

Marcel Duchamp's Approach to New York: "Find an Inscription for the Woolworth Building as a Ready-Made."

Craig Adcock

Many aspects of Marcel Duchamp's influential oeuvre were completed, or perhaps one should say "incompleted," during the period that he was involved with New York Dada. He arrived in America in July 1915 and soon began the actual construction of the *Large Glass* (Fig. 1) and the process of working out the final conceptualization and intellectualization of the ready-mades. These activities contributed to the strongly intellectual disposition of New York Dada. Duchamp's earliest ideas about his interrelated projects of making the *Large Glass* and the ready-mades had been formulated in Paris during the preceding few years—from say late 1912 to mid 1915—but they owed an important part of their ultimate character to New York and to America.

Among other things, Duchamp's basic vocabulary was affected by his arrival in the United States. As he learned English, he discovered that certain terms in the new language did not have exact equivalents in French and vice versa. The most important such term was *ready-made*. One of the first things that he did in the United States was to adopt this useful word and apply it to one of the central aspects of his work. Earlier he had used the French expression "le tout fait, en série" for the mass-produced objects that he occasionally brought within the boundaries of the art process through acts of choice. The early Parisian "ready-mades" include the Bicycle Wheel of 1913 and the Bottlerack of 1914, but only retroactively were these objects called "ready-mades."

The English term was derived from a particular New York usage associated with the fashion industry: "ready-made garments." Part of Duchamp's fascination with the term had to do with the way he could use it to imply that works of art were cloaked in mere appearance and that their interpretation and evaluation changed according to systems amounting to nothing more serious than fashion.¹ The use of the English designation thus gave the ready-mades another dimension of meaning—one that added to the significance of the original French expression without wholly supplanting it. By intrincating subtle language variations into the ready-mades, Duchamp could engage in a kind of transatlantic interchange of meaning.

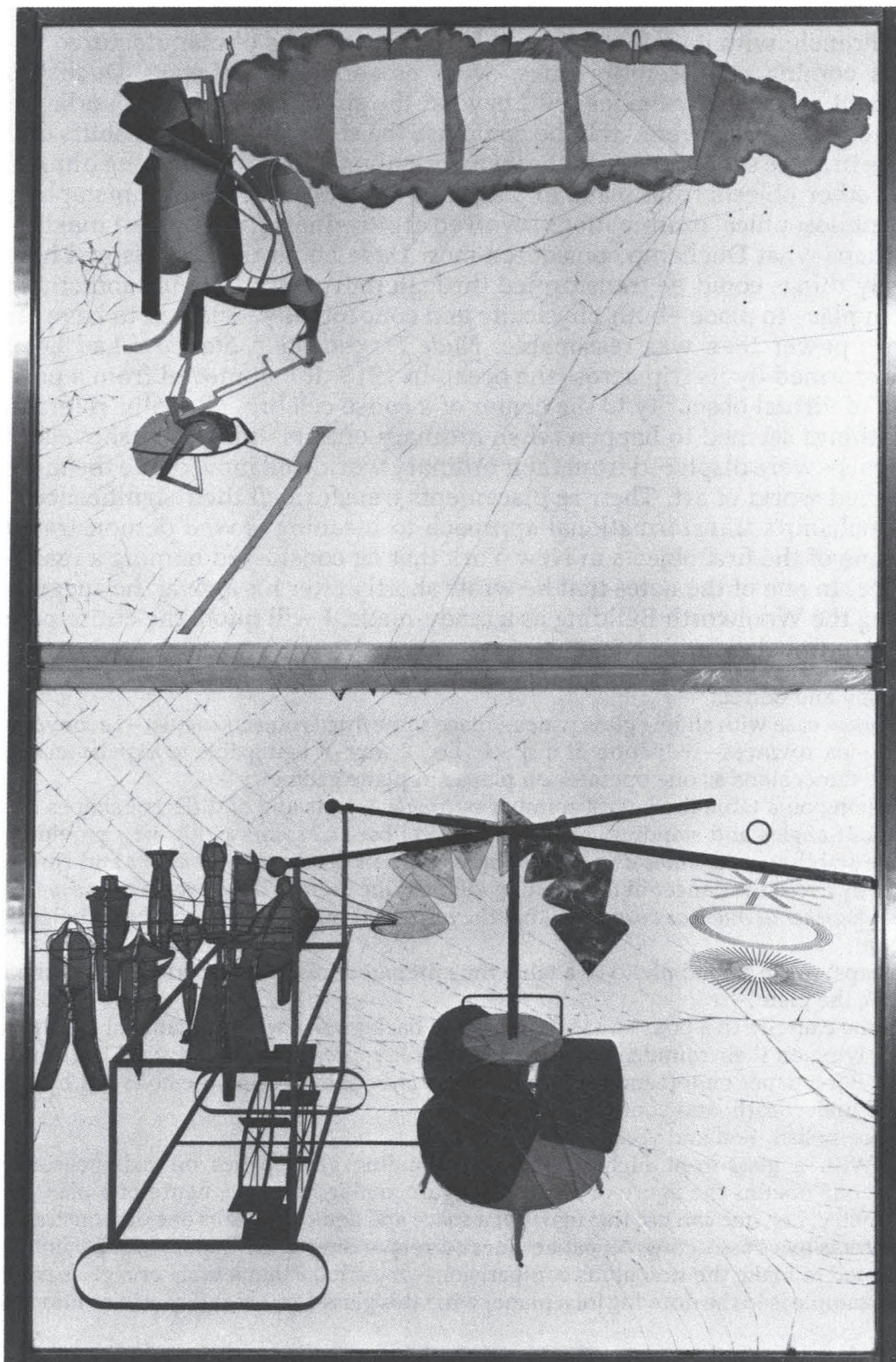


Figure 1. Marcel Duchamp. *The Bride Stripped Bare by Her Bachelors, Even* (the *Large Glass*). 1915–23. Oil and lead wire on glass. 109¼ x 69½ in. Philadelphia Museum of Art; Bequest of Katherine S. Dreier.

Both the English, with its connotative associations involving fashion, and the French, with its references to the iterative actions of manufactured objects coming off assembly lines, were essential to the ways Duchamp thought about ready-mades, but, beyond the simple intentional overlay of the terms, he discovered that he could use the shifts in meaning—shifts that were in some sense related to the transformational nature of moving himself and other objects from place to place—as an additional level of metaphor. His philosophical examinations involved arbitrariness in art and art making. Perhaps what Duchamp considered most Dada about the process was how easily things could be transformed through movement. Moving something from place to place—both physically and conceptually—seemed to have far more power than was reasonable. *Nude Descending a Staircase* had been transformed by its trip across the ocean in 1913. It had moved from a position of virtual obscurity to the center of a cause célèbre. Equally interesting things seemed to happen when ordinary objects—like snow shovels or urinals—were displaced from their ordinary world and moved into the more rarefied world of art. Their re-placements transformed their significance.

Duchamp's transformational approach to meaning is well demonstrated by one of the first objects in New York that he considered naming a ready-made. In one of the notes that he wrote shortly after his arrival, he suggests using the Woolworth Building as a ready-made. I will quote the entire note here in translation for convenient reference:

Recopy and correct

I. Show case with sliding glass panes—place some *fragile* objects inside.—Inconvenience—narrowness—reduction of a space, i.e., a way of being able to experiment in three dimensions as one operates on planes in plane geometry—

—Placing on a table the largest number of *fragile* objects and of different shapes but without angles and standing upright on a level base of some width, i.e., providing some stability.—*Assemble as many objects as possible on the table in height* and consequently avoid the danger of their falling, of breaking them,—but nevertheless *squeeze them together as much as possible* so that they fit together one into the other (in height I mean). . . .

Perhaps: make a good photo of a table thus prepared, make *one* good print and then break the plate.—

—Same exercise in a box. 1st: Make a kind of background with the same objects this time lying on their rounded parts in semi-stability, *prop them up* one with the other. 2nd: Put a paper on top and remake a second *layer* above, using the *holes* left by the layer underneath, and continue thus.

—Shoe polish. Red and yellow.

II. With a glass-front highboy closed by sliding glass panes on ball bearings, etc.—one obtains the figure of a space, a figure analogous to the figure of a plane in geometry, i.e., one can use this figure of a space and demonstrate as one demonstrates theorems by constructing, on paper, lines corresponding to the hypothesis. Do not be tempted to make the ridiculous comparison—objection—that a table or a glass pane for example is to the drawing [of a plane] what this glass-front highboy is in relation to

...

Find an inscription for the Woolworth Building as a ready-made. January 1916²

If the specific date on this note is correct, Duchamp had only been in New York for five or six months when he had his idea of using an entire building

for a ready-made. His recent transatlantic movement had altered his possible choices. The specific reference to the famous New York monument gives the note an American cast. Begun in 1913, the Woolworth Building was still under construction when Duchamp wrote his note. When the building was completed in 1918, its height of 792 feet made it the world's tallest skyscraper. Duchamp's desire to use the neo-Gothic building as a ready-made is indicative of one of his most interesting strategies: he often conjoined the topical, even the trivial, with concepts that had far greater importance.

The radicality of Duchamp's combinatorial approach becomes evident when the context of his reference to the Woolworth Building is taken into consideration – a context that locks the potential ready-made's meaning into the iconography of the *Large Glass*. The world's tallest building, when taken as a ready-made, becomes a humorous Dada object. But it can also stand for a mathematical situation. More specifically, the building can be used to symbolize certain characteristics of the fourth dimension – and this last is apparently what Duchamp had in mind. By 1916, he had already incorporated a great deal of speculative geometry into the iconographical program that he was working out for the *Large Glass*.³

Duchamp used several branches of advanced geometry to enrich and to complicate his art. At first glance, the reference to the Woolworth Building may seem nothing more than an offhand addendum, but it becomes significant when considered in relation to Duchamp's architectural method of describing four-dimensional geometry – even more so when his purposes for using such a geometry are taken into consideration. During the nineteenth century, these kinds of mathematical systems had had profound impacts upon philosophy – and from there, they had had profound impacts upon Duchamp.⁴ That the Woolworth Building was implicated in his program of combining art and mathematics is supported by one of his notes from *À l'Infinif*. Here, he explains that:

The shadow cast by a four-dimensional figure on our space is a three-dimensional shadow (see Jouffret, "Geometry of Four Dimensions," page 186, last three lines).

Three-dimensional sections of four-dimensional figures by a space: by analogy with the method by which architects depict the plan of each story of a house, a four-dimensional figure can be represented (in each one of its stories) by three-dimensional sections. These different stories will be bound to one another by the fourth dimension. Construct all the three-dimensional states of the four-dimensional figure the same way one determines all the planes or sides of a three-dimensional figure – in other words:

A four-dimensional figure is perceived (?) through an infinity of three-dimensional sides which are the sections of this four-dimensional figure by the infinite number of spaces (in three dimensions) which envelope this figure. – In other words: one can move around the four-dimensional figure according to the four directions of the continuum. The number of positions of the perceiver is infinite but one can reduce to a finite number these different positions (as in the case of regular three-dimensional figures) and then each perception, in these different positions, is a three-dimensional figure. The set of these three-dimensional perceptions of the four-dimensional figure would be the foundation for a reconstruction of the four-dimensional figure.⁵

With the workings of this note in mind, the metaphorical potential of an appropriated piece of architecture becomes clear. The note refers to Esprit Pascal Jouffret, the mathematician who, along with Henri Poincaré, provided Duchamp with most of what he knew about mathematics.⁶ The book mentioned is Jouffret's *Elementary Treatise on Four-Dimensional Geometry*.⁷ In this general textbook, Jouffret explains the workings of n -dimensional geometry. At one important point, he says that although our world seems to have only three dimensions, and while it is thus perfectly understandable that we should think of three-space as the *only* space, more complex arrangements can be imagined: normal space can be thought of as a field of the third degree immersed in a field of higher degree, namely, a four-dimensional continuum, or an "étendue," as he calls it in French. Jouffret explains that, when conceptualized in such terms, "our space is only an elementary slice out of the four-dimensional continuum surrounding it on every side. From the point of view of the fourth dimension, space is infinitely thin and absolutely flat, and this is true for every entity it contains" (pp. 183–84). Duchamp uses a similar kind of argument, but adds his own architectural metaphors. He explains that an architectural plan, which amounts to a two-dimensional plane, can be thought of as a "section," or "slice," through the three-dimensional space of a building. If the plan is displaced vertically, it generates the entire structure. The space can also be generated by displacing one of the sides of the building horizontally. In more general terms, this approach is, of course, still a standard way of constructing figures in elementary geometry: a point is displaced to generate a line, a line to generate a plane, a plane to generate a solid, etc. Duchamp applies this kind of constructive method to architecture. From his point of view, the three-dimensional space of a building can be thought of as a stack of infinitely thin "plans" or planes. If, as a next logical step, the entire three-dimensional building is thought of as an "infinitely thin slice" contained within the "étendue," it becomes, in some sense, a "plan" for a four-dimensional structure. In these terms, the ready-made Woolworth Building can serve as an embodiment of Duchamp's geometrical metaphors.

When Duchamp extrapolates from his discussion of three-space to a discussion of four-space, he enters a speculative world. He argues that "a four-dimensional figure is perceived (?) through an infinity of three-dimensional sides which are the sections of this four-dimensional figure by the infinite number of spaces (in three dimensions) which envelope this figure." In this analysis, Duchamp follows the word "perceived" with a question mark. Jouffret had also expressed a certain amount of skepticism about seeing four-dimensional figures: he says that while it is perfectly possible to conceive of the fourth dimension, and of four-dimensional objects, it is impossible to *perceive* them. Duchamp, at this same juncture, again adds his own speculations: he suggests that through movement, through changing points of view, it might be possible, if not to see, at least to reconstruct four-dimensional figures. He suggests that if perceivers could get into the fourth dimension and move around, they would then be able to look back and perceive a series of three-dimensional "sections" of four-dimensional objects. As he puts it in the note, "the set of these three-dimensional perceptions would be the foundation for a reconstruction of the four-dimensional figure."

Duchamp learned much of what he knew about multi-dimensional spaces from Jouffret's discussions of different n -dimensional "fields." Duchamp's mathematical notes examine the same kinds of mathematical structures. In general, he is concerned with establishing ways of conceptualizing a "field of the fourth degree" or a four-dimensional continuum. One approach that he uses involves going down one step in dimensionality. Because it is difficult to imagine a four-dimensional space, a space "superior" to ours, it might be helpful to imagine how beings living in a two-dimensional space, a space "inferior" to ours, might operate.

For this analogy, Duchamp relies upon Jouffret. When we turn to the passage in Jouffret's book that Duchamp specifically mentions, we encounter the concept of a cast shadow. In the "last three lines of page 186," Jouffret suggests doing the following: "In this regard [imagining what the fourth dimension is like], consider the horizontal shadow that attaches itself to you as you walk along in the sun, and that, long or short, wide or narrow, repeats your movements as if it understood you, although it is only an empty semblance" (p. 186). Jouffret uses his example of the behavior of a two-dimensional cast shadow to introduce a discussion of the perceptual world of "flat-beings" and the more general problem of perceiving $(n + 1)$ -dimensional configurations from n -dimensional points of view. He argues that "the things that are in [the horizontal plane on which we walk] are only the *sections* made through it by the three-dimensional bodies occupying the space in which it is immersed, or better the *contact surfaces*, the *interfaces*, of these same bodies with the plane." Solid, three-dimensional "figures" are, in their turn, "the *intersections* or the *interfaces* of space with *four-dimensional bodies*" (pp. x-xi).

Jouffret and Duchamp following his lead use the analogy of the cast shadow in relation to these kinds of "intersections." If we could somehow get into the four-dimensional continuum, we would be able to see the three-dimensional "shadows" cast by four-dimensional objects. These "shadows" would be "at the superficies" of the fourth dimension and they would be perceptible only "for an eye that looked at space as we look at the plane which is under our feet" (pp. x-xi). The force of the analogy is this: if we were inside a given n -dimensional space, we would not be able to see any kind of projection made on that space. Two-dimensional beings cannot see the shadows that are cast on their surface world; they can only perceive them edge-on as infinitely thin lines. The same situation would obtain for three-dimensional beings (ourselves) in relation to projections made on our space from the fourth dimension: we would only be able to perceive such projections as shadows, "edge-on."

Because four-dimensional objects cannot be observed, and also because the observation of "regular" three-dimensional solids is not really equivalent to the perception of projections from the fourth dimension, but rather to the perception of some strange kind of edge, Jouffret argues that they are "abstractions existing only in our thoughts." They are intellectual extrapolations built up from the geometrical components of the normal three-dimensional world. But even these kinds of mental reconstructions are very difficult to imagine: "certain brains are not easily accustomed to [thinking about the fourth dimension]" (pp. x-xi). Duchamp was also concerned with difficult

abstractions. He was interested in manipulating the ways that "brains" conceived aesthetic "facts."

In one of his notes from the *Green Box*, Duchamp suggests "losing the possibility of recognizing or identifying two similar things."⁸ He is concerned with "brain facts," or "cervellités," as he calls them in his French neologism. He arranges his discussion around categories of objects that are closely related to ready-mades – ones that seem particularly aligned with notions of fashion: "two colors, two laces, two hats, two forms whatsoever." In terms of such ready-mades, he wants "to reach the impossibility of sufficient visual memory to transfer from one like object to another the memory imprint. Same possibility with sounds, with brain facts."⁹ From the point of view of the fourth dimension, any three-dimensional form can be thought of as "infinitely thin"; it can be conceptualized as a very complex kind of shadow. With these points in mind, it seems likely that Duchamp was interested in the fourth dimension as a "leveling" device.

This interpretation is reinforced by a statement in another of Duchamp's notes: "Two forms cast in the same mold (?) differ from each other by an infra-thin separative amount."¹⁰ When the forms of Duchamp's ready-mades are cast as shadows, they become "infra-thin." In a certain sense, the projective characteristics of n -dimensional geometry, in general, act as Duchamp's "mold." It was through this process that he manipulated "brain facts." The "infra-thin" separation that he was concerned with had something to do with the "separation" between "works of art" and "ready-mades." As it worked out in the subsequent history of art, such separations were much thinner than anyone expected – shadows could be cast from any object whatsoever.

In the first part of his Woolworth Building note, Duchamp is concerned with a kind of showcase with sliding glass panes – with a "glass-front highboy." The notion of a glass case suggests the way Duchamp thought about the *Large Glass* as being a kind of "container." In one of his early notes included in the *Green Box*, he suggests putting "the whole bride under a glass case, or into a transparent cage."¹¹ Thus, when he suggests doing geometrical experiments with three-dimensional objects inside the space of the highboy in a way that would be similar to doing experiments with drawn figures on a plane, n -dimensional geometry immediately comes to mind. We know that Duchamp intended to carry out such geometrical experiments on the two-dimensional glass panes of the *Large Glass*: on several occasions he says that the "bride" was supposed to be "four-dimensional."¹²

In his discussion of the highboy, Duchamp has gone up one step from the two-dimensional surface of the *Large Glass* into the three-dimensional space of the glass showcase. Central to any interpretation of this situation is that the objects inside the showcase would, almost by necessity, be ready-mades; they would be everyday mass-produced objects placed on shelves for display. As such, they would be "fragile": the status of ready-mades is still debated. They teeter on some edge between art and nonart – and their continued existence within the world of aesthetics suggests that what we claim as knowledge about the makeup of art objects, in general, is still very much in doubt.

This aspect of the iconography of the *Large Glass* can be related back to the

"shadow" and "section" analogies that Duchamp uses in relation to the fourth dimension. If the glass case of the highboy were flattened by undergoing a projective transformation, the ready-made objects it contained would also be flattened; they would, essentially, become shadows. That Duchamp was interested in such transformations is strongly reinforced by the fact that he took photographs of shadows cast by ready-mades in his New York apartment in 1918 (see Fig. 2). What makes these shadows especially interesting in the present context is their close formal similarities to the flat shapes of the "Bride" in the upper panel of the *Large Glass* (compare Fig. 1). The flat forms of the "Bride" are very much like the flat forms of shadows cast from ready-mades. As we have already seen, the projective metaphor of a "shadow" can, in a sense, be "cast" on the superficies that may exist between different n -dimensional spaces. If the "glass case" of the *Large Glass* is taken to be a flattened highboy, then the "bride" becomes a "figure of a space" – namely, an "infinitely thin" layer containing ready-mades.

It is in this same sense that Duchamp uses the concept of a "section" in his discussions of the "étages" of buildings. With the workings of n -dimensional geometry in mind, the Woolworth Building can be thought of as a large-scale "glass case" or a very tall "highboy." This suggestion becomes more plausible when we remember that Duchamp proposed using size differences in the reconstruction of an image of the fourth dimension. In another note from *À l'Infinifif*, he says that "two 'similar' objects, i.e. of different dimensions but one being the replica of the other (like two deck chairs [chaises 'transatlantiques'], one large and one doll size), could be used to establish a four-dimensional perspective – not by placing them in relative positions with respect to each other in three-dimensional space, but simply by considering the optical illusions produced by the difference in their dimensions."¹³ Duchamp is here using the term *dimension* in its more mundane sense of "size" to get at the more complex notion of inter-dimensionality.

In the Woolworth Building note, Duchamp appears to have something similar in mind. He is, if not directly comparing, at least juxtaposing a small-scale glass case – the highboy – with a large-scale glass case – the world's tallest skyscraper. The French term that he uses for his "cases" provides additional credence for this idea: a *vitrine* is both a "showcase" and a "shop window." In ways that are analogous to what happens in showcases, the shop windows of the Woolworth Building, floor after floor, would have contained ready-mades; they would have contained commonplace, "five and dime" manufactured goods. Also, in some larger sense, the spaces of the building would have housed ready-made sections of the three-dimensional world. The "self-contained" components of the building were part of its contemporary appeal. It was advertised as a kind of microcosm of the city: it had its own generators, barber shops, stores, and restaurants. These could be taken as cross-sections, or slices of life. Given that the "Bride" in the *Large Glass* is four-dimensional and that the Woolworth Building is a kind of "plan" for a four-dimensional configuration, she might have been right at home within its spaces – flattened as she was by the exigencies of Duchamp's speculative geometry.

When considered as an inhabitant of a four-dimensional space, the "Bride"

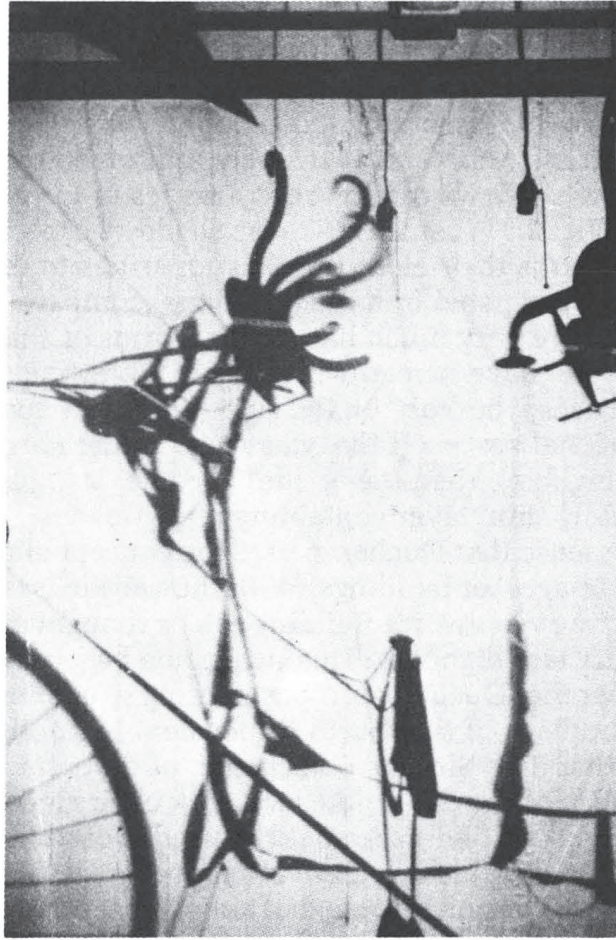


Figure 2. Marcel Duchamp. "Shadows of Readymades." Photograph taken in Duchamp's studio, 33 West 67 Street, New York, 1918. Collection Mme. Marcel Duchamp, Villiers-sous-Grez.

begins to resemble figures in Duchamp's earlier cubo-futurist paintings. Among the most important precursors to the "Bride" in the *Large Glass* were the "nudes" in his two versions of *Nude Descending a Staircase*. These works can also be interpreted in terms of Duchamp's interest in n -dimensional geometry.¹⁴ In the present context of a discussion of the Woolworth Building being a metaphor for the fourth dimension, it is perhaps important to remember that the different stories of buildings are connected with staircases. At any rate, the geometrical implications of Duchamp's earlier paintings are related to the "translational" similarities that he finds between geometrical "sections" and the "étages" of multistoried buildings. Moreover, the moving nudes in the paintings can be used as illustrations for his suggested method of moving around the "interfaces" between the third and the fourth dimensions in order to accumulate a sufficient number of different views to "reconstruct" the four-dimensional figure.

Nude Descending a Staircase, No. 1 (Fig. 3) depicts a more or less recognizable "nude." Various "sections" are repeated "cinematically" as the figure spirals down the staircase. The movement generates multiple images that

are then frozen, or "demultiplied," in a painting technique that emulates chronophotography. *Nude Descending a Staircase, No. 2* (Fig. 4) is more complex. One possible reason for Duchamp's making the second version more intricate is that he was trying to represent a more complex kind of space. From this point of view, the first version, rather than being simply a study, would represent an intermediary in a sequence of spatial transformations leading up to the fourth dimension. "Elementary parallelism" is the term that Duchamp uses for his constructive method of generating $(n + 1)$ -dimensional configurations by displacing n -dimensional configurations. The first three steps in this process—from point to line to solid—are perfectly straightforward, but the next step of displacing a solid to generate a four-dimensional object is quite complex. This complexity is suggested, but only suggested, by an illustration from Jouffret (Fig. 5). A displacement into the fourth dimension would have to occur along some strange set of "axes," simultaneously perpendicular to every possible axis in three-dimensional space, but not contained within three-dimensional space; in other words, the displacement would have to be in directions that were 90 degrees from everything else. This kind of complexity is only hinted at by the dotted line in the fourth diagram of Jouffret's illustration.

Duchamp's second version of *Nude Descending a Staircase* may have been intended to represent a four-dimensional situation. The "sections" through "Nude No. 2" seem to be interfused, rather than just repeated. In the first version, we can take the space of the stairwell to be three-dimensional. The nude then becomes a series of flat images generated through the movement of a normal object through normal space—much like the situations represented in chronophotographic images. If, in the second version, we take the stairwell to represent some part of a hypothetical four-space—as Duchamp's geometrical use of buildings would seem to legitimate—then the forms describe something far less familiar. As Jouffret pointed out, three-dimensional space and all the objects in it are "infinitely thin," when seen from the fourth dimension. From such a vantage, they are perceptually compressed into something like two-dimensional planes. A fundamental analogical problem arises at this point, however, because three-dimensional space as an "infinitely thin slice" is not a plane; it is a three-space that has been folded back upon itself in an infinite number of ways. Movement through such a multi-layered space may be what Duchamp intended to represent in *Nude Descending a Staircase, No. 2*—the flat "sections" in the painting seem to reverberate through the canvas; they seem to interpenetrate, to fold back into one another, as if the figure generating them were moving through some multiply compressed environment.

In this paper, it has been suggested that Duchamp used geometrical complication as a metaphor for the more general complication involved in the interpretation and evaluation of art objects. His arrival in New York facilitated this process. Duchamp wrote his suggestion about the Woolworth Building in January 1916. During that same month, he wrote a letter to his sister Suzanne in Paris.¹⁵ He explains to her that he had decided to use the English word "ready-made" for the "tout fait" sculptures that he had been choosing since 1913. In his apartment in Paris she would find two such objects: the



Figure 3. Marcel Duchamp. *Nude Descending a Staircase, No. 1*. 1911. Oil on cardboard. 37¾ x 23½ in. Philadelphia Museum of Art: The Louise and Walter Arensberg Collection.

Bicycle Wheel and the Bottlerack. The activity of making "ready-mades," in his newly developed English sense of the term, involved inscribing them with a more or less nonsensical English expression. He explains that since he had been in New York he had added the inscription "In Advance of the Broken Arm" to a Snow Shovel and "Emergency in favor of twice" to another object that he does not specify in the letter.¹⁶ He then suggests that he would like to retroactively create a "ready-made" out of the Bottlerack by having her write an inscription, that he would send along later, on the inside of its bottom rung.¹⁷ She should also sign it for him with the phrase: "[after] Marcel Duchamp."

Duchamp's activities in New York thus take on some interesting parameters. At the moment he was considering inscribing the Woolworth Building—a then very prominent example of a particularly American phenomenon, the skyscraper—he was engaged in additional transatlantic interchanges involving objects that had not quite yet become "ready-mades." His arrival in New York allowed him to transform ordinary objects (some French and some American) into "ready-mades" through both action and retroaction. Snow Shovels are American hardware items; Bottleracks are



Figure 4. Marcel Duchamp. *Nude Descending a Staircase, No. 2*. 1912. Oil on canvas. 58 x 35 in. Philadelphia Museum of Art: The Louise and Walter Arensberg Collection.

French.¹⁸ Duchamp was concerned with their "Americanness" and their "Frenchness" as "slices" of cultural difference. In this sense, his position in New York provided him with a useful approach to his Dada activity. He could use the cultural distance between France and the United States and his own movement from country to country as a way of implicating additional levels of doubt into his analysis of how things were chosen to be art or not art.

Infra-thin slices, geometrical sections, shadows, castings, the *Large Glass*, ready-mades—they were all associative concepts in Duchamp's thinking. By conflating them, he could imply that, in some sense, geometrical transformations were analogous to aesthetic transformations. From certain points of view, works of art—and ready-mades—appeared to be as flattened, as diminished, as geometrical solids seen from the vantage of the fourth dimension. Duchamp's approach certainly has its humorous side, but he put the light-hearted together with the serious. Their interrelationships were complex. By associating his ready-mades with the transformational nature of n -dimensional geometry, he could entail profound epistemic considerations within his own intellectual, and funny, brand of New York Dada.

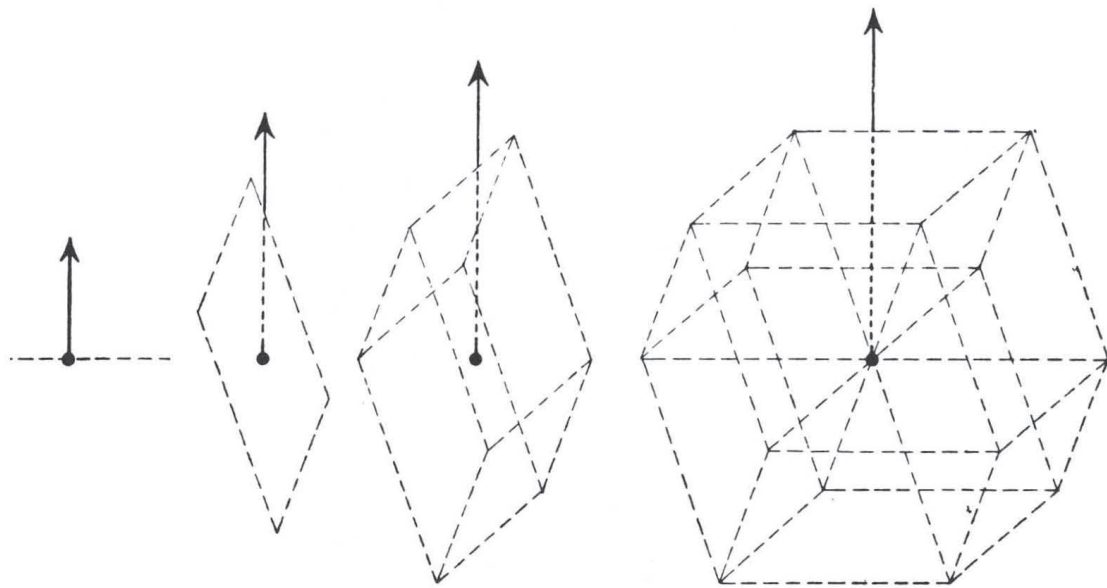


Figure 5. "The first four fields and their perpendicular," from E. Jouffret, *Traité élémentaire de géométrie à quatre dimensions* (Paris: Gauthier-Villars, 1903), p. 195.

Notes

1. For one of Duchamp's later statements explaining this attitude, see his interview with Otto Hahn, "Marcel Duchamp," *L'Express* (Paris), No. 684 (July 23, 1964), p. 22: "Le goût est momentané, c'est une mode. Mais ce que l'on considère comme une forme esthétique est débarrassé du goût. On attend donc cinquante ans, et la mode disparaît. Les choses prennent alors un sens. En fin de compte, c'est une entourloupette: une autre forme de goût. Ce qui ne l'était pas sur le moment le devient plus tard. Si on est logique, on doute de l'histoire de l'art."
2. Marcel Duchamp, *Salt Seller: The Writings of Marcel Duchamp (Marchand du Sel)*, ed. Michel Sanouillet and Elmer Peterson (New York: Oxford University Press, 1973), pp. 74–75.
3. For more detailed analyses of Duchamp's uses of geometry, see Craig Adcock, *Marcel Duchamp's Notes from the Large Glass: An N-Dimensional Analysis* (Ann Arbor: UMI Research Press, 1983); and Linda Dalrymple Henderson, *The Fourth Dimension and Non-Euclidean Geometry in Modern Art* (Princeton: Princeton University Press, 1983).
4. For a discussion of the philosophical influences of mathematics on Duchamp's development, see Craig Adcock, "Conventionalism in Henri Poincaré and Marcel Duchamp," *Art Journal*, 44 (Fall 1984), 249–58.
5. Duchamp, *Salt Seller*, pp. 89–90.
6. For a more complete discussion of Duchamp's possible mathematical sources and their relative importance, see Adcock, *Marcel Duchamp's Notes from the Large Glass*, pp. 29–39; and Henderson, pp. 117–30.

7. E. Jouffret, *Traité élémentaire de géométrie à quatre dimensions et introduction à la géométrie à n dimensions* (Paris: Gauthier-Villars, 1903); subsequent references to this edition appear in the text.
8. Duchamp, *Salt Seller*, p. 31.
9. Ibid.
10. Marcel Duchamp, *Notes*, ed. and tr. Paul Matisse (Paris: Centre National d'Art et de Culture Georges Pompidou, 1980), No. 18.
11. Duchamp, *Salt Seller*, p. 30.
12. See, for example, his statement to Pierre Cabanne, *Dialogues with Marcel Duchamp*, tr. Ron Padgett (New York: Viking, 1971), p. 40.
13. Duchamp, *Salt Seller*, p. 75.
14. For a more detailed discussion of the geometrical implications of these paintings, see Adcock, *Marcel Duchamp's Notes for the Large Glass*, pp. 141–46.
15. The original letter is now in the Archives of American Art, Washington, D.C. A translation of the letter has been published by Francis M. Naumann, "Affectueusement, Marcel: Ten Letters from Marcel Duchamp to Suzanne Duchamp and Jean Crotti," *Archives of American Art Journal*, 22, No. 4 (1982), 5.
16. This readymade has either been lost or the connection between the phrase and an extant object (or idea for an object) has been lost.
17. This phrase has apparently been lost. By the time Duchamp wrote his letter, Suzanne had probably already thrown out the Bottlerack when she cleaned his apartment. See Cabanne, p. 43; also Naumann, p. 18, n. 10.
18. The specifically American and French qualities of the Snow Shovel and the Bottlerack are noted in a review article by Michel Butor, "Reproduction interdite," *Critique* (Paris), No. 334 (March 1975), pp. 270–72.