As we approach architecture as an active context, we enable projections and speculations of how our design engagement, a site of action, of nuanced materialities that are now only lumped into a single category of energy, not recognized for the opportunities they present.

An approach architecture as an active context, we enable projections and speculations of how these typologies of space will become the catalysts for seeking new spatial boundaries that inform organizational activity and social engagement. Our architectural spaces will consist of these active contexts that our bodies move through daily is material malleable for our design engagement, a site of action, of nuanced materialities that are now only lumped into a single category of energy, not recognized for the opportunities they present.

The intention is to seek new territories of design, texture, and social interaction—to tease out the spatial and social implications that arise when "walls" and "geometry" are no longer our primary means of spatial organization. The context that our bodies move through daily is material malleable for our design engagement, a site of action, of nuanced materialities that are now only lumped into a single category of energy, not recognized for the opportunities they present.

Acknowledgments
This paper is an excerpt from a chapter of the same title in a forthcoming book called The Air on Other Planets.

References

Smart Disassemblies: OR, HOW I LEARNED TO TAKE THINGS APART

ABSTRACT
Taking things apart is easy. How something works, or even what it is, is irrelevant to its dismantling. If assembly can be perceived as a rational act, then disassembly is certainly its counterpart: an intuitive, foolproof, and mindless errand of the seemingly curious subject. It is in this unsettling description, however, that disassembly warrants an analysis of its smart potential. Smart Disassemblies locate the exploded view drawing, a representation that-conveys the instructions for assembly, within its architectural legacy, from its origins in the Renaissance to its more contemporary appropriation by Thom Mayne and Daniel Libeskind. The categorical rules, and the part-to-whole relationships they imply, gleaned from these precedents are then subverted toward the end of disassembling an object. The proposed rule sets (Point of Explosion, Point of View, and Explosion Sequence) and their variants are tested through their application to a complex assembly of objects, a jazz quintet.

Thomas Kelley
University of Illinois at Chicago
Sarah Blankenbaker
University of Illinois at Chicago
### 1. The Act of Disassembly

Taking things apart is easy. Unless you are handling explosives, you do not need to know how something works to take it apart. In fact, you do not even need to know what something is in order to take it apart. If assembly can be perceived as a rational act, then disassembly is certainly its counterpart: an intuitive, fast-paced, and mindless removal of the seemingly curious subject. It is in this unflattering description, however, that disassembly warrants an analysis of its smart potential.

Disassembly aims to understand the singular and composite forms of the parts when displaced from the whole. Prior to disassembly, the whole is perceived as perfect and carries with it a set of intentional part-to-part relationships that comprise the physical makeup of the object in question. However, as the first part is separated from its whole, both part and whole become incompletely, dysfunctional, and fragmented. The whole is broken like a shattered skull, and the farther parts get from their original position, the more autonomy is gained from the whole.

At this point, neither the part nor the whole perform normally. Once their union-explosion, the larger-whole function is subsumed by local-formal relationships. The whole’s functional past is of no concern to the broken mass of parts. As the distance grows and the orientation changes from the point of explosion, both false and strange appearances begin to emerge. ‘The only thing broken is a certain type of expectation that we have,’ writes geometer and historian Robin Evans on the topic of breakage and fragmentation that can invoke new histories (Evans 1995). He cites Braque’s paintings, in which enormous physical forces have been unleashed upon large subjects, resulting in the collapse of fractional and total organizations, as a testament to a revived legibility in modern art.

A smart disassembly inverts expectations, inasmuch as parts are no longer tied to their whole once functional alignments have been reoriented in space. Although the parts themselves do not alter geometry, the translation that occurs in disassembly repositions both legibility and intention. The original object submits coherence in favor of a Cubist’s sense of simultaneity. Disarticulation, or the separation of parts at their joints, introduces the notion of a recalibrated technique that coats precision with an affect of intuition. While Cubism’s affection for the fragmentation of modern culture offers one interpretation of disassembly, it is the inventories of the Renaissance that make comprehensible both the representation and reading of part-to-whole relationships.

### 1.1 The Explosion View Drawing

During the Renaissance, many graphic inventions were designed to emphasize part-to-whole relationships, especially when conveying the intricacies of mechanical devices and human anatomy. Although orthographic projection was commonplace in organizing these complex sets of relationships, the ability to convey multiple layers of assembly required more nuanced techniques for drawing.

The exploded view is a ‘three-dimensional illustration that shows the mating relationships of parts, sub-assemblies, and higher assemblies’ (Walton 1965). Today, we are familiar with this technique through BIM modeling software and patent drawings, where style gives way to legibility. Although the two examples are antagonistic to one another, each drawing presents a set of rules from which to unpack the exploded view and unravel its potential as a tool from which to invoke new part-to-part relationships and a revised definition of visual coherence, formal legibility, and simultaneity.

In the subsequent diagrams and text, we aim to outline the three most salient variations of the exploded view drawing. The rules are as follows:

**Rule 1: Explosion Point**

- **Rule 1.1: Point of Explosion**
- **Rule 1.2: Point of View**
- **Rule 1.3: Explosion Sequence**

By no means should the rules be read as truism; rather, they should be read as a set of new circumstances, which err on the side of visual clumsiness, and from which to question the exploded view’s ability to provoke designers with a renewed appreciation for the smart disassembly of parts.

### 2 Rulers

#### 2.1 Point of Explosion (Generic): Exponential Autonomy

The exploded view technique begins with an explosion that emanates from the center of an object. The point of explosion, however, is variable and may emanate from one of the three following points: center, part, external. From each distinct point of explosion comes a new set of expectations. The cube is no longer defined by symmetry, nor by its balance of 6 faces, 12 edges, and 8 vertices. As parts move farther away from an explosion point, the autonomy of the part from the whole increases exponentially (Figures 1–4).

**Figure 1** Richard Barnes, Skulls depicting Humans and Animals, 2006. 35 × 20 each image C-type digital photographs. (http://www.clarkegallery.com/artists/richard-barnes).

**Figure 2** George Braque, Violine and Candeliere, 1910. Oil on canvas, 24 in. × 19-3/4 in. SFMOMA, San Francisco. (http://www.fsmoma.org/explore/collection/artwork/W19#zoomIn=true&crop=San Francisco Museum of Modern Art).
Typically the projection of parts in an exploded view is illustrated from above and diagonally from the left or right side of the drawing, thus allowing for all parts to be visible and equidistant from their point of explosion. The view is not limited to a parallel projection, and often can include a perspectival view. For the purposes of this analysis, the exploded view technique has been focused on four axonometric projections, each one maintaining the measurability of the initial object's dimensions. Even though the object retains accurate dimensionality post-explosion, the overlapping of parts in some cases, and the retention of symmetry in others, suggests that certain objects privilege distinct parallel projections. The four axonometric projections include isometric, dimetric, oblique, and trimetric (Figures 5–8).

2.2 Point of View (Generic) : Privileged Symmetry

Figure 5

The sequence by which parts are exploded is integral to a revised legibility of the whole. In mechanical systems the components on the outside normally get removed first. The logic of sequence, however, is subsequent to rules 1 and 2. The first two figures respect the logic of assembly in that no parts overlap, parts are removed at equidistant intervals from the point of explosion, and most importantly, each part is translated (not rotated or scaled) away from the whole (Figures 9 and 10).

The last figure illustrates a concern for disarticulation: the surfaces of the cube have been subdivided into a finer collection of smaller planes (Figure 11).

As the parts move away from the whole’s centroid, the whole begins to exert unfamiliar shape characteristics to the X, Y, Z (equidistant) original cube. This technique is akin to Jesse Reiser’s notion of the generic collage, wherein an unchanging unit gets deployed along a variable trajectory. He writes: 

The Kapow! series is a meditation on arrhythmic composition. Illustrated in 45-degree oblique projection, each drawing is comprised of five instruments (grand piano, drum kit, ¾ bass, tenor saxophone, and trumpet) that have been exploded according to a set of variables typical to the explosive view drawing: 1) point of explosion, 2) point of view, and 3) explosion sequence (or distance from an explosion point). Rather than serve as an assembly guide, a diagram of part-to-whole relationships, or a fetishization of the tectonic objects represented, the series loosens its parameters in favor of apparent imprecision and clumsiness, and consequently, new spatial arrangements (Figures 22–26).

REFERENCES


3 CASE STUDY

3.1 Point of Explosion (Figures 12–15).

3.2 Point of View (Figures 16–19).

3.3 Explosion Sequence (Figures 20 and 21).

3.4 Two Explosions: Kapow! Series

The Kapow! series is a meditation on arrhythmic composition. Illustrated in 45-degree oblique projection, each drawing is comprised of five instruments (grand piano, drum kit, ¾ bass, tenor saxophone, and trumpet) that have been exploded according to a set of variables typical to the explosive view drawing: 1) point of explosion, 2) point of view, and 3) explosion sequence (or distance from an explosion point). Rather than serve as an assembly guide, a diagram of part-to-whole relationships, or a fetishization of the tectonic objects represented, the series loosens its parameters in favor of apparent imprecision and clumsiness, and consequently, new spatial arrangements (Figures 22–26).

REFERENCES


figure 22
Jazz quintet, starting position, plan.

figure 23
Explosion 1, plan.

figure 24
Explosion 2, plan.

figure 25
Explosion 1.

figure 26
Explosion 2.