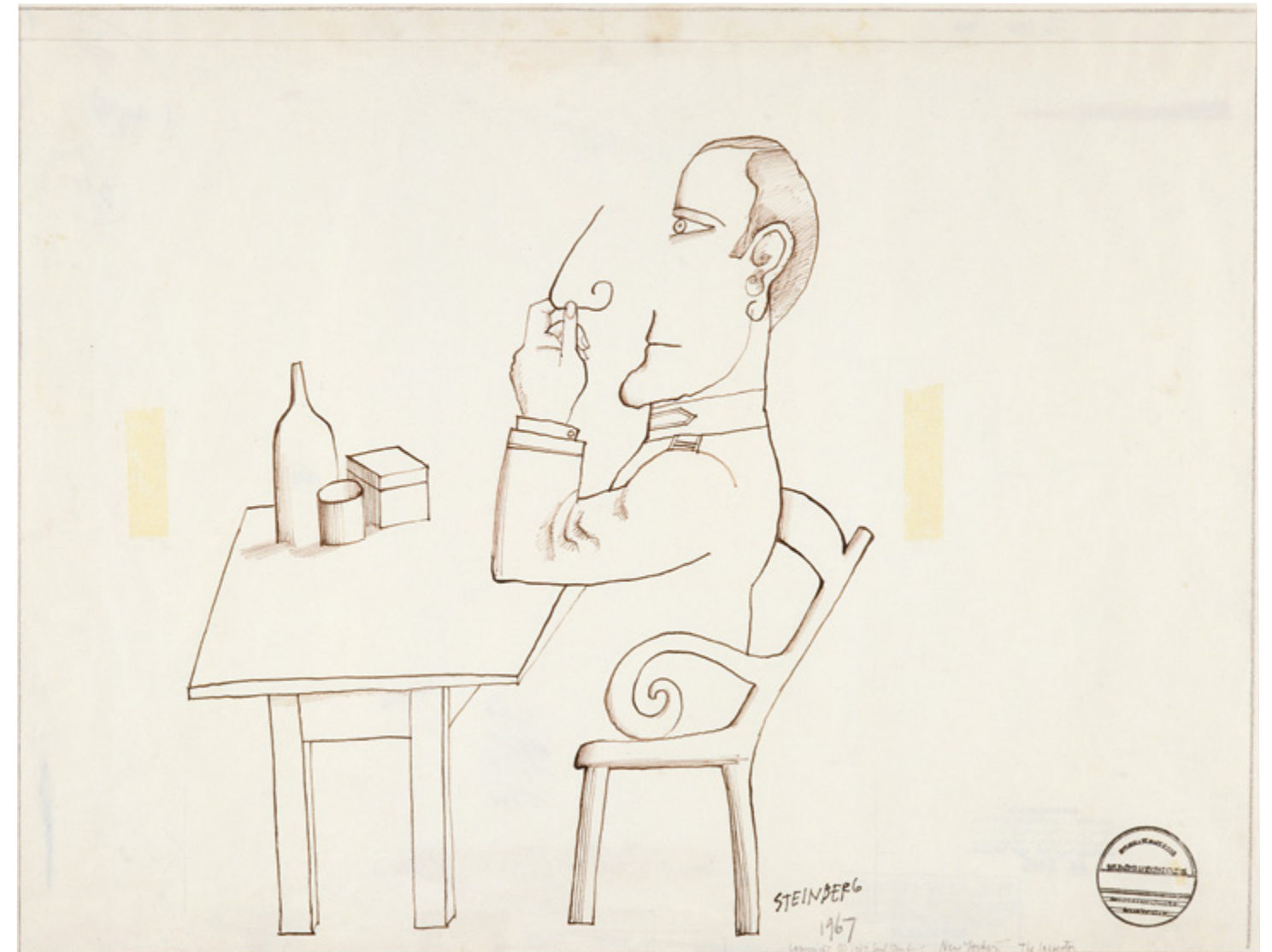


Epilogue

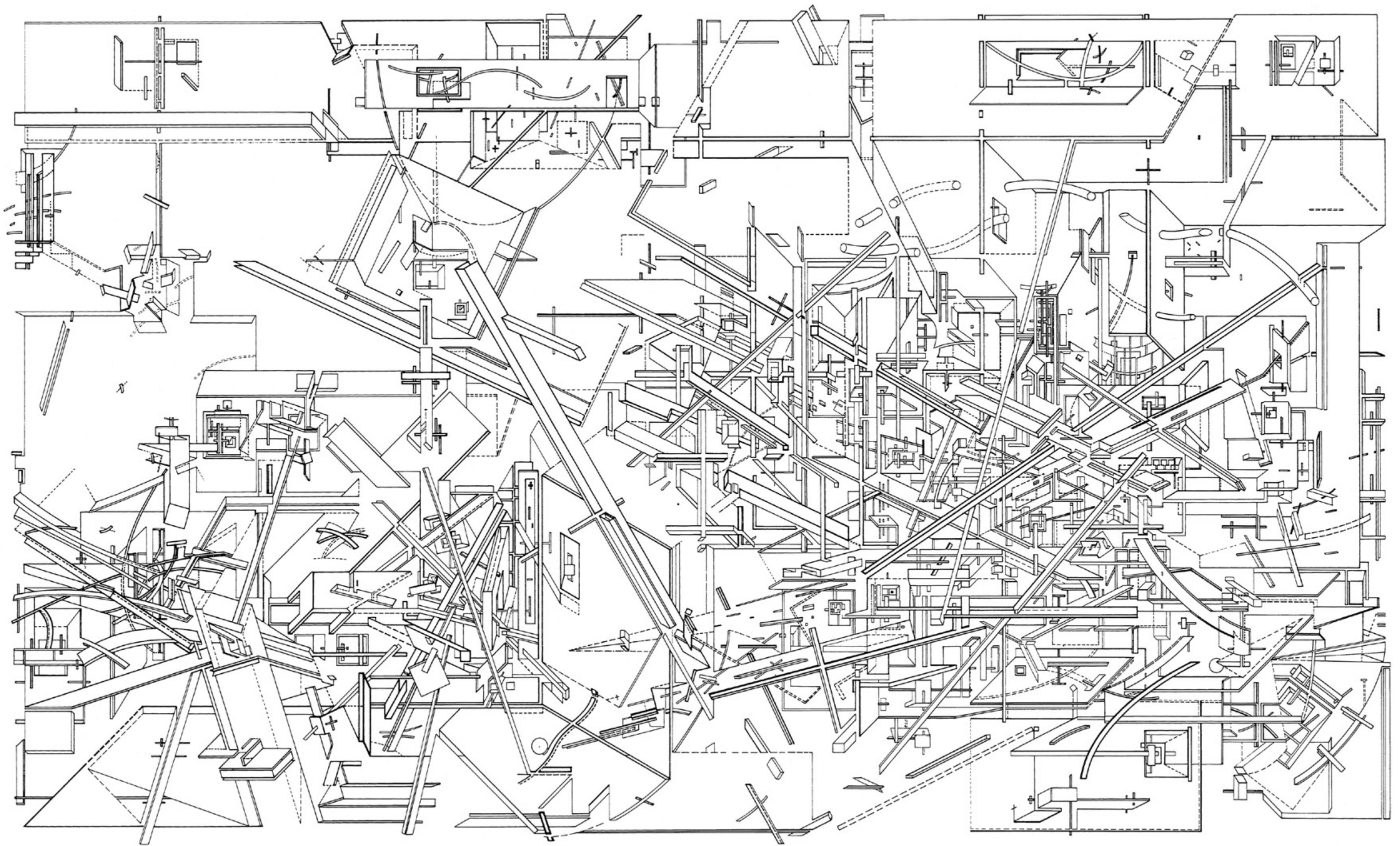
The Limits of Drawing

Architectural drawings are more often talked about for their successes than their failures. While this is no surprise, what is curious is that, with one principal exception, the limitations of architectural drawing have been so little acknowledged – the exception being all the problems arising from the projection in two dimensions of things that exist, or will exist, in three. Although the consequences of the reduction of three dimensions to two have been very extensively discussed¹ – so extensively that we will not say anything more about it here – it is by no means the only shortcoming of the medium. If the other limitations have been little talked about, that is not to say that architects have been unaware of them.² There are many drawings that betray signs of the authors' frustration with the medium; sometimes this has resulted in disappointment, but there are plenty of instances of architects exploiting the limitations, turning them into a source of pleasure and of delight. We thought, therefore, that it would be productive to explore some of these recurring limitations by looking at the evidence from drawings themselves to see how architects have responded to them, played with them or used them strategically.

In approaching the question of the limits of drawing, it is worth considering whether the limitations encountered in architectural drawing are particular to this specialised branch of drafting or are common to drawings of all kinds. Architectural drawings are like other sorts of drawings in that they can be seen as materialisations of the workings of thought;³ they may themselves generate thoughts; or they may be a record of something perceived.⁴ All these functions are widely acknowledged in drawing practice. Yet, there are ways in which architectural drawings are not like the drawings of artists. Whereas artists tend to regard drawings as ends in themselves (even drawings that are preparatory to a work in a different medium are generally treated by artists as 'works' in their own right), architectural drawings are more instrumental, mostly produced *for* someone – for a client or a public,



Saul Steinberg
The Nose (1967)
Ink on paper
490 × 620 mm (19 1/4 × 24 3/8 in)



for a builder or for the architect himself. Discussions around the success or failure of architectural drawings mostly revolve around how well, or badly, they serve one or more of these recipient's purposes. For the architect, they may be the means to generate, to investigate or to test out an idea. In relation to third parties, patrons or the public, their task is, generally, to persuade. For contractors, their purpose is to instruct, putting a premium on precision (recall Lutyens's remark, 'a drawing is a letter to a builder').⁵ There are, though, just as with the drawings of artists, exceptions to this distinction between drawings made for their own sake and those made for some ulterior purpose. The drawings produced by Peter Eisenman, John Hejduk, Daniel Libeskind, Superstudio and others in the 1970s and 1980s all aimed broadly to curtail the Albertian paradigm, wherein 'architecture' comprised the procedure of making buildings from drawings prepared previously. Instead, Eisenman et al. set out to detach drawing from building, and to concentrate architecture solely within the practice of drawing. Their novel *modus operandi*, which borrowed explicitly from the practice of conceptual artists, narrowed the distance between artists' drawings and architects' drawings. The results could not be judged successes or failures by reference to any communicative function, and so were immune to the sorts of critique that had customarily surrounded architectural drawings.⁶ But these cases, interesting though they are, remain on the margins of architectural practice; most architectural drawings continue to be instrumental.

Another difference between artists' drawings and architectural drawings is the extraordinarily high wastage rate of the latter – most end up in the bin. This is because architects habitually use drawings to investigate architectural problems, drawing and redrawing the same thing over and over again until they are satisfied with the result. A not untypical example is the 900 plus drawings made by Louis Kahn and his office between 1965 and 1969 for the unbuilt Dominican Motherhouse near Philadelphia. Unusually, these drawings, which show the same project repeatedly redrawn, have survived – though even these survivors are probably only a fraction of the total number of drawings produced in the course of the project.⁷ Or, to take another example, Álvaro Siza's sketchbooks contain sometimes up to 50 almost identical sketches of the same aspect of one project. And some architects make a point of *not* keeping the drawings produced during a working session.⁸ Such a high level of redundancy might lead us to describe all the drawings prior to the final solution as failures. Yet if they are failures, it is not as a result of any deficiency in the medium but rather a result of architects' particular way of working, of using drawing as a means

of exploration. The sorts of limitation that we are looking for in drawings are not born out of this procedure.

So closely identified is the practice of architecture with drawing that architects tend not to acknowledge that something they want to put their hand to might be incapable of being drawn. Artists, on the other hand, whose occupation is not so exclusively invested in drawing, can afford to be more relaxed about this, relatively indifferent to the risk of a drawing's failure. Indeed, there is a long history of failure within art practice – of artists taking failure as the subject of their work, consciously using it as a generative agent.⁹ When the artist Lee Lozano produced a work entitled *Idea That Cannot Be Drawn* (1968), it posed no threat to her credibility as an artist. For architects, though, still today, *the* question is always 'Can you draw it?' To admit that something might not be capable of being drawn tends to be seen as an admission of defeat – and a threat to the foundations of architecture as we know it. The remark of the 19th-century French architect J.N.L. Durand, 'drawing is the natural language of architecture,' still resonates, making architects disinclined to acknowledge that there might be architectural ideas that are beyond the capacities of this particular medium, and generally reluctant to explore the limits of drawing.¹⁰ The misapprehension that anything can be drawn, frequent among students of architecture, should not lead us to suppose that drawing has no limits.

The Metalanguage of Drawing

Drawings that highlight drawing's own specificity often also draw attention to drawing's limitations. Especially since the 20th century, artists have made drawings about drawing. Think, for example, of Paul Klee – but some of the best examples are the drawings of Saul Steinberg, in which a line abruptly stops being a nose and becomes just a line, or a body turns out to be no more than the surface of the paper: these drawings refer to the metalanguage of drawing, the conventions by which we are able to read and make sense of drawings. Conventional architectural drawings rarely go in for these kinds of references to the medium itself, presumably because it would be considered too confusing.

There is already quite enough ambiguity in architectural drawings through the reduction of three dimensions to two, so, it might be said, there is no need to increase their ambiguity still further by making them into a commentary on the medium. But there are some exceptions. Daniel Libeskind's 1979 *Micromegas* drawings used the conventions of architectural representation to create a kind of spatial chaos that stood no

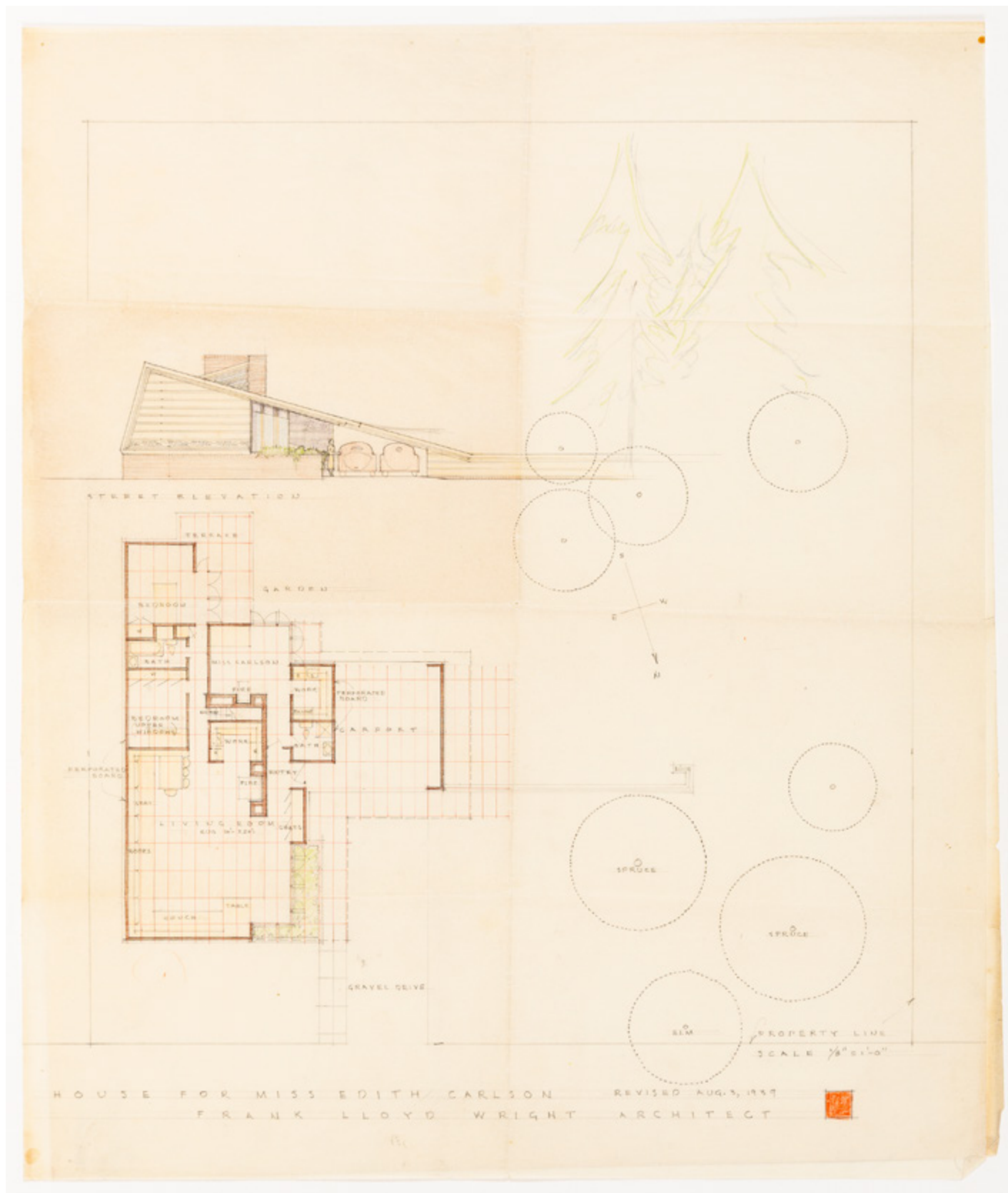
chance of being realised as buildings. Although their purpose seems to have been to abort the Albertian paradigm, whereby drawings are preludes to buildings, their means was confusion in the metalanguage of architectural drawing. Albeit with different motives, feminist architects have taken issue with drawing conventions – with the ways in which a single author is assumed, with the manner in which drawings seem 'voiceless' or with their failure to capture the immaterial and the bodily – with, in Katie Lloyd Thomas's words, 'orthography's use of an ideal line, its attention to rigid boundaries, or its power to appear objective, a-social and a-historical.'¹¹ In other cases, architects have mixed different conventions within a single drawing: Peter Wilson's Clandeboye drawings, for example, combined orthogonal projections of the proposed follies with Japanese-style brush and ink for the landscapes. While the results draw attention to the implications of alternative drawing techniques, with a consciousness of the effects of their combination, this is not quite the same as making drawings that are provocations to the very conventions on which drawings rely.

The Fixity of Drawing

Drawings may facilitate thought, and their abilities to fix a thought and to gain precision over how something is to be made are well recognised. But the fixity of drawing can work against the architect. There are occasions when architects have refused to make drawings, or made ones that were deliberately obscure, in order to retain control over the building process. A reluctance to surrender to the category of drawing is not uncommon. In 1939, Edith Carlson, a librarian living in Wisconsin, asked Frank Lloyd Wright to design a house for her. Following some consultation, Wright provided a set of drawings, in response to which Carlson made a number of suggestions that she, with good reason, expected to be incorporated into the final scheme. After several requests to Wright's office for the revised drawings, his long-suffering assistant Edgar Tafel wrote back to Carlson:

I do not want to seem like an old codger, but in my seven years of experience with Mr Wright, there has never been any evidence that Mr Wright is 'finished' with a set of plans. In organic building, ideas grow from ideas, and if the architect is not awake to these ideas with these plans during their making, and during construction, the house, your house, becomes static and dead. This spirit has permeated all of Mr Wright's works, and if your house goes ahead, it will be Mr Wright's number 204.¹²

Frank Lloyd Wright
 Ground plan and street elevation of 'Below Zero'
 house, for Edith Carlson (1939)
 Pencil and coloured crayon on tracing paper
 1050 × 440 mm (41 3/8 × 17 3/8 in)



Miss Carlson's circumstances changed, and the house was not built, but the episode shows an architect's wariness of drawing as a risk to a premature solution.

A rather different mistrust of drawing comes out of the architect Oscar Niemeyer's account of his working method:

The essential moment in architecture is when the idea comes about. When that happens, I follow a quite peculiar work process: when I have an idea, and I start addressing a problem, I first check what are the local conditions, the economic possibilities, all that... Then I start drawing. And when I reach a solution that I like [that I'm pleased with], I then move on to writing a text, an explanatory text, because if I cannot find good arguments when writing this text, I then return to the drawing board.¹³

In this procedure, if it is to be believed, we have a curious reversal of Alberti's well-known justification for drawing as a means of testing out an idea previously conceived in the mind. Instead, in Niemeyer's account, it is the drawing itself that has to be tested, by writing a text. Or – going further – here, the practices of drawing and writing assume a complex interdependent function in the process of design, with ideas being developed over time through their back-and-forth articulation via both mediums. In this case, the drawing is not an obstacle to producing the work of architecture but is seen as unreliable, a medium that can trick us into believing in the merit of a scheme unless verified through some other medium.

A different situation arises when the drawing obstructs not the architect but the builder. According to his former assistants, Eva Prats and Ricardo Flores, the Spanish architect Enric Miralles would send to the construction site drawings that were deliberately obscure. Although these drawings – often with plans, sections, elevations and details on a single sheet – have a superficial clarity and precision, it is very difficult to understand the relationships between their various parts. The uniform line weight, the variations in scale on a single sheet and the absence of text to identify what the various elements refer to make them impossible to interpret: they are hieroglyphs. So indecipherable are these drawings that the builders could not translate them without the help of the architects. All this was intentional, as a way of stalling work on the site and giving the architects time to change things while the building was in process without anyone noticing; the drawings allowed them to retain control over the building in the course of construction. Prats says that other architects were astonished that the office was sending out drawings of this kind,

and Flores conceded that this was a most unusual procedure, contrary to all the conventions of construction; the drawings 'made everyone nervous, except you' – the architect.¹⁴ Miralles's practice might make us ask whether it is appropriate to talk about the 'success' or 'failure' of drawings: drawings that were manifestly a failure in providing constructional information were, on the other hand, a success from the architects' point of view in enabling them to delay decisions about the building's form until long after construction had begun.

Limitations of Communication

Few architects have exploited the limitations of drawings quite so brazenly as Miralles. It is more common for architects to find themselves handicapped by drawing – and we can distinguish between those cases in which the limitations of drawing have obstructed communication with others and those in which they have interfered with, or inflected, an architect's self-expression. In either case, recognition of the limitation, and the need to find a way around it, has sometimes led to improvisation and to results that could not have been foreseen.

To look first at limitations of communication, a particularly vivid case comes from the work of the 19th-century British architect Philip Webb. Among many detail drawings for Clouds House in Wiltshire produced between 1876 and 1886, there is a drawing, dated 8 July 1884, for a length of decorative carving for the high-level frieze in the main hall. Above the immaculate full-scale drawing – which, like all Webb's drawings, he had produced himself – there is a long text, and next to it a small sketch. The text starts by referring to this small sketch:

Notes on the carving. This sketch has been made thus particularly to indicate the effect intended: the carving will be seen at its greatest distance from the eye of 28 feet and its nearest 18 feet, so that the carving must be done very vigorously and even rudely done but not coarsely. The soft gradations shown on this drawing, except as an aid to the effect desired from the distance, will not be necessary, indeed the labour of doing it would be worse than wasted, but in a drawing there was no other way of indicating the effect to be produced in the carving... The carver will necessarily use his judgement to get the effect in his ways of the intention of the drawing. To get the effect, as little laborious work should be done as possible: sharp gougings and trenchant channelling, after the faceting is rightly set out, should be employed,

and the chisel marks only softened by the tool and not in any way smoothed down, but none of the veining and other indications on the drawing to be lost sight of. In repeating the pattern no absolute match is wanted, so long as the general size, form and character are maintained.¹⁵

What is so extraordinary about this is that after all the effort of making the rendered drawing, Webb admits that it is useless and is to be disregarded. The little rough sketch at the top communicates better what he wants, but even that fails to indicate the way of carving that he has in mind. The paradox is that Webb, who was generally disparaging about architects' drawings (he instructed that all his own were to be destroyed at his death, a request his executors failed to observe), nonetheless persisted in producing outstandingly elegant examples while being well aware of their shortcomings. For an architect so invested in the craft of building, drawings as a medium were too reductive to communicate the variability looked for in artisanal labour. The solution here was to revert to language and, as he might have preferred anyway, to talk to the craftsman.

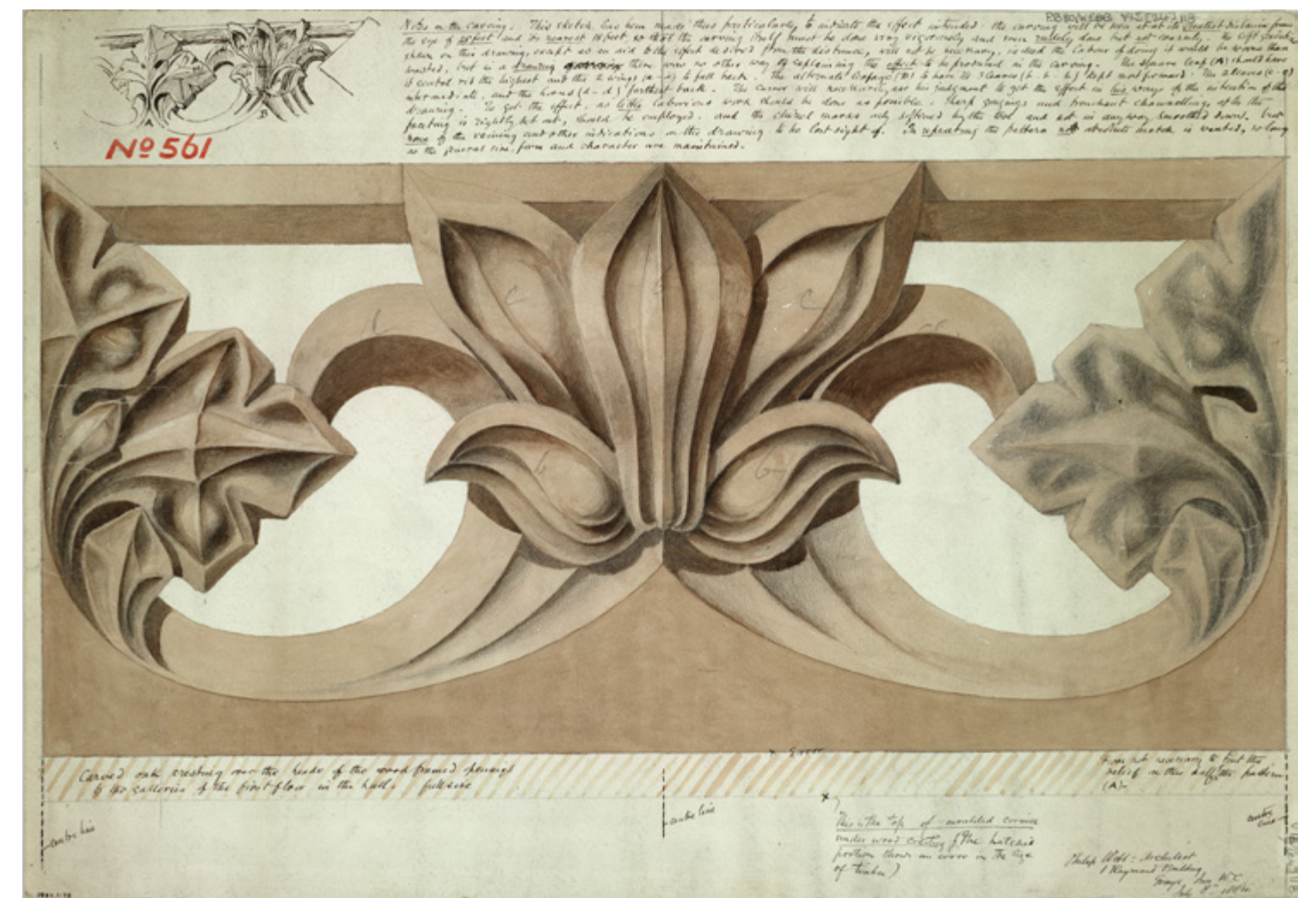
In building construction, drawings are meant to reduce risk, to stop things from going wrong. The less trust there is between designer and maker, the more work drawings have to do (Webb was not, it would seem, altogether confident in his wood-carver). But when there is a high degree of trust between architect and builder, drawings take on a rather different role, not so much reducing risk as increasing the possibilities for it. In these circumstances, the definitiveness and precision of drawing, the qualities for which it has been traditionally valued, become a limitation. Such a case occurs with the series of around 300 villas built along the coasts of Sardinia in the 1960s and 1970s to the designs of Alberto Ponis. For the earliest villas, the laxity of building control meant that the architect could get away without submitting plans for building permission until long after the houses were completed. The only drawings needed were for the builders, with whom Ponis had very close and understanding relations. The distinctive feature of these drawings is that, in certain respects, they are extraordinarily vague. Ponis's drawings are of three kinds. The first are of the terrain, and in these, as Jonathan Sergison remarks, Ponis is 'drawing the rocks more intently than the building itself', which is usually no more than a white shape.¹⁶ The second kind of drawings are those produced for the contractor, and these show the house, or fragmented parts of it, in the terrain. These do not, at least in their original state, contain enough information from which to make a building – though successive overdrawings and annotations, added as building work progressed, provide a gradual accumulation of data. The third kind of drawings were produced after the houses

were completed, and – sometimes in perspective, sometimes in plan – show the finished building in its rocky setting. This type is the least interesting for our purposes.

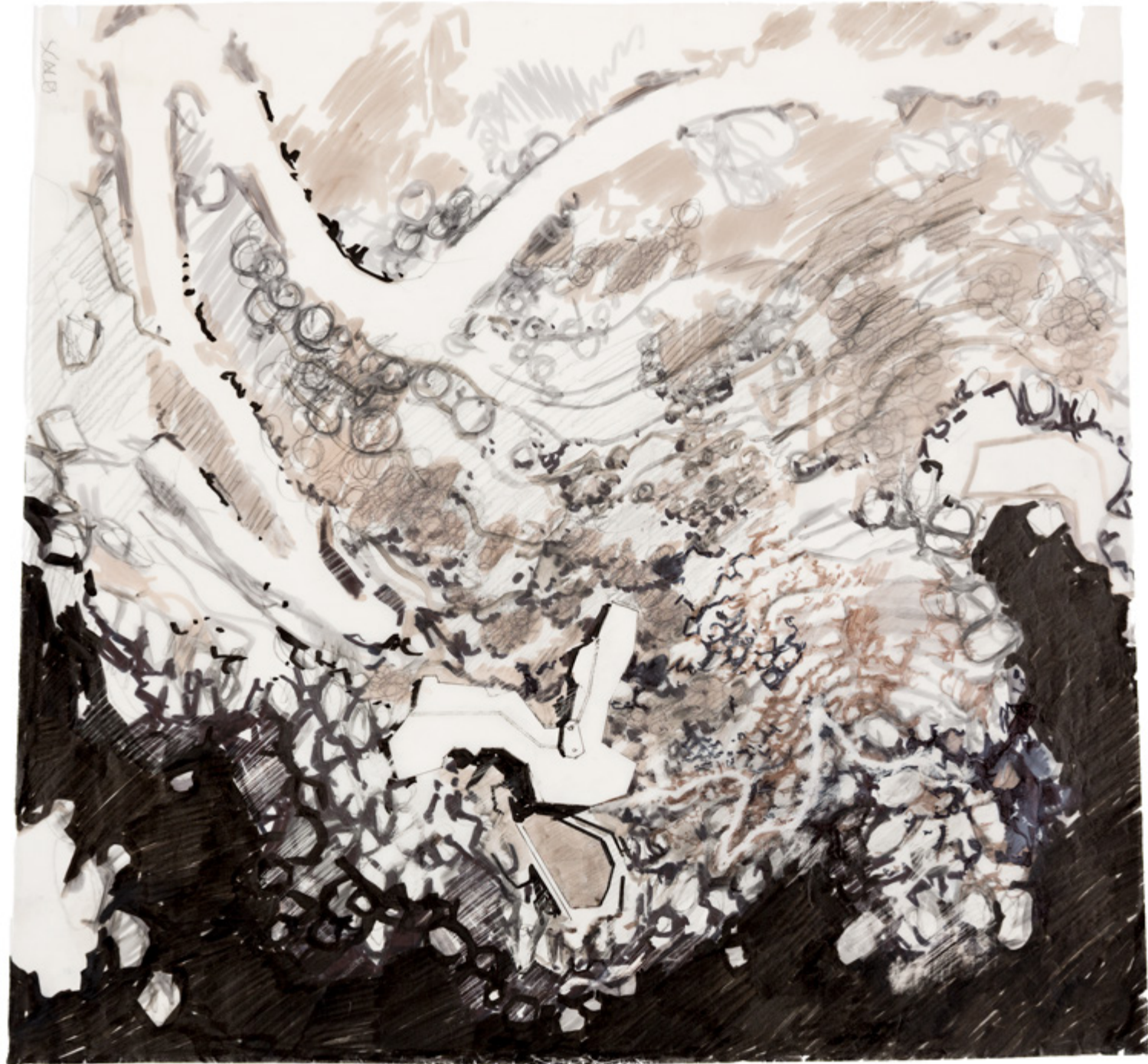
It is the second-stage drawings – the 'working' drawings – that are most revealing about the limitations of the medium. Ponis's buildings were responses to their sites. 'It is always the site that makes the design,' he says, 'Ultimately I discovered that the characteristics of a house are not something I should impose, but should only come from the site.' For at least one of his houses and probably others too, 'the plan... was not produced on a drawing board, but marked out with boards and wires on the site itself.' Ponis wanted to retain 'the freedom to change your mind while you are building, even if this means temporarily stopping the construction or removing something and starting again.' In this way of working, drawings could never be more than provisional if they were not, as in Wright's case, to become an obstacle. Where drawings normally fail is in representing the indefinite, the vague; they excel in precision. Ponis's solution to this limitation was unusual. Parts of his construction drawings are very detailed – a kitchen or a bathroom will be drawn very exactly. But other parts of the building – those that would normally be the first to be considered in any architectural scheme, like external walls and the placing of exterior openings – are indistinct or non-existent, only becoming so through the many annotations and overdrawings added later. By these means, and the patience and forbearance of his builders, Ponis was able to let the site make the design. His drawings expose the limitation, in certain circumstances, of normal constructional drawings as being too distinct; at the same time, he evolved a solution in which the drawing's purpose is not to give instructions, as Webb's did, but rather to be part of a dialogue between architect, contractor and site, out of which the building is shaped.

Recent developments in drawing technologies have mostly aimed to bring about a more exact correlation between the processes of design and of making, and to alter the nature of the relationship between the various groups involved in construction. Building information modelling (BIM), for example, which scripts the geometry of a building in relation to other kinds of technical information and parametric data, is often heralded as overcoming many of the limits both of traditional architectural hand drawing, and its earlier computer-aided design (CAD) precursors. We should note that the status of the drawing shifts with the advent of BIM, insofar as Phillip Bernstein of Autodesk observes that 'drawings [become] no longer the object of the representational instruments, but rather the artefact extracted when necessary from the parametric model of the building.' Nevertheless, increased 'digital accuracy'

Philip Webb
Design showing carved decorative woodwork
for the Great Hall at Clouds House, East Knoyle,
Wiltshire (1884)
Pencil, with brown washes and pen inscriptions,
numbered in red wash
355 × 510 mm (14 × 20 1/8 in)



Alberto Ponis
Site plan of Casa Scalesiani, Sardinia (1977)
Pencil, felt tip, black ink on trace
463 × 498 mm (18 1/4 × 19 5/8 in)



Alberto Ponis
Working plan of Casa Heintzschel, Sardinia (1986)
Pencil, pen, ink and felt pen over print on pink paper
900 × 835 mm (35 3/8 × 32 7/8 in)



and an ability to store, manage and share large amounts of complex data much more efficiently – enabling collaboration between architect, contractor and other professionals, who may well reside in different parts of the world – are often cited as key strengths of these new drawing-related technologies.

Within this digital drawing framework, the concept of failure also plays out in new ways. On one hand, in addition to projecting the future form of a building, architects and construction professionals can also incorporate and learn from analysis relating to different dimensions of its performance – assimilating information from the structure itself as it is being built, or from other previous buildings already in existence. Facilitating improved risk management, this ‘immediate feedback on the technical implications of a given design strategy’ has been argued by Bernstein to potentially raise the credibility and value of the architect in today’s building industry.¹⁷ But at the same time, this promise and emphasis on foreseeing, reducing, even *preventing* failure, and its associated ‘costs’, is a loss that creates another kind of limitation of its own. In what ways might this commercial drawing tool be made to acknowledge the creative potential of failure, inaccuracy or imprecision within processes of design thinking and/or communicating?

The architect Lok-Kan Chau’s observations about how today’s BIM practitioners can learn from the ‘precisely loose’ drawings of Schinkel, which ‘articulate... more than exact geometry’ are relevant here.¹⁸ And in Chau’s own *Construction Manual for Lantau Commune* drawings of 2017, the architect inserts an additional stage of ‘manual editing’ into making his digital drawings, in order ‘to discover flaws and errors in the original 3D model... and to reflect and rethink every part of the proposition – as one would do in a hand drawing.’¹⁹ The repetition and detail of these finely rendered line drawings, which depict an ecology-education centre in Lantau, clearly signal that they have been rendered digitally. At the same time, they indicate a more ambiguous mode of production through their wavering individual line-vectors. Far from elevating the analogue over the digital, Chau instead combines and plays at the limits of these old and new technologies, inhabiting and dwelling in the space of digital manual editing. This allows for self-reflection on the process and outcome of computer-aided drawing.

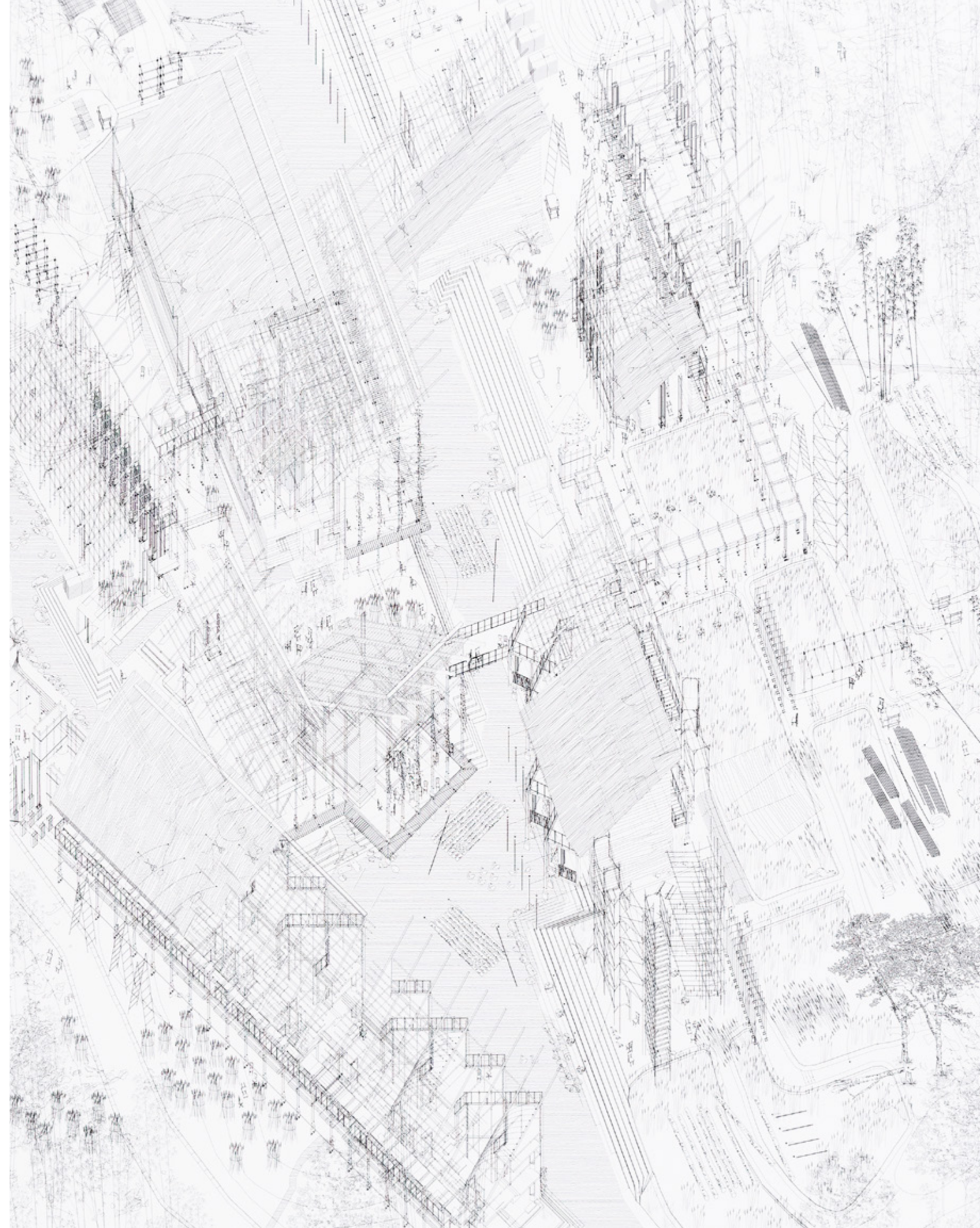
Lok-Kan Chau
Detail from *Construction manual for Lantau Commune* (2017)
Computer-generated drawing
595 × 595 mm (23 3/8 × 23 3/8 in)

Drawing Time

Ponis’s working drawings, elaborated at successive site meetings, show the emergence of a building over time. This is unusual, for of all the properties that architectural drawings struggle to communicate, time has been the most elusive. As the architects Yeoryia Manolopoulou and Níall McLaughlin write, ‘each drawing can only ever represent a fixed moment in time, from a fixed and individual point of view.’²⁰ Their installation *Losing Myself*, at the Irish Pavilion for the 2016 Venice Architecture Biennale, was intended to explore both these problems – the limitations of time, and the apparent single authorship of drawings – as well as a third problem: of how inhabitation might be drawn. We will concentrate here on the limitation of time, and leave the matters of authorship and of drawing’s feebleness at representing inhabitation to another occasion.

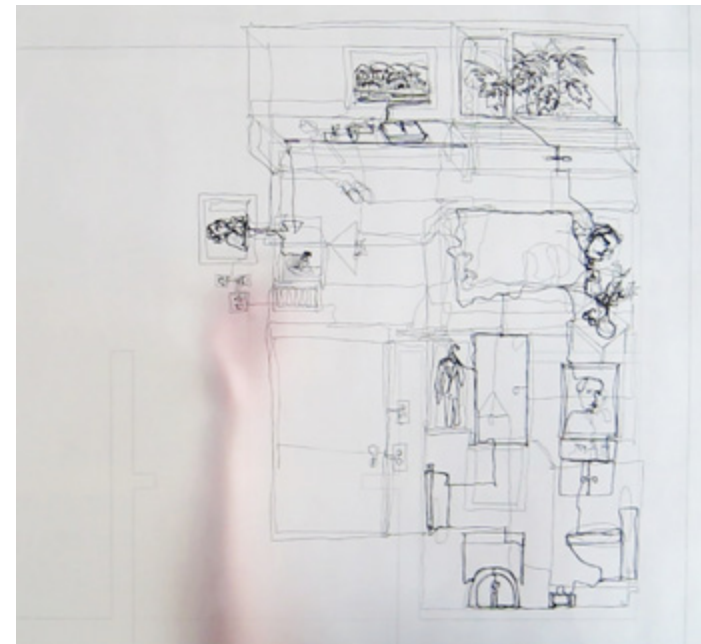
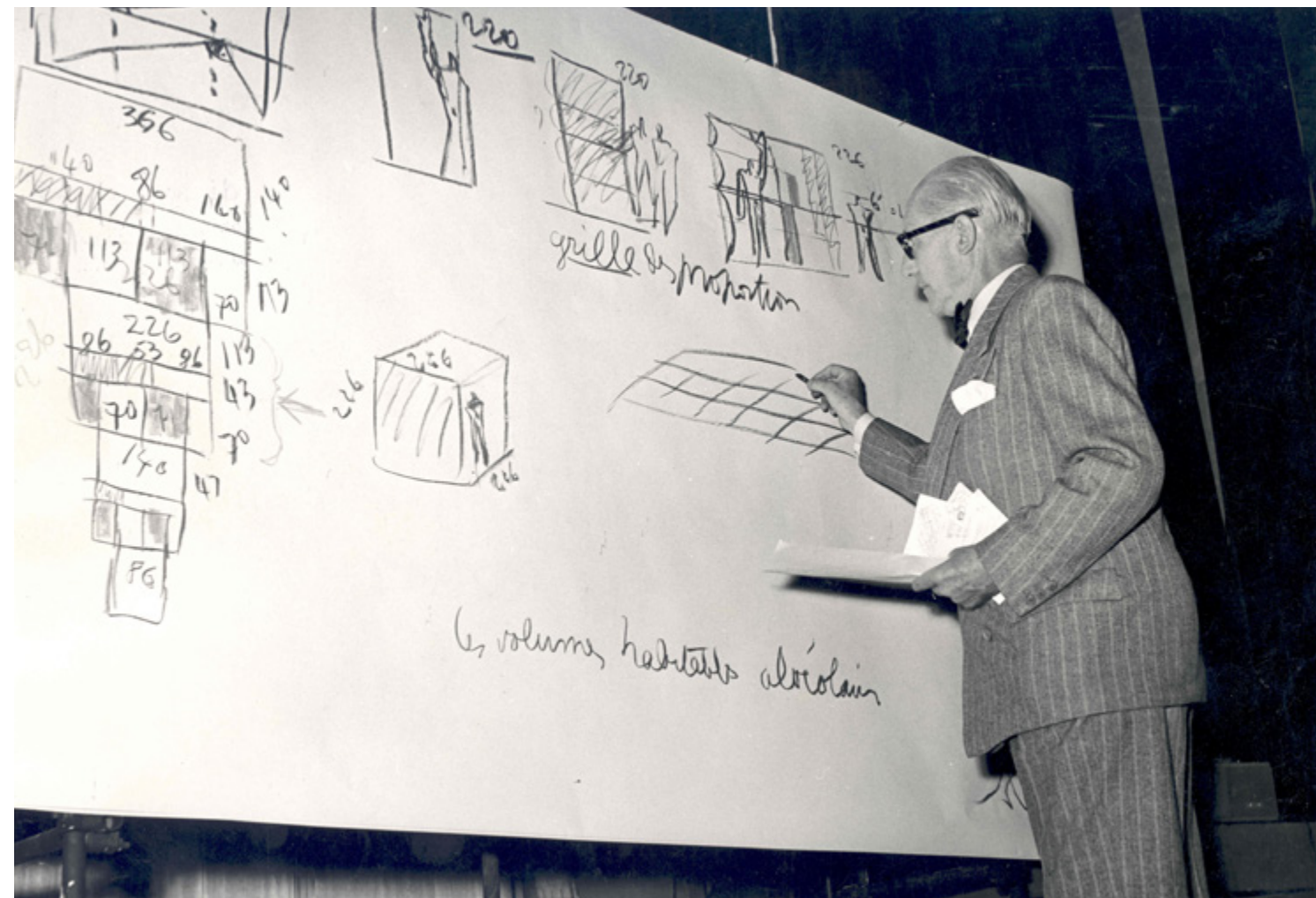
Drawings – and we are talking here of all kinds of drawing, not only those of architects – can be seen to represent time in two different ways. There is the time within which the drawing was made or there is a representation of time external to the work, in its reference to ‘other aspects of human activity.’²¹ Of the former, all drawings show this to some extent, and a practised draughtsperson will be able to tell how long any particular drawing took to make – whether seconds, minutes, hours or days. Although duration of this kind has always been present in drawings, in the 1960s some artists started to give a great deal of attention to the time and work of making, to the extent that this became the content of their work. In what became known as Process Art, ‘the existence of the artist in time is worth as much as the finished product’, as one of its exponents, Robert Smithson, put it. Following this line of thought, ‘the object gets to be less and less but exists as something clearer.’²² The medium of drawing was particularly well suited to making evident the existence of the artist in time, and during the 1960s and 1970s there were many experiments of this sort.²³ Apart, though, from in the work of Gordon Matta-Clark, these developments largely passed architecture by, and there was no particular interest in, nor attempt at, pushing architectural drawings towards representation of the duration of the work itself. A rare instance was *Untitled (Drawing for the Judson Memorial Poetry Reading)*, made around 1973 (see page 72–73), when Matta-Clark drew the history of architecture on a continuous roll of butcher paper for the duration of the poetry reading held in St Mark’s Church in the East Village of New York: the drawing – and the history of architecture – is as long as the reading.

There is, though, one particular exception to architectural practice’s general inability to address the time-based element of drawing, and that is the lecture drawing. Drawings produced



Right: Le Corbusier lecturing at the Milan Triennale, 1951

Below: Níall McLaughlin and Yeoryia Manolopoulou
Still from *Losing Myself*, presented for the Irish Pavilion at
the 2016 Venice Biennale



by the speaker while they are speaking, as part of the performance itself, have a long tradition in architecture and have no real equivalent in other fields. Science lecturers may draw diagrams as they talk, but architects do something more: they are both practising and demonstrating their art. Tim Benton has shown how carefully Le Corbusier rehearsed his lecture drawings beforehand, coming to the lecture with sketches already prepared; in the performance itself, even though he had drawn the same drawings before in many previous lectures, it would seem that his ideas emerged as he drew, the drawings generating the thoughts. As one observer said:

On great sheets of white paper rolled out at the back of the stage, his skilful hand, using charcoal and coloured chalks, made concrete the idea which he was simultaneously explaining in words. We are present at a real sprouting [éclosion] of his thought: an extraordinary and very moving spectacle, into which one appears to be implicated in a personal way.²⁴

The fact that the drawn line is, in Roland Barthes's words, 'a visible action' has made it seem that drawings should be good at representing temporality.²⁵ If, as Deanna Petherbridge says, drawings 'write time', then it might be expected that they lend themselves to showing the passage of external time.²⁶ This has certainly been the ambition of some artists: Henri Michaux wanted 'to draw the consciousness of existing and the flow of time.'²⁷ Nonetheless, drawings are tied to moments: for a drawing to show a sequence of moments, or the passage of time, is more problematic. Alexander Cozens's cloud studies recorded

clouds at particular points of time, but their movement was beyond him. Various stratagems have been evolved to overcome this limitation of drawings, which, in the early 20th century – especially following the emergence of cinema – started to seem particularly constraining. Shifting viewpoint perspective in cubist art, strip cartoons and animation were all developed partly as ways to overcome drawing's perceived failure to represent time. Although these techniques were of momentous importance in art practice, their impact on architecture was marginal, and the norm continued to be the production of drawings that disregard time and remain suspended in an atemporal void.²⁸

Drawings to convey more than one temporality remain elusive in architecture, though there have been some notable successes. Piranesi's engravings of Roman monuments showed them not as they were in antiquity when originally built, nor entirely as they were in his own time as decayed ruins, but rather in an imagined time when their full magnificence is apparent. Yet alongside this imagined state, there were references both to their original condition, in reconstruction drawings, and to their current ruinous decay: part of the success of the etchings was their triangulation of three temporalities. In more recent times, architectural draughtsmen like Rodrigo Pérez de Arce and Alexander Brodsky have employed similar techniques to extend the temporality of the drawing. So, if drawing's tendency to be stuck in one moment of time has been a limitation of architectural drawing it has nonetheless given rise to much inventiveness.

One particular recent attempt to address the temporal limitations of architectural drawing was shown at the Irish pavilion of the Venice Biennale in 2016. The Dublin Alzheimer's Respite Centre, completed in 2010, had been designed to allow residents to circulate freely within a variety of indoor and outdoor enclosed spaces. The project had been inspired by medical efforts to identify the particular forms of memory loss and confusion experienced by Alzheimer sufferers, focusing especially on their inability to form meaningful narratives for their actions, and the building had been designed to sustain a supportive narrative framework for the day-to-day life of the residents.

Revisiting the building six years later with Yeoryia Manolopoulou, the architect, Níall McLaughlin, was disappointed to find it not being used as had been intended.²⁹ The work shown at the Biennale arose from their frustration at the way conventional drawings fail to deal with anything other than normative experience, and was conceived as an alternative that might be closer to the lived understanding of the building. McLaughlin and Manolopoulou wanted to see if they could communicate and interpret some of the changes to spatial perception caused by dementia: as they explain, 'an inhabitant may never experience the building from the architect's complete

and fixed vantage point? People living with dementia's loss of ability to see themselves within the particular space that they are in is one of the main causes of their disorientation, and the task was to find a way of drawing that might be closer to the actual experience of someone with dementia. The method adopted was to invite 16 people to each draw the imagined movements of a resident over a period of 24 hours, following the convention of never removing the pencil from the paper; the technique replicates the experience of the wandering occupant who lives in a 'continuous present' – you are only where the pencil is, you never have a 'picture' of the whole. 'The conceit of the drawing,' says McLaughlin, 'is that the moving pencil is the apprehending mind.'³⁰ The drawings were made on tracing paper placed on a glass table, and filmed from below, creating an animated drawing. The films of all 16 drawings were merged to make a single animation, which was then projected onto the floor at the Biennale. While not itself a drawing – rather, a film of a drawing – it was a means of combining multiple authors into a single work, and presenting in graphic form the residents' experience, albeit imagined, of the space over time. The result contained some unpredictability and uncertainty – '[p]erhaps,' Manolopoulou and McLaughlin say, 'as a consequence of attempting to represent a cognitive state which is only partially understood, using a medium that we developed through iteration and experiment.'³¹

Drawing Decay

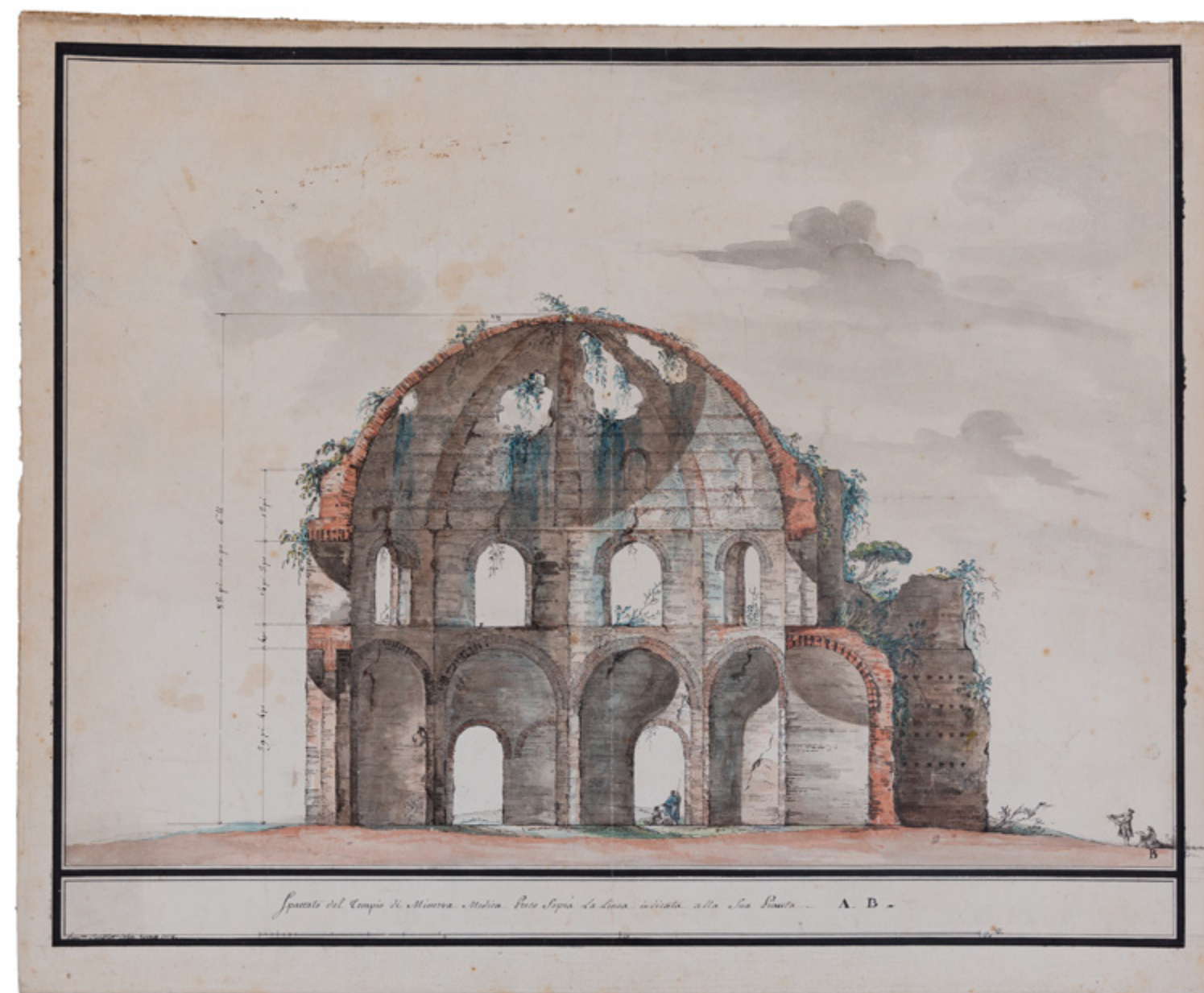
One particular aspect of architectural practice in which the difficulty of drawing time emerges is in the representation of decay. While the histories of art and architecture, especially since the late 18th century, are stiff with drawings of picturesque ruins where the passage of time is the implicit subject, drawing struggles when it tries to represent decay with any scientific precision. As long as draughtsmen were more concerned with the evocation of a mood, this was of no great concern. Attempts to regularise the drawing of ruins start with the *envois* sent back from Rome by French Prix de Rome scholars, who in their fourth year of residence had to make a drawn reconstruction of an antique building. From 1799, to rectify the confusion present in almost all previous representations of ancient buildings as to whether you were looking at the building in its present state or an imagined picture of its original state, or at something in between the two, the *pensionnaires* were required to prepare two sets of drawings – one, an exact record of the building in its current state, called the *relevé d'état actuel*; the other, the *restauration*, showing its

hypothetical original state.³² Over time, certain conventions were established for the *relevés*, mainly concerning how much of the accumulated evidence of the passage of time could be omitted but also governing the mode of representation, the extent of colouring allowed, and so on. Later in the 19th century, these drawings often adopted a quasi-photographic realism, but comparison with contemporary photographs shows that as records they were far from scientific. Apparently the *pensionnaires* grew to resent having to produce the *relevés* for their creative work was in the restorations, and it was not ultimately that important how much detail or precision the *relevés* contained since they were essentially there as a datum against which their restorations could be judged.

It was in Britain in the later 19th century – when restoration practice, under the influence of John Ruskin, William Morris and the Society for the Protection of Ancient Buildings (SPAB), became increasingly concerned with preserving the marks of time on buildings – that accuracy really started to matter. Architects surveying old buildings had to find a way of reconciling what once was with what was now there, in a future state in which both would be evident. The conventions of drawing do not easily lend themselves to representing layers of time, yet this was necessary if evidence of past time was to be retained while at the same time ensuring the soundness, stability and watertightness of the structure.

Most architectural drawings, whether of buildings that have yet to be built or that have been built, show buildings at a single moment in time – usually, when they have just been completed. Changes over time have most often been shown by overlays or liftable flaps like those in Humphry Repton's Red Books, which showed watercolour views of his landscape designs, but even with these devices each individual drawing still only shows one moment of time – there is no single drawing that combines different temporalities within one composite image. This was the task that faced architects involved in restoration. A good example is provided by the survey sketches for the Old Post Office, a 14th-century yeoman's house at Tintagel in Cornwall, whose restoration was undertaken by Detmar Blow following its acquisition by the National Trust in 1903. A contemporary photograph shows just how decayed the house was – and for Blow, a SPAB adherent, it was important to retain as much of its tumbledown appearance as was consistent with keeping it standing. To achieve this result required very careful attention to the fabric of the building. Blow's sketchbook includes both perspectival views and a dimensioned plan. The former are impressionistic and show the age-character of the building, with notes on certain particular features, but much of the surface is unrecorded.

François Soufflot le Romain
Section of the Temple of Minerva, Rome (1778)
Black ink and grey and red washes, with black-pencil detailing
451 × 550 mm (17³/₄ × 21⁵/₈ in)





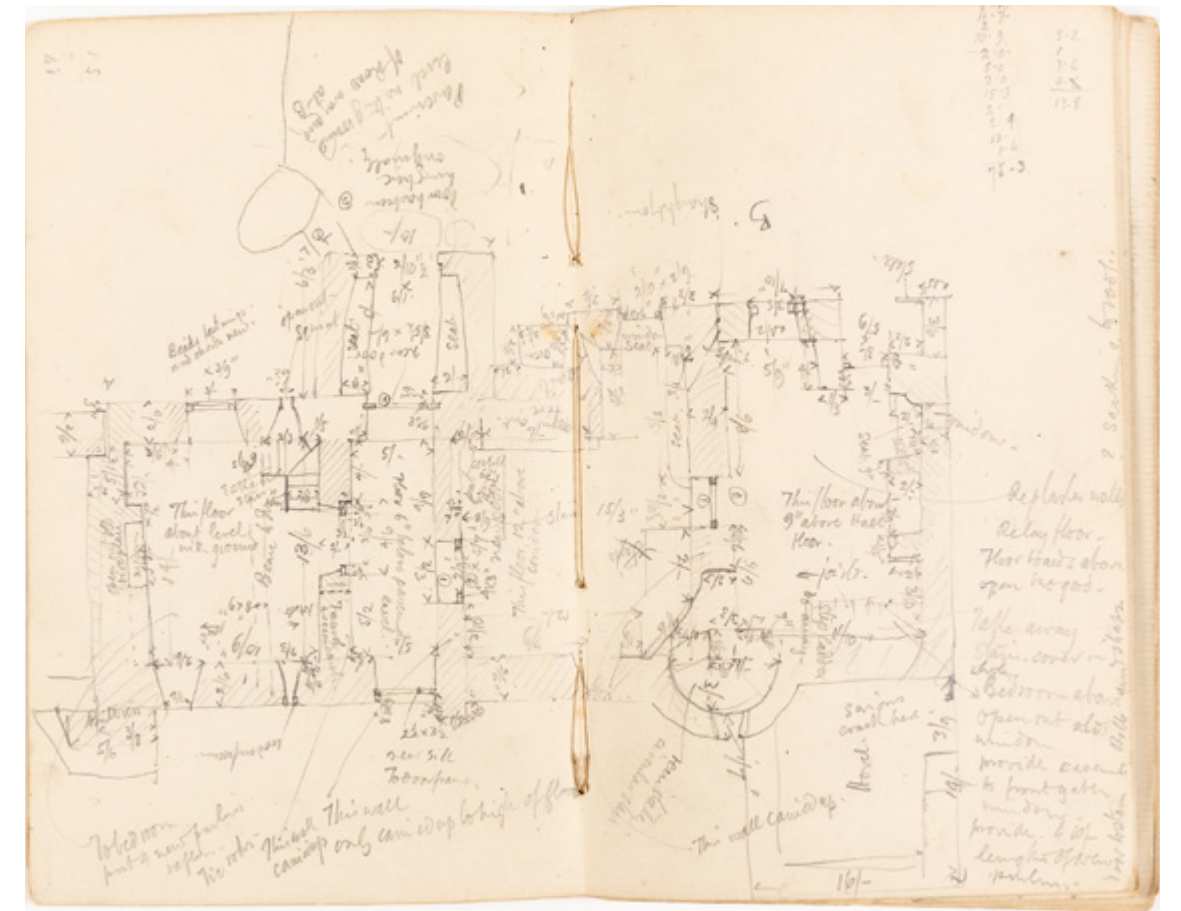
Only the plan, covered with very extensive notes, goes some way towards identifying what is to be preserved and what is to be replaced, bringing together what is, what was and what will be within a single drawing – though written notes were necessary to supplement the drawing and make it intelligible.

The inadequacies of drawing to the restorer were all too familiar. There is a telling passage in Viollet-le-Duc's entry on 'Restoration' in his *Dictionnaire raisonné* (1854–68):

In fact, while architects possessed only the ordinary means of sketching, even the most exact – the *camera lucida* for example – it was very difficult for them not to make some omissions – not to overlook certain scarcely apparent traces. Moreover, when the work of restoration was completed, it was always possible to dispute the correctness of the graphical reports – of what is called the *existing state*. But photography presents the advantage of supplying indisputable reports – documents which can be permanently consulted when the restorations mask the traces left by the ruin. Photography has naturally led architects to be still more scrupulous than before in their respect for the slightest vestiges of an ancient arrangement, and to take more accurate observation of the construction; while it provides them with the permanent means of justifying their operations. Photography cannot be too sedulously used in restorations; for very frequently a photograph discovers what had not been perceived in the building itself.³³

Another survey drawing, of Gaddesby Church in Lincolnshire made by the architect W.H. Cowlshaw in 1892, shows the various materials of the building, with their conditions described in annotations.³⁴ On a separate sheet, Cowlshaw noted, 'The floor is principally of stone, much patched with bricks. Very uneven, and interesting.' But exactly what made it 'interesting' never appears in his drawings. How were you to convey in a drawing the 'interest' generated by progressive wear and repair over time? Both Cowlshaw and Blow, like many others in similar situations, resorted to language to supplement the limitations of drawing. When it comes to undertaking the work of repair itself, it was – and still is, today – common practice not to try to draw a representation of the work to be done but simply to draw in chalk or paint on the building itself what is to be retained and what repaired.

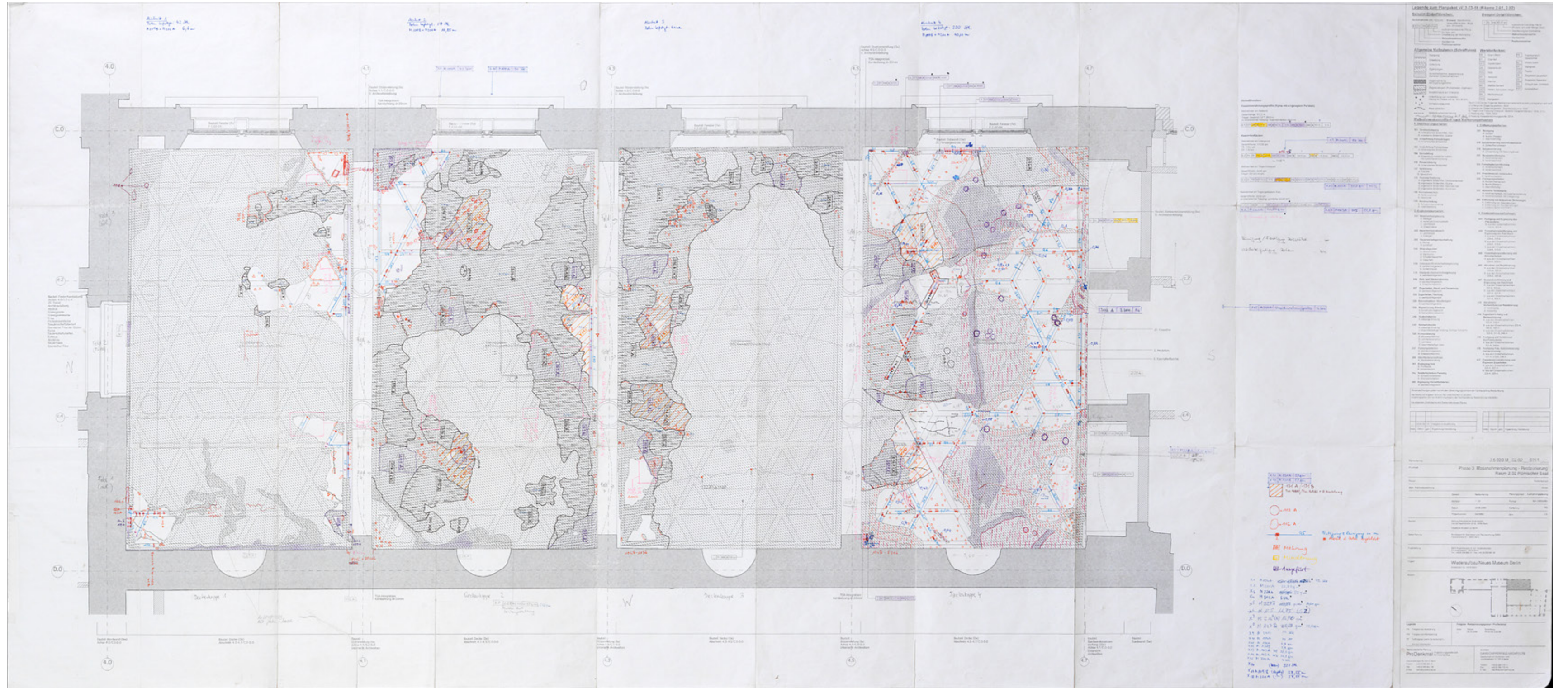
Finally, let us look at a very different sort of drawing that also deals with decay: the drawing of the ceiling of one of the rooms in the Berlin Neues Museum, made in 2009 during the restoration by David Chipperfield Architects.



Above: Tintagel Old Post Office
(c.1900)
Photograph
87 × 140 mm (3 3/8 × 5 1/2 in)

Opposite: Detmar Blow
Tintagel Old Post Office (1896)
Paper, string bound
118 × 180 mm (4 5/8 × 7 1/8 in)

David Chipperfield Architects
 Ceiling Plan, Neues Museum, Berlin (2009)
 CAD drawing with annotations in coloured pencil
 840 × 1970 mm (33 1/8 × 77 1/2 in)



This is a very large drawing, almost 2 m long, and it contains an extraordinary amount of detail. On the right-hand side, there are two keys – one showing the materials found in the ceiling as it was, and the second showing the processes to be used in its restoration. There is a third key, handwritten in colour, which was made by the conservators as they were working on the ceiling, indicating the various states and stages of work – shown in pencil and in coloured ink on the drawing. The drawing itself is very detailed, and very complex. Now housed at the V&A in London, its catalogue description is as follows:

The drawing captures three distinct layers of information, the printed layer (in black) is a survey capturing the existing conditions prior to restoration, including areas of damage, cracks, structural faults, and areas where the rooms' surface has come away. This survey is supplemented by various codes and hatches giving instruction to the conservators on site on how to treat the building surfaces, both aesthetically and structurally. Finally, the hand-drawn pencil annotations are added by these conservators on site, recording the work that has been done, in order to feed it back to the architects and other parties. The fold marks and general wear on the drawing show that it has been used on site. The printed legend in the top righthand corner of the drawing lists the various processes to be enacted upon the building fabric. These include *Festigung* (stabilising), *Entsalzung* (removal of salt), *Ergänzungen* (addition, reconstruction), *Entfernung* (removal), *Kombimaßnahme* (combination), *Ziegelergänzung* (repair tiles), *Ausgleichsputz* (equalising render), *Hinterfüllung* (backfilling of holes), *Risse schließen* (closing of cracks), and even *Splitterbruchkonservierung* (conserving of damage of bullets or shrapnel). An additional legend has been added in pencil to the drawing itself by the conservators, as a way to record the work that has been undertaken. Pencil hatching in pink/red notes where material is to be added, repaired. Yellow hatching denotes where material has been removed or lost. Blue lines and annotations refer to where stabilising and cleaning is to be undertaken. The red dots on these blue lines denote the number of 'pearls' in the ceiling that have been cleaned and fixed. Purple hatching notes where work has been completed already.³⁵

If this sounds complicated, it is. It is complicated because there are really three kinds of drawing here: there is an archaeological survey drawing of the original state of the ceiling; then there is an architect's drawing, detailing what is to happen

in order to bring about a projected result; and, finally, there is a conservator's drawing, recording the work that has been done as it is being executed. The drawing contains an extraordinary amount of information, and looking at it closely we can see something more like a battle plan than an architectural project. In fact, this is not such an absurd comparison, because what the drawing shows are three layers of temporality: a present, a future and a past (the time of the ceiling's conservation). It has a 'depth' to it, a depth that is temporal as much as it is spatial. In this respect, it is a drawing that achieves what none of the other examples that we have looked at before do (except perhaps Ponis's site drawing) – that is, representing the full scope of temporal dimension. But the difficulty is that it is so difficult to interpret because there is more than one type of notation. At one layer, the survey layer, it conforms to the conventions of an architectural drawing in that there is a correspondence between the drawing and the visible reality of the ceiling – it is a 'picture'. But at other layers, the notation consists of symbols that do not themselves signify, and have no relation to, visible reality, but have to be interpreted through a key. This is more like cartography than any architectural drawing convention. Finally, it is worth adding that part of what is intriguing about the drawing is that while it seems to have a kind of scientific precision to it, the closer we get to it the more the actual marks on it seem surprisingly approximate.

There are many things that can be said about this drawing. First of all, it is a result of multiple authorship. No one person directed the progress of the drawing through its successive stages, and the temporal dimension of its making is very apparent. Secondly, it is unlike conventional architectural drawings in that it does not project a desired end result but, on the contrary, records a succession of acts towards an unforeseen goal. Thirdly, it is not conventional in that the various marks on it do not correspond visually to the actual interventions. They are a code that needs interpretation for the drawing to signify at all – though paradoxically, the fact that some of the marks are non-representational signs makes it easier to see the various temporal layers. A more literal method of representation would have made it more difficult to distinguish between the different stages that the drawing refers to.

That this drawing has survived at all, and has found its way into a national museum (the V&A), suggests that somebody saw it as important to retain the evidence of the progressive stages of the restoration. Whereas the finished result of the restoration shows only a surface – admittedly, a surface that shows some parts restored to the original state, while in other parts the underlying fabric is left – what is visible now in the building is nonetheless all one surface. Someone, it would

seem, wanted more than this to be seen – as if the real interest of the ceiling lay in all the successive stages of the work that had been put into it over the course of time, and not just the final skin that is all we see today. There was, maybe, a regret that all the stages of work were concealed by the finished result, and a wish that the ceiling might somehow have been able to reveal its temporal thickness. This was physically impossible, but the Neues Museum drawing turns out to show something of that thickness – even though it was probably not its original intention, which was simply to map the decay and to plan its conservation. As a drawing, it turns out, more by accident than design, to have engaged productively with some of the limitations of drawing.

We could conclude that, in more than one sense, most architectural drawings fail. Indeed, if the purpose of a drawing is to fix an ever-shifting cloud of possibilities and opportunities, then all drawings fall short, and even with the one from which the actual building is constructed we know that the eventual result will differ from its prior two-dimensional representation. We can also concede that there are many dimensions of producing, occupying, conversing about, reflecting on or recording buildings that involve time, experience, enactment and change in ways that do not lend themselves to graphic encapsulation within the frame of a single drawn image.

But beyond these relatively obvious conditions of failure, it should be recognised that most so-called failures of the medium of drawing are but one side of a story. The same drawing can be simultaneously deemed both lacking and successful; it depends on what is being expected of it, and through whose eyes it is being considered – the architect's, the builder's, the client's, the theorist's or the historian's. We must also acknowledge that to explore the 'exceptions' – where architects *have* consciously circumvented or transgressed the limits of drawing – is ultimately to explore only one particular type of success.

As many before us have noted, the conventions that an architect uses can be the means through which the most ingenious visual, technical or communicative operations of a drawing take place. But equally – no matter how apparently interesting, skilful or virtuosic – the same conventions always retain the possibility to simultaneously remain illegible and 'off-limits' to those without knowledge of such codified methods and techniques of projection and representation. Interrogating how and where these conventions stimulate questions and tensions, or may break down, is where interesting things start to happen.

There is, of course, creative potential in occupying the limits of two-dimensional architectural representation – as there is even in failure. Awareness of and confrontation with

drawing's limitations can take place, as we have shown, through departures from traditional ways of visually and materially representing – often leading to new ways of thinking and building. It can also come about through consciously appropriating these existing conventions so that the drawing and its means become sites for critique, or a way of practising forms of cultural criticism that are architectural, or other. The creative potential of failure is just as likely to materialise through an architect's repeatedly drawing the same idea. This can suggest something inadequate or missing in the 'just-drawn' rendition, while at the same time conversely signalling a kind of efficacy within the act of making similar, 'failed' attempts and versions over time.

While we have touched on examples of all of the above, perhaps the type of architectural drawing limits that we have become most interested in are those which combine the pragmatic with the performative. Here, attention to drawing limits also plays a key role, in what anthropologist Edward Robbins would call an architectural drawing's 'social use' or practice – operating as playful tool and agent in mediating communication about the design process with others.

Indeed, something we have grappled with throughout this investigation is the rhetorical significance of the practice of making and using architectural drawings. And by this we do not only mean the impulse behind a drawing in architecture as being to persuade but also the discrepancies between what architects sometimes claim or assume their drawings are doing and some of the other things that may also be at work in the drawing's agency. In this chapter, on one level, we wanted to probe and problematise a culture and history of architects talking about and expressing attitudes about drawing – including the widely varying assertions that they have made about its status in their work. Questioning drawing's reputation as a more-often-than-not successful medium reveals a more complex story. Through pursuing the operations of failure and of what a drawing may not be achieving – as well as acknowledging the limits of the discipline of architecture's own culture of representation – we become more attentive and precise about what it can do in specific circumstances, for whom, and to what end.

Most of the time, architects do not ask too many questions about drawing. Drawing is what they do, and that's that: it is their principal, if not their only, medium. But just occasionally, whether out of necessity or choice, someone finds themselves testing the limits of drawing. It is the graphic record of these moments that interests us, for in these moments, drawings are at their most revealing – about the medium itself; about architecture, its anxieties, its insecurities; and more besides. Not all things can be drawn, but that is not to say that those undrawable things are not architectural.