of construction such as bricks which encompass more than one material (e.g. clay, glass, concrete, etc.). Neither construction forms nor materials can be

referred to without the other. As Aristotle made clear, neither form nor matter is a substance in itself.

In its composite structure table 2/3 recalls Aristotle's formulation in Book Zeta of the *Metaphysics*:

All outputs of production can be split up, with this component and that component ... the one is matter and the other form.<sup>11</sup>

Aristotle chooses the example of the bronze sphere to illustrate his discussion:

In speaking here of matter I have in mind, say, the bronze of a statue, while by shape-form I mean the geometry of the object's appearance and by the composite the statue itself as a whole entity.<sup>12</sup>

He seems to be aware that his particular choice of example lends itself to an understanding of form and matter as separate. He points out that, unlike the case of man who is always made of flesh and bones and cannot be imagined in any other matter, in the case of a sphere it is easy to separate out form and matter because the shape 'may be imposed on bronze, on stone and on wood'. We can imagine that each of these materials is interchangeable – and could be substituted in the argument by any other.<sup>13</sup>

Material		Construction form						
		Cast in situ	Bricks, blocks	Structural units	Sections, bars	Tubes, pipes	Wires, mesh	Quilts
In formed products		E	F	G	H	I	J	K
e	Natural stone		Fe	Ge				
f	Precast concrete		Ff	Gf	Hf	If		
g	Clay		Fg	Gg		Ig		
h	Metal			Gh	Hh	Ih	Jh	
i	Wood		Fi	Gi	Hi			
j	Natural fibre		Fj	Gj	Hj	Ij	Jj	Kj
m	Mineral fibre					Im	Jm	Km
n	Plastics		Fn	Gn	Hn	In	Jn	Kn
o	Glass		Fo		Ho	Io		
In formless products								
p	Loose fill							
q	Cement, concrete	Eq						
r	Gypsum							
s	Bituminous materials							

In Table 2/3 the categories along each of the axes are placed next to each other as if they have the kind of equivalence Aristotle assumes. Along the top the ‘forms’ loosely reflect the traditional trade divisions of the specification – foundations, structure, walls and ceilings, finishes – a logic from practice that becomes inaccessible once it is abstracted into the elements here. But the categories down the side – ‘formed’ ‘formless’ and ‘agents’ – might inspire the kind of ‘wonderment’ Foucault has described in his encounter with Borges’s Chinese encyclopaedia of animals.<sup>14</sup> The building rationale behind the three divisions is hard to ascertain even if their poetry is delightful.

Although Aristotle’s bronze sphere lends itself so easily to a composite definition, the bronze it is formed out of is no less just one instance of matter than the ‘materials’ running down the vertical axis of table 2/3. It is precisely because of its specific properties that bronze exemplifies matter so beautifully – it can be formed into any shape, melted down to be reformed, and once formed it remains stable. Despite Aristotle’s suggestion that they could be substitutes, neither wood nor stone is ‘matter-like’ in the way bronze is. Stone cannot be reshaped, and wood has a history as a living thing and is shot through with ‘implicit forms’. When

bronze stands in for generic matter it is its particular properties that lend Aristotle’s argument its force.

### Specifying materials in a variety of clauses

Table 2/3 is riddled with gaps and anomalies that demonstrate the inadequacy of Aristotle’s composite structure for use in relation to building materials. The specification, on the other hand, yields a great variety of definitions of materials that might be seen as alternatives: the material as recipe or as species, for example. As Simondon noted in relation to the observer outside the workshop, who only sees what goes in what comes out, table 2/3 tends to confine its categories to object-based or static understandings of materials with very few exceptions.<sup>15</sup> Most interestingly, the specification yields two alternatives that reflect a more dynamic understanding of materials: the performance specification and what I call the ‘process-based clause’, which will be the main focus here. In addition, the form of the classification – what is described about the material and what is omitted – changes between materials, and for a material like concrete, even between the different contexts of its use. In a sense, the form of the clause is *prepared* for what it will describe, or shaped towards

Foils, papers (except finishing papers)	Foldable sheets	Overlap sheets, tiles	Thick coatings	Rigid sheets	Rigid tiles	Flexible sheets tiles	Finishing papers, fabrics	Thin coatings	Components	Products in general
L	M	N	P	R	S	T	U	V	X	Y
		Ne		Re	Se				Xe	Ye
		Nf		Rf	Sf				Xf	Yf
		Ng		Rg	Sg				Xg	Yg
Lh	Mh	Nh		Rh	Sh				Xh	Yh
		Ni		Ri	Si		Ui		Xi	Yi
Lj				Rj	Sj	Tj	Uj		Xj	Yj
				Rm						Ym
Ln	Mn	Nn		Rn	Sn	Tn	Un		Xn	Yn
		No		Ro	So				Xo	Yo
										Yp
			Pq							Yq
			Pr				Vr			Yr
			Ps				Vs			Ys

it, in a similar way in which Simondon describes clay being prepared for the brick mould. So, for example, although the materials specified in the contemporary clauses for natural stone and reconstituted stone are each to be used as external claddings and might have a very similar visual appearance, they are described in rather different ways.

F21 NATURAL STONE ASHLAR WALLING/  
DRESSINGS

To be read with Preliminaries/General conditions.

TYPES OF WALLING/ DRESSINGS

110 ASHLAR \_\_\_\_\_ .

Stone:

*Name (traditional):* \_\_\_\_\_ .

*Petrological family:* \_\_\_\_\_ .

Colour: \_\_\_\_\_ .

Origin: \_\_\_\_\_

Finish: \_\_\_\_\_ .

Supplier: \_\_\_\_\_ .

Quality: Free from vents, cracks, fissures, discolouration, or other defects adversely affecting strength, durability or appearance.

Before delivery to site, season thoroughly, dress and work in accordance with shop drawings prepared by supplier.

Mortar: As section Z21.

Mix: \_\_\_\_\_ .

Sand: \_\_\_\_\_ .

Other requirements: \_\_\_\_\_ .

Bond: \_\_\_\_\_ .

Joints: Flush.

Width: \_\_\_\_\_ mm.

Pointing: \_\_\_\_\_ .

Features: \_\_\_\_\_ . [...]

F22 CAST STONE ASHLAR WALLING/  
DRESSINGS

To be read with Preliminaries/ General conditions.

TYPES OF WALLING/ DRESSINGS

110 CAST STONE \_\_\_\_\_ .

Cast Stone Units:

*Manufacturer:* \_\_\_\_\_ .

*Product Reference:* \_\_\_\_\_ .

Absorption: As clause \_\_\_\_\_ .

Compressive strength: To BS 1217.

Cube strength:

Average (minimum): \_\_\_\_\_ .

Single (minimum): Not less than \_\_\_\_\_ .

Finish: \_\_\_\_\_ .

Colour: \_\_\_\_\_ .

Mortar: As section Z21.

Mix: \_\_\_\_\_ .

Sand: \_\_\_\_\_ .

Bond: \_\_\_\_\_ .

Joints: Flush.

Width: \_\_\_\_\_ .

Pointing: \_\_\_\_\_ .

Other requirements: \_\_\_\_\_ .<sup>16</sup>

The clause for natural stone specifies its source. It is identified by geographic origin and its geological classification. The cast stone, however, which is produced rather than simply extracted, is identified by a manufacturer and reference.<sup>17</sup> It is also defined in relation to its strength and absorption – in other words in terms of its behaviour or performance.

This variety is particularly striking in the case of concrete, which is used in so many ways in building – broken up into pieces as hardcore, mixed, poured into the ground, or into complex casts, laid as blocks and so on. For example, in the case of hardcore it is described in terms of its dimensions or gauge:

Make up to required levels under concrete beds and pavings with approved brick hardcore *broken to pass a 75 mm gauge*.<sup>18</sup>

When it is to be made up on site, concrete is defined as recipes of ingredients for specific mixes and also in terms of its consistency for handling or workability:

*Mix A* – one part cement to seven parts all-in aggregate *to pass a 38 mm sieve*

*Mix B* – one part cement to seven parts all-in aggregate *to pass a 19 mm sieve*

*The concrete shall be prepared in an approved mixer, or delivered to site ready mixed to BS 5328: 1981, with only enough water added to give a good workable mix.*<sup>19</sup>

The last clause, which refers to a British Standard, also makes it clear that concrete is subject to regulation and embedded in law.

## Describing process

In Table 2/3 the first column ‘cast in situ’ contains only one reference, to ‘concrete, cement’. It was a special condition – referring to a *process* of fabrication among all the other *objects* along the top axis. Prior to their standardization, however, specifications are full of descriptions of the processes of building. Many pages are devoted to concrete fabrication and all kinds of details appear, from the washing out of buckets to the precise ways in which strata of paint are to be applied. These ‘process-based’ clauses are particularly interesting because they have been almost entirely eradicated from the contemporary specification since their peak usage in the 1960s and there seems to be something at stake in their exclusion.

For Simondon it is precisely the *processes* through which individuation occurs which are ‘veiled’ in the hylomorphic account of a technical operation such as the forming of a clay brick. Clearly, clay is used for its specific properties and is not any matter. As

Simondon explains, if we filled the mould with sand and opened it we would still have a pile of sand, not a brick. Moreover, particular processes must prepare the clay in order that its interaction with the brick mould is possible. These processes, such as crushing the clay with rollers and grinding it into smaller pieces, only work because the clay is not already soft and plastic, as it will be when it reaches the mould. Simondon concentrates on the microscopic structure and the networks of reactions taking place. These allow him to reconceive the mould as a limit condition to an energetic transformation, rather than the imposition of form on a passive clay, and to think of the clay in terms of its singularities and implicit forms – in the way we might imagine a material like wood has its own knots and grain. He takes seriously processes as things in their own right, which individuate by making relations between different orders:

The method would encourage, on the one hand, a refusal to construct the essence of a given reality by means of a *conceptual* relation between two imposed terms, and on the other, a consideration of any veritable relation as something existing in its own right.<sup>20</sup>

### The process-based clause

Simondon's demonstration of the inadequacies of the form/matter model for an account of brick production is pertinent to another use of the mould: concrete fabrication – the special condition in Table 2/3. Concrete specifications (at least, pre-standardisation) reveal

another story – there the processes of form-taking are rendered in great, even loving, detail.

The clauses of the specification that describe concrete casting in rigid formwork reveal the minute details of the techniques that are used to ensure precisely that casting *appears* to take place in the terms of the hylomorphic schema. The two buildings I shall look at here are, in the rhetoric of architectural styles, supposed to represent rather different approaches to concrete casting: the smooth white concrete of modernism and the raw *béton brut* of brutalism. Alison Smithson, a leading architect of the brutalist movement, for example, said of modernist building that it was 'not built of real materials at all but some sort of processed material such as Kraft cheese: we turned back to wood and concrete, glass and steel, all the materials which you can really get hold of.'<sup>21</sup> At the detail of process, however, both approaches seem equally concerned with making concrete in such a way that it *seems* to reproduce 'matter'.

The first specification is for a modernist house at Farnham Common designed by Val Harding with Tecton in 1934–35<sup>22</sup> and built using reinforced concrete (below and over). The section for the Concretor is the longest, perhaps because it was still an unfamiliar technology – or perhaps because the architect was so enchanted with it. But a close reading reveals the degree of care involved in making sure that the cast walls conform as closely as possible to the perfect lines of the rigid formwork. For example, the formwork must not deform when the concrete is poured:



F.R.S. Yorke, *The Modern House*, Architectural Press, 1946

## FORMWORK

106. Form work must be erected true to line; be properly braced and of sufficient strength to carry the dead weight of the concrete with any constructional loads *without excessive deflection*.<sup>23</sup>

And the external concrete walls were to be polished, 'rubbed down with a wood float *and sanded till perfectly smooth*' after casting:

## EXTERNAL FINISH

111. The shuttering for the external surfaces of all walls, reveals, copings, soffits and fascias must be perfectly smooth. As soon as the shuttering is struck and while the concrete is still green the above mentioned surfaces must be rubbed down with a wood float *and sanded till perfectly smooth*. On no account must a cement grout be used.<sup>24</sup>

What we see here are the details of those processes used to make concrete appear *as if* it is amorphous matter that can be formed perfectly into the orthogonal shapes of the architect's modernist concept.<sup>25</sup>

AGGREGATE.	94. The cement shall be stored in such a manner that it will be efficiently protected from moisture and the consignments can be used up in the order in which they are received.
	95. No cement which has become damaged in the storage shall be used in the work, and all lumps must be removed.
	96. The aggregate shall be composed of hard stone or ballast, free from clay, dirt or other deleterious matter. It shall pass through a $\frac{3}{4}$ inch screen and be thoroughly graded from coarse to fine.
	97. The aggregate shall not be composed of flat or flaky materials.
	98. Coal residues, such as coke breeze and clinkers, shall not be used for reinforced concrete work unless specifically approved in writing by the Architects or Engineers.
WATER.	99. The aggregates to be used are presumed to be of a nature and quality necessary for the production of concrete which will give a crushing strength of not less than 3,000 lbs at the expiration of three months. When the concrete, made from such materials, is exposed to the weather or has to retain water, the materials shall be of such a nature that the concrete will resist the passage of water. All concrete materials supplied shall be subject to the approval of the Architects or Engineers.
	100. The water shall be fresh water, clean and free from organic impurities.
PROPORTIONS.	101. That portion of the aggregate which is retained on a $\frac{3}{4}$ inch screen shall be termed "coarse aggregate" and that portion which passes a $\frac{3}{4}$ inch screen shall be termed "fine aggregate".
	102. The 1 : 2 $\frac{1}{2}$ : 5 concrete shall be composed of 1 part cement, 2 $\frac{1}{2}$ parts sand and 5 parts coarse aggregate.
	103. The 1 : 2 : 4 concrete shall be composed of 1 part cement, 2 parts sand and 4 parts coarse aggregate.
	104. The materials shall be measured in vessels or containers of a nature which make reasonably accurate measurements possible.
FORM WORK.	105. The Contractor may, or shall if called upon, vary the proportion of fine to coarse aggregate with a view to obtaining the densest mix, provided the amount of cement per cubic yard of concrete in position is not reduced.
	106. Form work must be erected true to line; be properly braced and of sufficient strength to carry the dead weight of the concrete with any constructional loads without excessive deflection.

13.

The specification for the Elfrida Rathbone School for the Educationally Subnormal (right) designed by John Bancroft for the LCC in 1961 and built 1963–64 describes how the marks of the timber shuttering were to be left in the exposed concrete walls of the raised assembly hall. While we see a very similar clause for building the formwork, it is stressed that the concrete *must not* be rubbed down in this case, or the timber tracery would be lost:

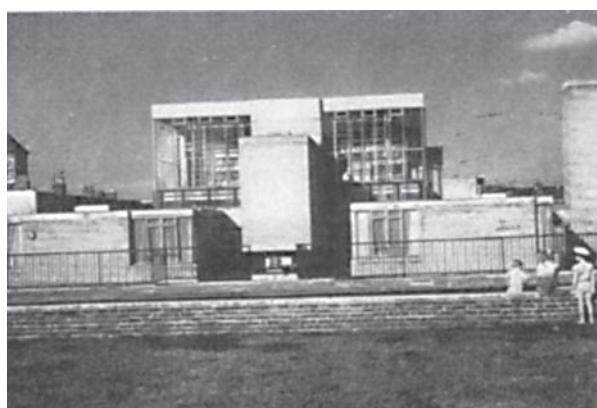
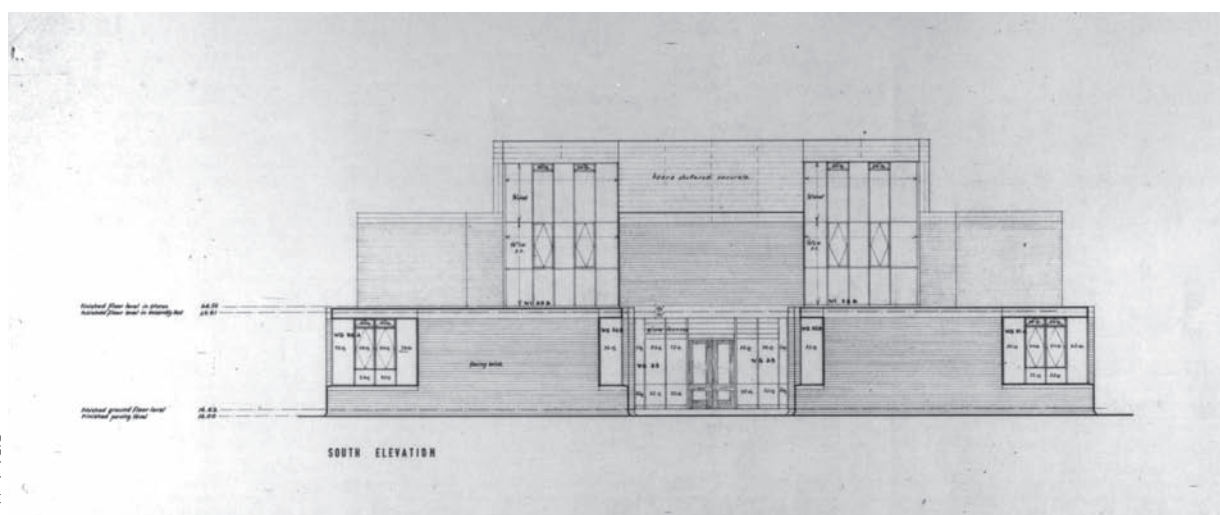
C14. Where concrete beams, slabs, etc. are shown on the drawings be a shuttered concrete finish, the Contractor's attention is drawn to the very high standard of accuracy, consistency and finish of concrete that will be required. *The greatest care will be called for in formwork*, mixing and placing of concrete, positioning of construction joints, removal of shuttering, etc. and the Contractor will be deemed to have allowed for this in his tender. *No rubbing down or making good will be allowed after removal of the shuttering to any of these surfaces. The resulting concrete surface is to be free of any honey-combing, cavities, pitting and any imperfections not the result of the texture of the concrete*.<sup>26</sup>

Nor must it exhibit any irregularities. While this method of concrete casting is supposed to be more 'honest', because it registers an aspect of its fabrication, what is particularly striking is that the architect edits other parts of the process from the finished product. While he insists that the grain of the shuttering is inscribed into the finished wall, traces of the boltholes must disappear:

## C14A FORMWORK AND MOULDS

... Formwork is to be erected true to line and to the profiles shown. Where a shuttered concreted finish is indicated *the formwork shall be so designed to produce the formwork patterns shown on the drawing and shall be of rough sawn, clean new timber with a pronounced grain all to the approval of the Architect... Boltholes will not be allowed in any finished surfaces*.<sup>27</sup>

Thus the architect ensures that only the timber shuttering will determine the appearance of the concrete. Other aspects of fabrication are censored. At the level of these tiny details we see how the formwork must appear to impose form, both at the scale of the whole piece, and at the scale of its texture, where the grain of another material forms the surface of the concrete whose own variegations and implicit forms



– swelling, sweating, the texture of the aggregate – are rendered invisible, and also how the concrete must appear to behave like matter.

## Specifying in practice: from process to performance

During the 1960s the RIBA specifications panel began working towards the standardization of the specification that was finally published in 1973 as the National Building Specification, with a structure that was in part developed from the object-based categories of the SfB system.<sup>28</sup> According to one of the members of the team who developed the NBS an explicit aim was ‘to describe “work in place”, i.e. the finished result rather than the process of achieving it.’<sup>29</sup> The process-based clause has almost entirely disappeared from the NBS, and with it to a large extent the architect’s access to the processes of building. The specifiers I have spoken to report that these changes are leaving contractors in greater control of the selection of materials, and increasing the difficulty of specifying materials or ways of building that are outside industry norms. In fact, the current digitized NBS offers a drop-down menu of material choices that is extremely laborious to override. In addition the processes involved in building

materials – labour, transportation, extraction, production and so on – disappear from view.

To return to Simondon's image, the disappearance of the process-based clause leaves the architect once more outside the workshop, in a position where the technical operation appears to take place according to the hylomorphic schema, and building materials can be understood in terms of matter. A first conclusion might be, then, that the kinds of clauses in use in the specification influence the ways materials are conceptualized; and the extent to which they mirror the hylomorphic schema or construct alternatives to it can also be seen to depend on developments in the broader contexts of the industry.

For Simondon ‘the forgetting of process’<sup>30</sup> is, as we have seen, the losing sight of the specific processes and contexts that set up the circumstances in which a material can take part in a technical operation. Thus, looking at a clay brick in the terms of the hylo-morphic schema, we see only homogeneous matter and the imprint of form, not the ‘historical singularities’ through which the brick came into being:

The dominance alone of the techniques applied to materials rendered plastic by preparation can ensure to the hylomorphic schema an appearance

of explanatory universality, because this plasticity suspends the action of historical singularities provided through the material.<sup>31</sup>

On the one hand, hylomorphism and the forgetting of process are a particular way of understanding the world; on the other, Simondon seems also to suggest here that certain techniques of fabrication are able to reinforce the schema. A second conclusion might therefore be that, as we have seen in the two examples of concrete rendered matter-like through techniques of casting and finishing, the schema is physically reproduced and thus naturalized. If the apparent realization of the schema contributes to its conceptual dominance, then it is perhaps only at the level of process that the intricacies of the technical operation can be visible.

I want also to suggest a third more tentative conclusion. What is particularly interesting about the various kinds of definitions of materials in the specification is that they cannot easily be applied equally to all materials and all instances of the uses of materials. Even in the object-based categories of 'construction forms' in Table 2/3, a special column had to be made for concrete produced on site. If certain forms of definition suit certain kinds of materials, then we can see that their disappearance or dominance in the specification may also have productive effects on the kinds of materials used, and even on the development of new materials. Even timber, a favourite example for materialist philosophers who want to demonstrate the singularities of material,<sup>32</sup> has by now been 'rendered plastic by preparation'. The 'matter-ization' which might seem more natural to a material such as clay is clearly produced in a material such as MDF, which transforms the detritus of large-scale timber production into a material which is homogeneous, uniform and capable of being formed (not just cut) into any shape from sheets to cylinders. Materials like these can be easily described in the terms of abstracted matter, in the numerical and divisible terms of quantity which Marx associated with the specific materials used for money:

Only a material whose every sample possesses the same uniform quality can be an adequate form of appearance of value, that is a material embodiment of abstract and therefore equal human labour. On the other hand, since the difference between the magnitudes of value is purely quantitative, the money commodity must be capable of purely quantitative differentiation, it must therefore be divisible at will, and it must also be possible to assemble it again from its component parts. Gold and silver possess these properties by nature.<sup>33</sup>

It may come as no surprise, then, to discover that the form of clause on the ascendancy in the architectural specification is the one that describes materials in precisely these terms. The performance clause, of which we saw some examples in the specification for cast stone, describes the behaviours of materials in numerical terms – as in this example of a recent specification for glass.

#### H10 PATENT GLAZING

##### 371 HEAT CONSERVATION

Average thermal transmittance (U-value) of patent glazing: \_\_\_\_\_

##### 391 SOLAR AND LIGHT CONTROL

Glazing panes/units: Must have:

Total solar energy transmission of normal incident solar radiation (maximum): \_\_\_\_\_ .  
Total light transmission (minimum): \_\_\_\_\_ .

##### 401 THERMAL SAFETY

Glazing panes/units: Must have adequate resistance to thermal stress generated by orientation, shading, solar control and construction.

##### 411 ACOUSTIC PROPERTIES

Sound transmittance: Minimum weighted sound reduction index (Rw) within 100 to 3150 Hz frequency range to BS 5821-3:

\_\_\_\_\_.  
Location: \_\_\_\_\_.<sup>34</sup>

If the 'forgetting of process' enables us to imagine clay as generic matter and to overlook the specific processes and preparations that allow it to take part in a particular interaction, the performance specification describes material without reference to *any* specific kind of material. As such, it is a particularly apt form of definition for homogeneous, matter-like materials and, in practice, allows a contractor to choose any material that fits the performance criteria. Yet despite this, the performance specification is no purely functional 'description'; it develops out of specific material and has enormous implications and effects.

A peculiarity of Simondon's account is that he limits his understanding of process and 'historical singularities' to the physical operations of form-taking and excludes the social, political and economic processes that also produce the technical operation and the way it is conceptualized. In examining the eradication of the process-based clause and the ascendancy of the performance-based clause we cannot ignore these processes. The clauses of the specification are a site where relationships between concepts of materials, the forces of production and the production of materials can be examined. Whether we stand outside the workshop or 'go into the mould' is determined by more than the kinds of concepts at our disposal.

## Notes

- Thanks to Adrian Rifkin and Peter Osborne for advice and enthusiasm, and to the many specifiers who have discussed their practice with me, particularly Colin McGregor, Martin Mulchrone and Jim Randall.
1. Gilbert Simondon, *L'individu et sa Genèse Physico-Biologique*, Press Universitaires de France, Paris, 1964, p. 40.
  2. Ibid., pp. 40–41.
  3. Katherine Shonfield's wonderful piece on the cavity wall is a rare exception. Katherine Shonfield, 'Why Does Your Flat Leak?', in *Walls Have Feelings*, Routledge, London, 2000.
  4. Mr Rosenberg, *Specification for work at No. 5, Fairhazel Gardens, N.W.6*, 1934–5, RIBA Archives, SaG/17/7.
  5. Andrew Benjamin, 'Plans to Matter: Towards a History of Material Possibility', in Katie Lloyd Thomas, ed., *Material Matters: Architecture and Material Practice*, Routledge, London, 2007.
  6. Nicholas Coetzer, 'Between Birds' Nests and Manor Houses: Edwardian Cape Town and the Political Nature of Building Materials', in Lloyd Thomas, ed., *Material Matters*, p. 191.
  7. For an excellent account of this separation, see particularly Alberto Pérez-Gómez, *Architecture and the Crisis of Modern Science*, MIT Press, Cambridge MA, 1983.
  8. See L.M. Giertz, *SfB And Its Development 1950–1980*, CIB/SfB International Bureau, Dublin, 1982, pp. 5–6.
  9. Table 2/3 and the definitions of each of the other tables are taken from the section openers in the *Construction Indexing Manual*, RIBA Publications, London, reprinted 1969. The distinction between 'the what' (building elements, such as car parks, assembly halls, or ceilings) and 'the how' (components of constructing that building and those parts) was another of SfB's aims and is discussed in Giertz, pp. 8–9, from where I have taken the 'what' and 'how' categories.
  10. *Construction Indexing Manual*, p. 63.
  11. Aristotle, *Metaphysics*, trans. H. Lawson-Tancred, Penguin, London, 1988, p. 194.
  12. Ibid., p. 174.
  13. Ibid., p. 207.
  14. 'In the wonderment of this taxonomy, the thing we apprehend in one great leap, the thing that ... is demonstrated as the exotic charm of another system of thought, is the limitation of our own, the stark impossibility of thinking *that*.' Michel Foucault, *The Order of Things* (1966), Tavistock Publications, London, 1974, p. xv.
  15. The first column, 'cast in situ' (which I will return to), concerns fabrication or 'process', and a number of columns contain a definition of what the material is to do – 'protective materials', 'fixing, jointing agents', 'structural units', or, in other words, how it is to perform.
  16. NBS, *National Building Specification: Standard Version (Update 38)*, RIBA Enterprises, London, 2004, F21, F22.
  17. John Gelder, NBS Content Development Manager, makes a distinction – which I have not followed – between *materials* which can be used in any way (such as natural stone) and *products* (such as cast stone) which are produced for an intended function in the building industry. Email correspondence with the author, 17 January 2005. For Marx 'raw materials' have already 'undergone some alterations by means of labour' in becoming commodities and the distinction in Gelder's terms is not a valid one. 'Hence,' Marx writes, 'we see that whether a use-value is to be regarded as raw material, as instrument of labour or as product is determined entirely by its specific function in the labour process, by the position it occupies there: as its position changes, so do its determining characteristics.' Karl Marx, *Capital*, Volume 1, trans. B. Fowkes, Penguin, London, 1990, p. 289.
  18. Jack Bowyer, *Practical Specification Writing*, Hutchinson, London, 1985, p. 55.
  19. Ibid., p. 57.
  20. Gilbert Simondon, 'The Genesis of the Individual', trans. M. Cohen and S. Kwinter, in *Zone 6: Incorporations*, ed. S. Kwinter and J. Crary, Zone, New York, 1992, p. 312.
  21. Interview with Alison Smithson, *Zodiac* 4, 1959, p. 64, cited in Andrew Higgott, *Mediating Modernism: Architectural Cultures in Britain*, Routledge, London, 2007, p. 92.
  22. For details of this building, see Jeremy Gould, *Modern Houses in Britain 1919–1939*, Society of Architectural Historians of Great Britain, London, 1977, and *Architectural Review*, October 1935, pp. 123–6.
  23. Valentine Harding, *Specification of Works required to be done and materials to be used in connection with erection and completion of a House at Farnham Common, Near Slough, Bucks, for Valentine Harding, Esq, April 1934*, RIBA Archives SaG/17/3, p. 12.
  24. Ibid., p. 14.
  25. There are two curved walls in the Harding house but they are constructed from blockwork – not concrete – and rendered with a thick plaster.
  26. Ibid., p. 31.
  27. *Specification for the Works at the Elfrida Rathbone School for the Educationally Subnormal*, 1961, RIBA Archives LCC/AD/1, p. 13. The school, in South London, was designed in 1961 and built in 1963/4. It was designed by John Bancroft at the LCC, who went on to design the better known Pimlico School. For more details, see John Bancroft, 'Health, Power and Pleasure', *RIBA Journal*, April 1973, pp. 192–3.
  28. My narrative of the standardization of the NBS has been traced in part from journal articles and correspondence with Colin McGregor, who has worked on the NBS since its preparation, but in the main from the collection of papers from various committees held by the RIBA archive; RIBA/STECH.
  29. Colin McGregor, email to the author, 6 March 2006.
  30. Alberto Toscano cites this phrase from Isabelle Combes's commentary on Simondon's work in *The Theatre of Production: Philosophy and Individuation between Kant and Deleuze*, Palgrave Macmillan, London, 2006, p. 142.
  31. Simondon, *L'individu*, p. 59.
  32. See, in particular, 'Meaning is Force', Brian Massumi's wonderful account of a woodworker making a table in which he recasts the technical operation in terms of 'an encounter between lines of force'. Brian Massumi, *A User's Guide to Capitalism and Schizophrenia*, MIT Press, Cambridge MA, 1992, pp. 10–21. Simondon also discusses wood, pointing out that it is treated as homogeneous when it is cut 'abstractly' by mechanical saw 'according to a geometric plan', but also as having 'implicit forms' – its grain, undulations, knots and so on – when it is split with a wedge and follows the fissure. Simondon, *L'individu*, p. 57.
  33. Marx, *Capital*, Volume 1, p. 184.
  34. *National Building Specification*, H10.