

# The Creative Act:

From Functional Fixedness to Functional Dynamism

Calen Russell Barca-Hall

Sincere thanks to Maria Porges for her guidance and encouragement; Josh Greene for pushing me to challenge myself and tackle a thesis that had more substance than a mere project proposal; Lindsey White for her timeless wisdom, undeniable influence on my art practice, exposure to all that is good in the comedy world and her dedication to 'Jokes on You'; Lisa and Jeff for extensive editing and removing even more unnecessary; semicolons; and Anna Huemmer for exposing me to Roman Signer.

Most of all, I would like to thank Kira Maritano for her support, opinions, patience, compassion, understanding and her irreplaceable role in shaping me and my practice.

Calen Russell Barca-Hall is an artist and recent MFA graduate of California College of the Arts in San Francisco, Ca. His work can be found at [www.russellhallstudio.com](http://www.russellhallstudio.com)

The Creative Act:

---

From Functional Fixedness to Functional Dynamism



---

The world is a complicated place, full of objects, experiences, problems, people and decisions. As we navigate this tangled web, our minds, unable to comprehend all that we observe, simplify that which we perceive. In psychology this phenomenon is sometimes referred to as inattentional or perceptual blindness. It is widely examined in psychology and was popularized by the “Invisible Gorilla” test<sup>1</sup>. Where perceptual blindness references our general modes of perception, there are more specific phenomena to describe how we react to the individual parts of our world, for instance: objects and their function.

I am a sculptor. I consider myself an object maker, someone concerned with the material world and how our bodies relate to it. If you ask most sculptors or fabricators about the challenges of their practice, they will describe the onslaught of problems and prototyping which plague an object-based practice. This is ultimately also what they love most about it. I am specifically concerned with objects: their functions, how we relate to them, and how we find solutions to the problems that they create. Artists Harrison and Wood, Roman Signer, and Fischli and Weiss provide exceptional examples of innovative thinking applied to ordinary objects and

their relationship to the human body. When it comes to the psychology behind problem solving as it relates to objects however, there is no one more relevant than Karl Duncker.

“A problem arises when a living creature has a goal but does not know how this goal is to be reached.”

-Karl Duncker



Replicating Duncker's Experiments, 2014

# Karl Duncker

---

Karl Duncker was born on February 2, 1903 in Leipzig, Germany. He lived a relatively short and troubled life<sup>2</sup>, but in his 37 years he was able to complete some critical work in the field of experimental psychology. In 1938, while Duncker was between jobs and being forced out of Germany<sup>3</sup>, he published a paper titled *Zur Psychologie des Produktiven Denkens*, [Psychology of Productive Thinking]. This paper proved to be Duncker's most memorable work. Translated into English in 1945 and titled *On Problem Solving* it is considered one of the most influential papers on the topic of something which Duncker called "productive-thinking."

*On Problem Solving* is a scientific paper that thoroughly examines the process of how humans identify and solve problems. The most important aspect of Duncker's work is what he describes as the "fixedness" of an object. Fixedness is the inability to see function within an object outside of its intended use. For instance, "A chimpanzee who stands in need of a stick sometimes has difficulties in recognizing the stick in a branch still growing on the tree." On the tree, the 'branch' is both literally and figuratively fixed as being part of the visual figural unit 'tree.' To examine this problem Duncker devised a series of experiments in which he presented his subjects with a problem that could be only be solved by using the

objects which he provided them with in a new and innovative way. Duncker has a number of terms which he uses to describe the different elements of his experiments. I have included a list of these terms and their definitions below.

**Problem Solving** : A mental process that involves discovering, analyzing and solving problems. The ultimate goal of problem-solving is to overcome obstacles and find a solution that best resolves the issue

**Productive Thinking** : The ability to problem solve

**Functional Fixedness** : The inability to see a use for an object outside of its intended use.

**Problem-Situation** : The context around which a problem is framed

**Crucial Object** : The object that has the inherent ability to act as the "solution object" but has not yet done so

**Solution-Object** : The "crucial object" after it has been re-framed as being the suitable to solve the problem

**Centering** : The normal association or expected function of an object

**Re-centering** : To create a new association/expectation that is outside its normal function

**Pre-utilization** : The object has already been used in the same problem-context, but in another way, in another function.

**Without Pre-utilization**: (w.p) The test was conducted in such a way that the subject did *not* first use the crucial-object

**After Pre-utilization**: (a.p) The test was conducted in such a way that the subject had to directly use the crucial-object

**Statically Fixed** : Embodying a previous function without any intervention or activation by a person

"We experimented with all sorts of objects in daily use (e.g. boxes, pliers, etc.), which were first claimed in their usual function and then, within the same problem-situation, for a new, unusual function. The crucial object was each time to be selected as the suitable tool out of a great number of objects which lay in confusion on a table."

- Karl Duncker, "On Problem Solving"

Duncker experimented with a total of six different problems. Each of the problems focused on a different specific object (the crucial object) which was to be used as the solution (or solution-object.) The crucial object was first used in its intended and presumed way, but then needed to be used a second time in a more unpredictable, "although by no means inappropriate," manner. "In [the] problems, the pre-utilization<sup>4</sup> of the crucial object was chosen in such a way as not to give it special prominence in the problem situation. In other words, [in its first function] no new centering took place, but solely a freshening, an 'actualization' of the usual centering of the object." In the example of the chimpanzee, when the branch falls from the tree, it is no longer fixed. It has had a re-centering; the chimpanzee develops a new association with the object's function and in result can see it as a stick/tool.

Of the six experiments he conducted<sup>5</sup>, I am most interested in two of them, the "cork" and "box" problems. These two problems are distinctly different from the others, in that the crucial objects are "statically" fixed, embodying their previous function without direct intervention of the subject. In the other problems, the subject had to first use the crucial object in order to determine its function. This idea of an object functioning without any direct interaction is more specifically relevant to the assumptions we make about the objects in our daily life. We assume that the objects surrounding us are there for a reason; that a chair is there to be a chair, its function pre-determined and no potential outside of being a chair.

# The Experiments

---

“You will receive several little technical tasks. For solution, certain objects are needed which you will find among the objects here on the table. Everything which lies on the table is completely at your disposal. You may use what you like in any fashion you wish. Please think aloud during the experiment, so that I may hear as many of your ideas as possible, including those which you take less seriously.”

- Directions given by Duncker before each test

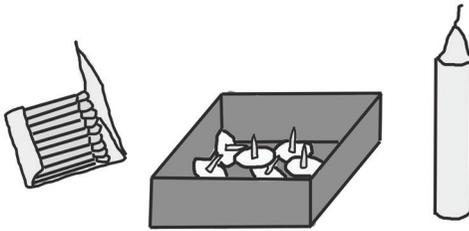


Figure from “On Problem Solving”

In the “box problem” Duncker presented his subjects with an arrangement of objects on a table, among those objects were three small pasteboard boxes (the crucial objects) each filled with candles, some tacks, and a few matches. The subjects were then given the problem: “On the [wall], at the height of the eyes, three small candles are to be put side by side.” The subjects had to figure out how they were to mount these candles on the wall using the

materials at hand. The subjects' immediate and pre-conditioned assumption to stick the tack through the candle would not work, leaving them in search of a new and slightly more obscure solution<sup>6</sup>. "With a tack apiece, the three boxes are fastened to the wall, each to serve as platform for a candle." The candles are then placed on the boxes themselves; the boxes no longer serving their typical function of containing loose objects.

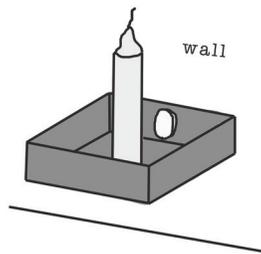


Figure from "On Problem Solving"

The second problem of interest is the "cork problem." According to Duncker's text the prompt read, "A triangle is to be drawn on a piece of cardboard which is in turn to be fastened to a wooden bar. The wooden bar is then to be fixed in a doorframe without the help of nails." Quickly the subjects would realize that the wooden bar was just a little too short to wedge into the frame, so they would look to the table full of objects for a solution. As before, on the table lay many objects and the one crucial object: the cork. The solution was to wedge the cork into the space between the wooden bar and the doorframe. However, "the cork [was] stuck as a stopper in an ink bottle, from which the ink for drawing the triangle was to be taken." This problem, in Duncker's words, "proved

to be the most difficult” of all the tests.

As part of my research for this paper, I conducted these experiments myself. In doing so I discovered an important distinction involving the degree to which the subjects successfully solved the problems. In Duncker’s description of his experiments he mentions that the solution objects lay on the table “among other things.” This vague description of the other objects present on the table meant that I had to use my own discretion in selecting those objects. In his paper he states that the crucial objects should provide the best solution of any of the other objects present on the table. In my experiments however, subjects continually found other ways of “solving” the problem using the extra materials provided. For instance, one subject used a ruler that he tacked to the wall instead of using the boxes. Initially I was frustrated by this, thinking that I had failed to properly select the other assorted objects present on the table. But upon reflection, I realized that despite the ruler functioning as a shelf for the candles, it was a poor shelf compared to the boxes. It was precarious and barely held the candles, and would never have allowed for them to burn without lighting the wall on fire. So, despite finding an alternative solution, the fixedness of the boxes still kept the subject from discovering the *best* solution possible.

# Functional Dynamism

---

Through all my research on Duncker, I have yet to discover a term that effectively describes the opposite of functional fixedness. Fixedness is clearly defined as a problem, but there is no terminology to describe the solution. Duncker uses the term “re-centering” to describe what happens in order to discover the solution, but this doesn’t necessarily refer to the general mind set as a whole.

Fixedness is a static position. Its opposite is a dynamic position, therefore I’ve found the most suitable term to describe the opposite of fixedness to be: “Functional Dynamism<sup>7</sup>.” I define Functional Dynamism as: the understanding that an object has nearly infinite potential; that one’s own understanding of an object’s function is inherently limited, and can and should forever be expanded. With this understanding, nothing is limited by our assumptions; our observations and opinions continue to change and develop over time. There is a clear acceptance of the fact that what we know is limited and impermanent; any new function or association becomes possible. From this, novel solutions can arise from previously inescapable situations.

## Finding the Solution

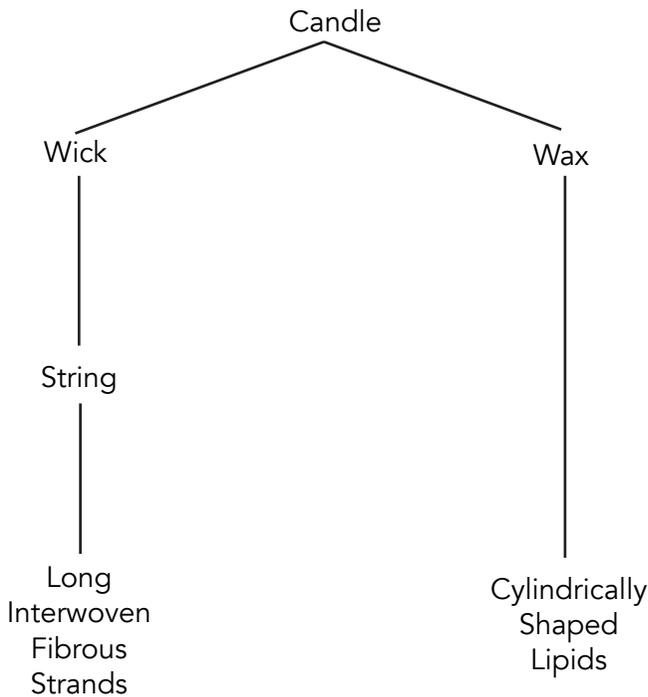
---

After it was published in 1938, *On Problem Solving* quickly became one of the most influential papers on productive-thinking. Many psychologists have both tested and confirmed its findings. In 1951, Birch & Rabinowitz published a paper called *The Negative Effect of Previous Experience on Productive Thinking*, and in 1952 Robert E. Adamson published a paper called *Functional Fixedness as Related to Problem Solving: A Repetition of Three Experiments*. Both of these papers confirmed Duncker's original findings, yet do not specifically describe a method for counteracting functional fixedness. In 2012 psychologist Tony McCaffrey was the first to release a paper of this nature: *Innovation Relies on the Obscure*.

In his paper, McCaffrey introduces a technique which he calls The Generic Parts Technique. This technique involves reducing an object to its most simplistic forms and describing these parts using words that do not imply a direct function. In his words: "For each object in your problem, you break it into parts and ask two questions, 1. Can it be broken down further? and 2. -- this is the one that's been overlooked -- Does my description of the part imply a use?" McCaffrey uses Duncker's example of a candle and illustrates his technique using the tree diagram shown. The Generic Parts Technique, employing the deconstruction of the original object, is

similar to what is commonly referred to as “hacking”.

Hacking, tinkering or bricolage<sup>8</sup> are all terms referring to the making of something using limited available materials. Often, as in the case of McCaffrey’s candle, the limited resources are contained within a larger object. If you pick up any issue of MAKE magazine you will find innumerable specific examples of this kind of Do It Yourself resourcefulness. Perhaps more interesting though, are the examples of entire societies, forced to develop their own tactics for repurposing materials as a means to survive.



## Out of Necessity

---

In the film, “The Coconut Revolution”, director Dom Roth-eroe documents a community in Papua New Guinea who live on an isolated island they call Bougainville. The people of Bougainville forcibly shut down a massive mining operation on the island, which in turn enraged the Papua New Guinea government resulting in an embargo that completely isolated Bougainville from any outside resources. Out of pure necessity, the islanders began harvesting and repurposing the old materials from the mining operation. Using the decrepit machinery they were able to create a sustainable, self-sufficient infrastructure including hydro-powered generators, weapons and combustible fuel for the abandoned vehicles.

Similarly in Cuba, around 1961, there was “an exodus of foreign companies and investment. The start of the now famous United States embargo against Cuba meant the large-scale departure of material resources from an island that once relied heavily on American cash and imports<sup>10</sup>.” Out of necessity, the people of Cuba began finding new uses for defunct items.

The story in Cuba is well documented by Ernesto Oroza. It is part of a movement which he refers to as Technological Disobedience. Facing the lack of new and working technology, Cubans had

“no choice but to build and repair both the state factory machines and the smaller machines in their homes...fabricating goods not officially available on the island became an essential skill.” Some of the most common modifications were to convert standard issue metal lunch trays into television antennas and cut old vinyl records to work as replacement fan blades.

These two examples in Cuba and Papua New Guinea are obviously not the only examples of such resourcefulness. They are however, excellent representations of entire societies overcoming functional fixedness. In these examples, they were unknowingly employing McCaffrey’s Generic Parts Technique breaking down larger objects and repurposing the smaller components. Pushed by circumstance, they freed themselves from their pre-conceived notions of an object’s function, literally saving their own lives.

Hacking, as evident in these examples, is a highly effective step forward from fixedness, yet in my mind it has one weakness: it does not address the greater conceptual issues of functional fixedness from the start. Breaking an object down to its simplest parts allows the subject to discover new uses for those parts, but does not specifically encourage a re-centering of the object as a whole. In order to examine the greater general concepts of functional dynamism, let us turn away from the acute mechanical and physical side of the problem and look instead towards its philosophical and theoretical sides.

## In Theory

---

“The degree to which a machine approaches perfection is thus everywhere presented as proportional to its degree of automatism. The fact is, however, that automating machines means sacrificing a very great deal of potential functionality. In order to automate a practical object, it is necessary to stereotype it in its function, thus making it more fragile. Far from having any intrinsic technical advantages, automatism always embodies the risk of arresting technical advance, for so long as an object has not been automated it remains susceptible of redesign, of self transcendence through incorporation into a larger functional whole.”

- Jean Baudrillard, *The System of Objects*

In *The System of Objects*, theorist and critic Jean Baudrillard describes the transition of an object from its original intended function into a larger functional whole as ‘functional transcendence’. Functional transcendence is the transition which allows for the re-centering of an object, an integral step along the way from fixedness to dynamism. Thinking back to the chimpanzee and the tree, the branch falling from the tree is the moment of functional transcendence. It is this action which allows the branch to transcend its original function, resulting in its re-centering.

In *The System of Objects*, Baudrillard addresses this idea of functional transcendence in relation to automatism. He is inter-

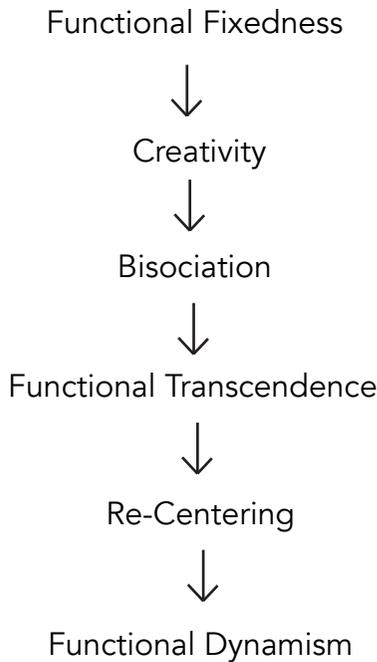
ested in examining how automatism sacrifices “a very great deal of functionality.” Automatism, or the stereotyping of a machine’s function, describes machines that become so specific in their use that they are nearly useless in any other way. Author and critic Jeremy Millar noted that “for all its extraordinary sophistication, a modern mobile phone might, in most circumstances, have less actual functionality than a simple bowl, especially when it can’t pick up a signal or its battery is flat.” This sacrifice could also be described as the fixedness of an object. The objects have not definitively lost any possibility of further function, rather, the bells and whistles push the concept of alternative function further from our grasp.

It is interesting to note that Baudrillard recognized the danger of Automatism in 1968, well before the advent of mobile computers and much of the modern, even more automated technology we use today. Where Millar and Baudrillard might see this as technology becoming useless, I would say that it is becoming more firmly fixed in our association of its function.

In order for an object to achieve functional transcendence, one must be able to see the object as it is *and* how it could be. One must simultaneously be able to imagine an object operating in two different ways. This dichotomy is what author Arthur Koestler describes in his 1964 book *The Act of Creation*. He defines it as ‘bisociation’; the “perceiving of a situation or idea [...] in two self-consistent but habitually incompatible frames of reference.” Bisociation is therefore necessary in order for functional transcendence to occur,

another step from fixedness to dynamism.

What is especially interesting about Koestler's text is that he not only describes bisociation, but he also points to creativity as a literal example of bisociative thought. There is a "clear distinction between a routine thought, taking place on a single plane or associative context, and the creative act, which always operates on multiple planes." As if as proof, in an interview with Claire Bishop and Mark Godfrey in 2006, artist Peter Fischli stated that "operating on two planes at once is part of our practice." Therefore, we can say that it is the creative act that elevates one's thinking to a place where we can perceive something bisociatively. As such, creativity is the first step forward from functional fixedness.



## The Creative Act

---

Artists clearly demonstrate the vast diversity and potential within the creative act. The role of an artist can be described as responsible for the transformation of an object or material from one state or thing into a completely new state or thing. In the context of this thesis, I might find it difficult to argue that a painter's use of paint is an example of transcendence of function, but within sculpture there are innumerable examples. There are many sculptors whose work exemplifies functional dynamism and provides tangible proof of the power and possibility of this dynamic mindset.

Art is the best medium for communicating these ideas about functional dynamism. By its very nature it is a subjective medium, and as a result it is harder for its content to become fixed in one particular association. When fixedness is the very content that we are talking about, it is important that the way we communicate the ideas does not perpetuate the problem. In this way, art can provide examples of functional dynamism without specifically limiting those examples to one particular product or one particular application. It leaves the viewer room to interpret and apply the ideas presented to his or her own life, thereby allowing a natural and dynamic evolution of ideas. For an example of this, let's look first at artists Fischli and Weiss.

## Fischli and Weiss

---

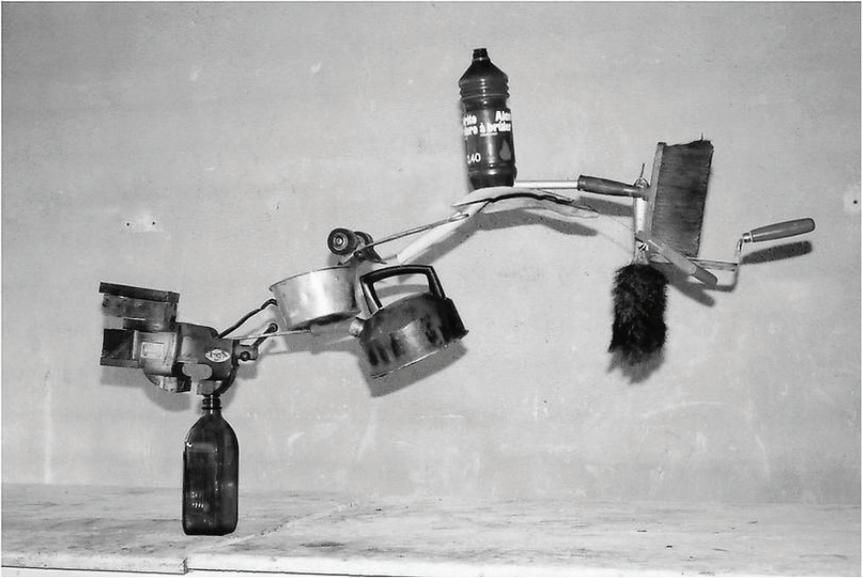
Peter Fischli was born in 1952 in Zürich, Switzerland, and studied at the Academy of Fine Arts in Urbino and Bologna. David Weiss was born 1946, also in Zürich, and studied at the School of Arts and Crafts in Zürich and Basel. Often referred to as Fischli/Weiss, the pair is well known for their humorous and seemingly absurd installations and video works.

Their collaboration began in 1979 with Wurst Series, which is a series of photographs of everyday scenes acted out by an assortment of sausages and lunch meats. In 1984 they completed another photographic series called Equilibrium, which documents precarious constructions of mundane objects right before the moment of collapse.

“We were sitting in a bar somewhere and playing around with the things on the table, and we thought to ourselves, this energy of never-ending collapse - because our construction stood for a moment and then collapsed before we built it up again - should be harnessed and channelled in a particular direction.”

- David Weiss

This work, as well as this idea of a never-ending collapse, would become the basis of their most well known and influential work, *The Way Things Go*.



"Equilibres", Peter Fischli and David Weiss

The Way Things Go is one of the best examples of functional dynamism that there is. The film is a thirty minute long, seemingly endless, chain reaction of objects collapsing and falling onto one another. The typical everyday objects used in the film are activated, becoming unique components of a larger mechanical system. For instance, the film's opening shot is of a standard trash bag spinning as the rope suspending it from the ceiling slowly unwinds. As the rope unwinds, the bag lowers, brushing up against a tire below it which in turn rolls away. So begins the entire chain reaction. One might never have thought that a trash bag could function as a delayed switch, but in this instance they have transformed it. No longer limited to its original function of only holding stuff, it has new limitless potential. At another point, we watch as a kettle attached to a roller skate sits atop a flame, boiling and building pressure. Suddenly it springs to life, careens along a track into a nearby table,



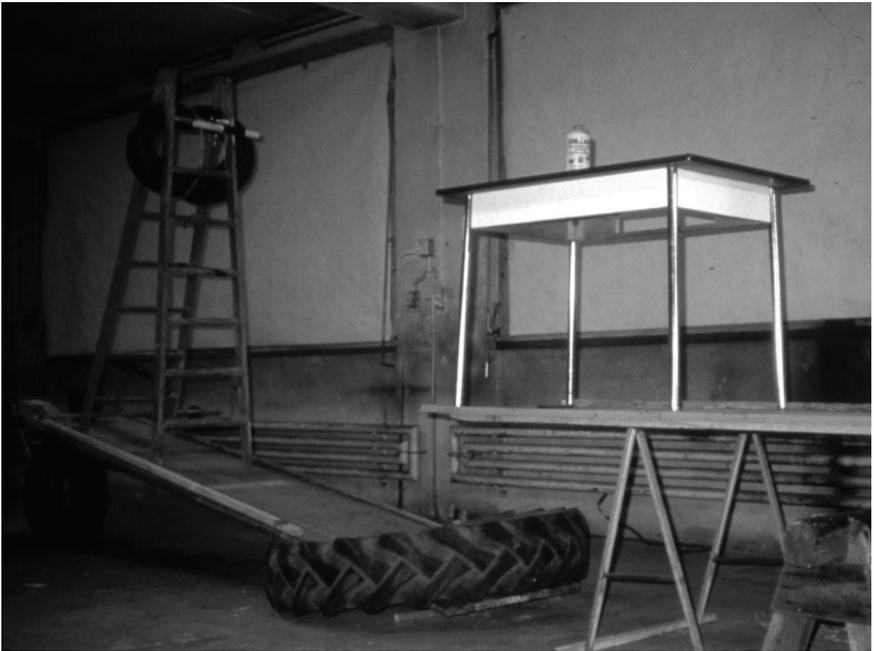
"The Way Things Go", Peter Fischli and David Weiss, 1989

and bursts into flame. Watching water boil, which is typically one of the most mundane and cliché examples of monotony, suddenly becomes an engaging moment of tension and wonder. These objects, ordinary and unassuming, become captivating and humorous, creating narrative actions that are poignant and amusing.

In his book, *Fischli and Weiss The Way Things Go*, author Jeremy Millar takes an in-depth look at this work, describing it as: "everyday objects removed from the everyday, performing tasks that are both the same as those they are used to – filling falling, emptying, rolling – and quite different." This 'similar yet different' phenomena is precisely bisociation. As the viewer we witness these objects, which we so clearly recognize, perform tasks that are completely outside their normal associations. We are seeing the objects

in two different ways, at once.

*The Way Things Go* was a huge success both in the art world and in the public domain. It played a huge role in inspiring dynamic new ways of associating with objects among a broad audience. Though they may be the most widely known example, they were not the first nor only artists to be working in this way. One may even speculate that they were influenced in some manner by Swiss artist Roman Signer.



"The Way Things Go", Peter Fischli and David Weiss, 1989

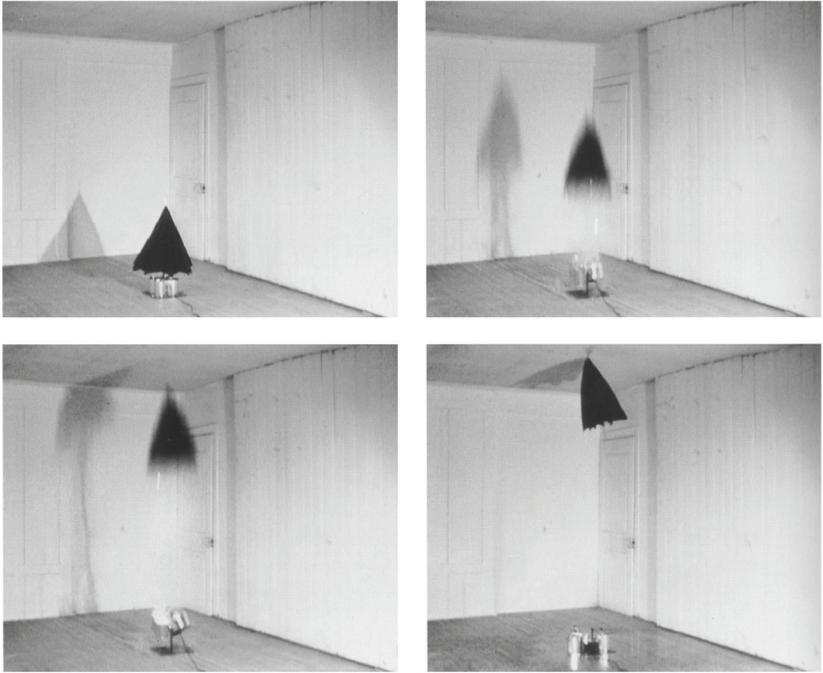
# Roman Signer

---

Roman Signer was born in 1938 and grew up in Appenzell, Switzerland. For much of his early life he was described as listless;<sup>11</sup> unsure as to what he was doing or where he was going in life. He had aspirations of being an explorer or an adventurer, but couldn't seem to hold down any real jobs. He was a failed radio technician, worked in a pressure cooker factory, and he spent 10 years working as an architect's draftsman, which he describes as "10 years [of his life] he lost". He failed at all of these professions and in 1966 fell very ill. During this time he was very weak, and spent much of his time reading or visiting museums. This time for reflection allowed him to realize finally that he wanted to be an artist. In 1971 he was awarded a scholarship to the Polish art academy and had his first exhibition in 1973. It was around then that he first started working with video, and in 1975 he started experimenting with explosives.

In an interview with Paula van den Bosch, Signer describes a moment from childhood, which seems to resonate within his entire body of work. "My aunt was once making a barley soup and the cooker exploded. All the soup hit the ceiling. A wonderful sculpture, fantastic! But my aunt was not amused."

In "Umbrella" (1989), Signer places an umbrella in an



"Umbrella", Roman Signer, 1989

arrangement of buckets loaded with explosives. The detonation propels the umbrella upward, sticking it into the ceiling above. "It's like an accident" he says, but an accident that comes about from a certain amount of deliberateness. This action of the umbrella being propelled into the ceiling is absurd in the sense that it has no real relation to the umbrella's original function. However, in this instance it is perfectly suited to act as a rocket or an enlarged dart. It is a clear example of the object functioning outside its intended function.

We see another example of this dynamic functionality in an earlier work, "Cap with Rocket" (1983). In this work, Signer is seen standing in a snowy field with a knit cap pulled over his head. A

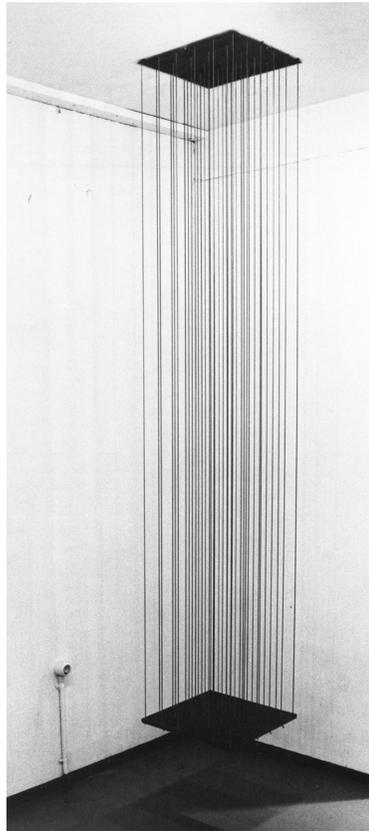


"Cap with Rocket", Roman Signer, 1983

rocket is launched right next to him and as it flies up into the air it whisks the hat off of his head. All of the objects within this work are operating more or less the way they are intended to function, yet somehow the literal and figurative connection of these objects creates an action sublimely out of the ordinary. The string that connects the hat to the rocket is a physical expression of Signer's ability to draw connections between objects that are clearly outside their typical association with one another. He continually proves that objects have a seemingly infinite wealth of 'hidden' potential.

In "Fatigue" (1978), Signer has a box over which he suspends a "metal sheet from two rubber cables fixed to the ceiling. Over a period of many years, the rubber becomes fatigued, the cables lose their tensile strength and begin to stretch in length. Gradually, the sheet sinks into the box", disappearing inside of it.

I was unable to find any documentation of this piece, but the work is visually very similar to "Floating Iron Slab," pictured below. "Fatigue" examines the passage of time, but also taps into properties of the materials which are completely outside their intended use. The gradual stretch of fatigued surgical tubing is typically described as an undesirable flaw. Signer is able to recognize the potential in this property, however, and utilize it in a simple, effective and poetic way. This awareness of a material's obscure physical properties comes directly from the same dynamic thinking and free exploration which this paper has been examining. This type of liberated exploration can also be seen in the work of Harrison and Wood.



"Floating Iron Slab", Roman Signer, 1975

## Harrison and Wood

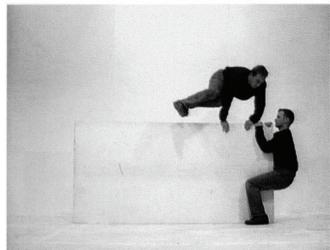
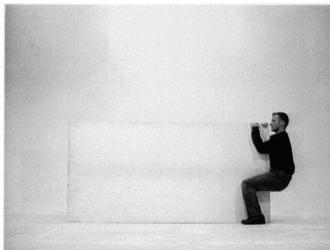
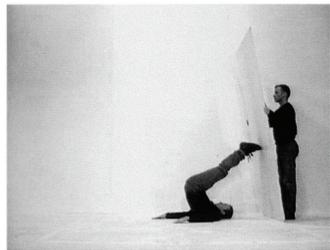
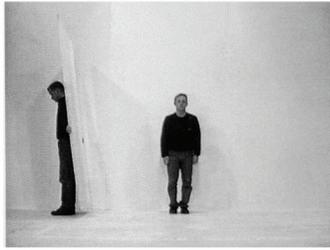
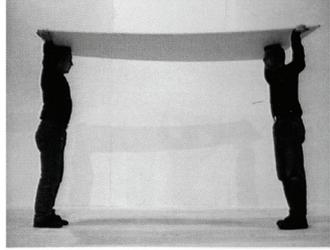
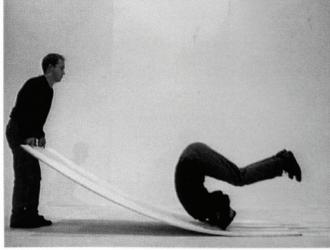
---

“John Wood and Paul Harrison, a British collaborative duo, make single channel videos, multipart video installations, prints, drawings, and sculptures that elegantly fuse advanced aesthetic research and existential comedy.”

-Toby Kamps, Answers To Questions

John Wood and Paul Harrison met in 1989 at the Bath College of Higher Education in the United Kingdom. In college, both Wood and Harrison made performative videos, but they never collaborated. In fact they “knew each other only in passing<sup>12</sup>.” It wasn’t until after school, while Harrison was in a two year residency program in Uppingham, England, that they began a number of casual collaborations. The early performances are described by Harrison as “just messing around in front of the video camera.” They continued their collaboration and over a period of about eighteen months they developed an effective communication style and a shared sense of direction for what they wanted to do.

Their work is a direct exploration of how the human body interacts with the material world. Their films are often shot in a neutral white space, the pared down environment allows the focus of the film to be on the actions presented. This simplicity is also reflected in that they “reject the dynamic camerawork and elaborate editing, common in artists’ films today.” They turn nearly any action into a beautiful, sculptural moment. In an email correspondence with



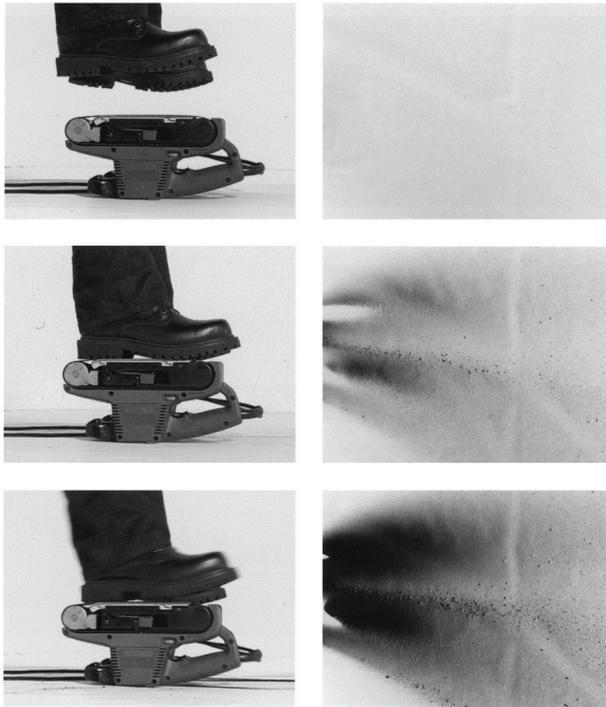
"Board", Paul Harrison and John Wood

curator Toby Kamps, John Wood is quoted as saying “things that appear as nothing are in fact sculptural, and there might be no such thing as an empty room<sup>13</sup>.” Applying our discussion of functional fixedness to this statement, one might say that the belief that an empty room has no use is an example of fixed thinking. Even since their earliest work, Wood and Harrison have demonstrated the limitless potential in even the most simple and mundane objects.

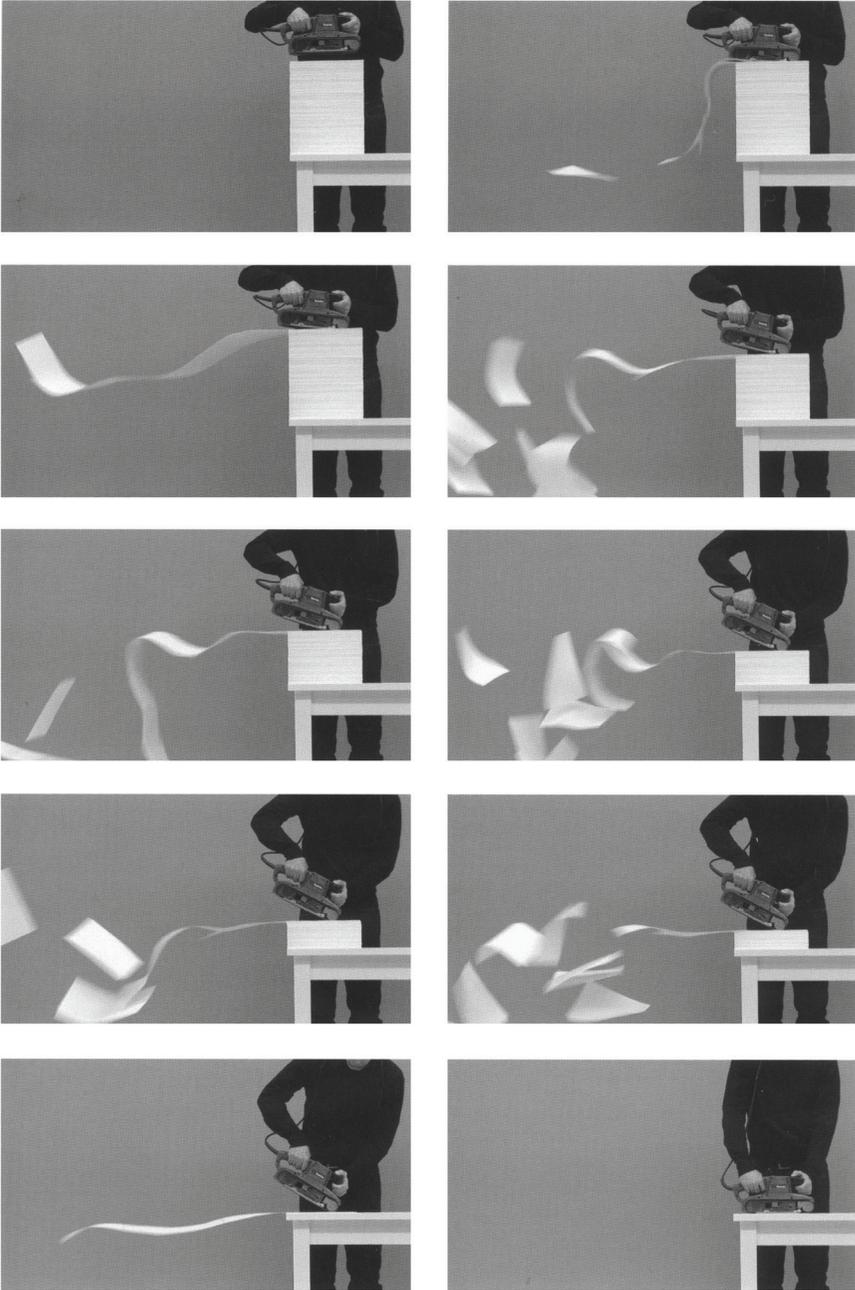
“Board” (1993), often thought of as their first work, is a simple static camera shot that documents the two of them completing “dozens of interdependent, choreographed moves on and around a large sheet of particleboard.” The work is a perfect example of the limitless types of interaction that are possible within the constraints of even the most basic forms. In the video the artists show us seemingly every possible permutation of interaction, it is practically a direct demonstration of functional dynamism.

In other works, they have chosen to highlight a specific moment that they have discovered through this explorative process. In “Another Pair”, we see a belt sander lying on the ground facing up. A pair of feet clad in black leather boots descend from the top of the frame. As the shoes meet the belt sander, the soles are worn away, leaving a black spray of worn rubber on the ground. This work brilliantly uses two very common and mundane objects in ways that are not dissimilar from their intended use. However, the combination of the two together end up creating an entirely new, absurd and poignant expression of time and function.

In "One More Kilometre", the belt sander is present again, but this time held in the hands of a figure, Harrison, only visible from the shoulders down. The sander hovers above a stack of computer paper, and as the figure lowers it, the paper slides off the stack in a "sinuous, white wave." This work once again demonstrates the amazing ability of the artists to find completely new properties and uses of ordinary objects and materials. The phenomenal visual effect of these pages, turned flowing stream, could only have been discovered through unrestricted physical exploration and conceptual recentering: functional dynamism at its best.



"Another Pair", Paul Harrison and John Wood



"One More Kilometre", Paul Harrison and John Wood

# Humor

---

“Jokes depend on sudden shocks and strange transformations that undermine the laws of our existence.”

-Rowan Atkinson, Rules of Comedy

I would like to take a brief tangent and mention a particular tone that all of these artists share. Looking at the examples we can see that there is an underlying theme of humor in most of the works. This aspect of humor, both entertaining and integral to the work, is an inherent by-product of the conceptual content we've been discussing.

Comedian Rowan Atkinson, well known for his role as Mr.Bean, has a list of rules for visual comedy. The list breaks down some fundamental truths about what makes something funny. There are a few specific components of that list<sup>14</sup> that are especially relevant to our discussion. Rule number two breaks down the three basic principles of what makes “things” funny.

- A.) Objects behave in an unexpected way,
- B.) Objects go to or appear in an unexpected place
- C.) Objects are shown the wrong size

These rules are very much in line with the rules that define bisociative thinking. It is for this reason that we interpret these bisociative, functionally dynamic actions as humorous. Our minds find it amusing to be surprised by something that we thought so mundane. Laughter is our visceral reaction to the surprise of seeing these objects' new potential.<sup>15</sup>

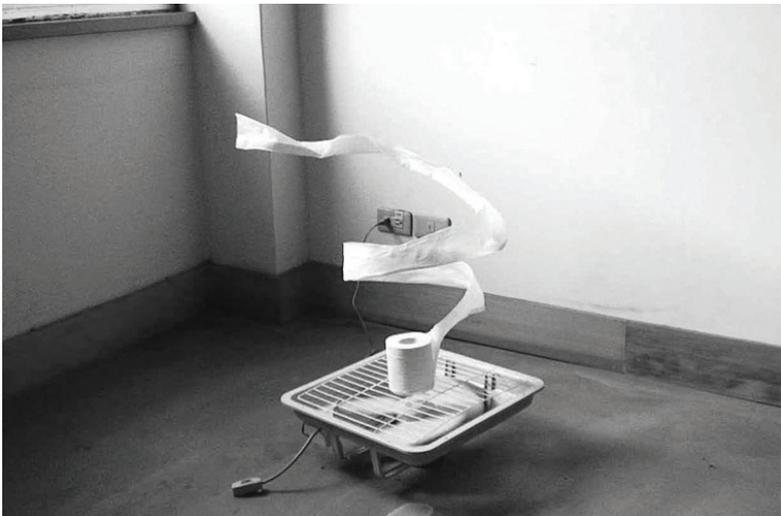


Buster Keaton and Jimmy Durante , circa 1930's

## More Artists

---

The previous examples of Fischli and Weiss, Roman Signer, and Harrison and Wood are perhaps the most well known examples of functional dynamism. There are many other artists however, whose work could also be classified in this vein. I am not going to address these other works, but I would strongly suggest that you look into the following artists. Japanese artist, Koki Tanaka, has a video titled "Everything is Everything" (2006/2007), which is essentially a survey of the subtle and obscure movements that exist within mundane everyday objects.<sup>16</sup> Bestue Vives, another collaborative duo, have a video titled "Actions at Home" (2005) in which they explore different ways to transform elements of their apartment into interesting actions.



"Everything is Everything", Koki Tanaka

## The Tape Series

---

As one might assume, the process of writing and researching this paper has had a profound impact on my own practice. As I work through my own ideas and projects, I have begun to employ these newly discovered tactics of problem solving and have found great inspiration in the work of all the artists I have mentioned. The most direct example of this influence can be found in my recent series of tape pieces: *Falling in Line I*, *Falling in Line II* and *Peel*. These works directly emerged from my research on functional fixedness; they were the result of a search for hidden or alternative functions within a roll of tape.

The typical function of a roll of tape is to stick two things together. This fixed interpretation of tape's function literally makes it a static object. Motivated by the action and time-based works of Signer, I pushed myself to find a new dynamic use for the tape. Through experimentation I discovered that the stickiness of the tape, rolled onto itself, provides a certain level of resistance as it unrolls. The stickiness of the tape acts as a brake, limiting how quickly it unrolls. With the right balance of weight and stickiness, I found a way to create a long drawn-out action that has little or no connection to the typical function of a roll of tape.

The first piece I made in the series, "*Falling in Line I*" (2013), consists of eighteen rolls of blue painters tape, hung at the top of



"Falling in Line I", Russell Hall, 2013

a wall. Each roll supports the weight of an empty one gallon paint can. Releasing them all at the same time, the weight of the paint can slowly causes the tape to unroll, and in turn leaves behind it a crisp vertical line of blue tape. The resulting installation is a large-scale, kinetic sculpture that references painting and is, in a way, responsible for its own creation.

I have continued exploring other ways in which I can exploit this unorthodox characteristic of a standard roll of tape. In "Falling In Line II" (2013), six rolls of duct tape suspend a standard yellow mop bucket. The bucket rolls down the wall leaving behind it a thick band of gray duct tape.

In "Peel" (2014), a stripe of color is painted on the wall, which is then completely concealed by a length of duct tape. At the top of the line of tape, a standard caster wheel is attached, which slowly begins to peel back the duct tape. As the wheel descends the wall, the stripe of color beneath is slowly revealed marking the descent of the tape over time. These works are indicative of a new way for me to handle and relate to objects. They are the beginning of my efforts to embody the information presented and apply it to my own practice. What is most exciting, though, is that these ideas have more significance than just governing our relationship to objects and art. They can be applied to larger contexts, they can be used in real world situations.



"Peel", Russell Hall, 2014

## As it Applies

---

“Although a thunderstorm is the most striking example of electrical discharge, its laws are better investigated in little sparks within the laboratory. To study in simple, convenient forms what is complicated and difficult to access is the method of experimental science; to lose in this simplification just the essential aspects, is its notorious danger... I hope to have succeeded in simplifying my subject without altering its essential nature.”

- Karl Duncker, 1935

Through experimental science, Duncker was interested in examining the complex methods of human problem solving. His research, which centered around minute problem situations which he created for his subjects, was not designed simply to find how best to mount candles to a wall. His concern was the larger concepts that these small situations simulated. The way in which we solve Duncker’s candle problem is indicative of how we might solve greater, more complicated issues. The same methods we use to overcome our fixedness towards candles can be applied in larger contexts. They can be used in real world situations.

In Cuba and Papua New Guinea, people were pushed by necessity to find dynamic solutions to their problems. In the United States, the same type of dire circumstance may rarely exist to force us to overcome functional fixedness. As a result, it is of utmost importance that we make a conscious effort and commit to a

continual pursuit of functional dynamism, always looking critically at the pre-conceived or underlying associations that may be falsely shaping and limiting our view of the world.

If, as individuals and as a society, we can maintain this mindset of free exploration and continual questioning, we will enable ourselves to discover the solution to the critical problems that we face. Functional dynamism is not the solution to all our problems, but it can play a key role in facilitating the discovery of those solutions.



"Falling in Line I", Russell Hall, 2013



footnotes

---

1

"Imagine you are asked to watch a short video (above) in which six people—three in white shirts and three in black shirts—pass basketballs around. While you watch, you must keep a silent count of the number of passes made by the people in white shirts. At some point, a gorilla strolls into the middle of the action, faces the camera and thumps its chest, and then leaves, spending nine seconds on screen. Would you see the gorilla?

Almost everyone has the intuition that the answer is "yes, of course I would." How could something so obvious go completely unnoticed? But when we did this experiment at Harvard University several years ago, we found that half of the people who watched the video and counted the passes missed the gorilla. It was as though the gorilla was invisible.

This experiment reveals two things: that we are missing a lot of what goes on around us, and that we have no idea that we are missing so much. To our surprise, it has become one of the best-known experiments in psychology. It is described in most introductory textbooks and is featured in more than a dozen science museums. It has been used by everyone from preachers and teachers to corporate trainers and terrorist hunters, not to mention characters on the TV show *C.S.I.*, to help explain what we see and what we don't see. And it got us thinking that many other intuitive beliefs that we have about our own minds might be just as wrong. We wrote *The Invisible Gorilla* to explore the limits of human intuition and what they mean for ourselves and our world. We hope you read it, and if you do, we would love to hear what you think."

- [www.invisiblegorilla.com](http://www.invisiblegorilla.com)

2

From 1923-1928 Duncker studied at Friedrich-Willhelms-University in Berlin, where he worked closely with Professors Wolfgang Kohler and Max Wertheimer. In 1925 Duncker was awarded a Clark University Fellowship and was able to follow Kohler to the United States. In the year at Clark University in Worcester, Massachusetts, Duncker received a Masters in Arts with his thesis, "An Experimental and Theoretical Study of Productive Thinking (Solving of Comprehensible Problems)".

In 1927 Kohler selected Duncker, "his "best student", to temporarily serve as his University Assistant at FWU, a position which he permanently took over in 1930. Duncker held his position as University Assistant at Friedrich-Willhelms-University until 1935 when he was fired from the university for political reasons. It should be said that in 1933 Duncker had applied for professorship at the university with his thesis, *Zur Psychologie des Denkens beim Lösen von Prob-*

lemen, which, per google translate, means "On the psychology of thinking when lots of problems", yet was rejected.

3

Much later upon looking into this event it has been discovered "that the reason for this decision was Duncker's communist connections, and the fact that he had been married to a Jewish woman." [Schnall] The university itself eventually admitted to wrongfully firing Duncker and forcing Kohler to leave, but not because of their claim that he was aligned with politics that the university detested. Rather because they acted on information that was given to them by a "lower" professor who ultimately had a lot to gain in seeing Kohler gone. For "the source" eventually was the person who took over Kohler's position once he left.

In 1935, Duncker applied for professorship again, yet was rejected for a second time and ultimately fired from his position as University Assistant. Interestingly enough, it was during that year that Duncker was able to publish his research in his influential book *Zur Psychologie des produktiven Denkens*, [Psychology of Productive Thinking].

After his hopes of working within German academia were squashed, he moved to England. However, by 1937 Duncker's mental state was rapidly deteriorating. He went to Switzerland for two months where he was treated for endogenous depression (basically a deep depression that comes from a chemical imbalance within the body, for which there is no apparent precipitating cause). Kohler and Wertheimer, Duncker's mentors/friends and closest colleagues were both working in the United States at this point and, concerned for Duncker, Kohler arranged for him to come to Swarthmore College, where he was currently working. Duncker spent two years as an instructor at Swarthmore, where he published three new papers yet was unable to gain control of his emotional and mental well-being and unfortunately, after several "nervous breakdowns" and the failed efforts to help by Kohler, Duncker, ended up committing suicide in 1940. He had just turned 37 years old. After Duncker's death one of his students, Lynne S. Lees, recognizing the significance of Duncker's work, decided to translate his 1935 book, *Zur Psychologie des produktiven Denkens*, into English. The translation was published in 1945 and was titled "On Problem Solving".

4

Duncker has two variations on each of the problems: "with pre-utilization" and "after pre-utilization." "With pre-utilization" describes a situation where the subject does not have to use the crucial object in its intended fashion before using it as the solution object. I am specifically interested in the "after pre-utilization"

tests, for these situations directly deal with the difficulty of re-centering one's association with an object. Duncker of course had to test both in order to prove this difficulty and show the drastic difference that this minor shift made in the subjects' problem solving capabilities.

The results were: "Under our experimental conditions, the object which is not fixed is almost twice as easily found as the object which is fixed." Meaning that the simple act of using the object in one way was so influential on subjects that it made it twice as hard for them to then see the second use for that same object.

5

"The "box problem:" On the door, at the height of the eyes, three small candles are to be put side by side. On the table lie, among many other objects, a few tacks and the crucial objects: three little pasteboard boxes (about the size of an ordinary matchbox, differing somewhat in form and color and put in different places). Solution: with a tack apiece, the three boxes are fastened to the door, each to serve as platform for a candle...the three boxes were filled with experimental material: in one there were several thin little candles, tacks in another, and matches in the third."

The "gimlet problem:" Three cords are to be hung side by side from a wooden ledge. On the table lie, among many other objects, two short screw-hooks and the crucial object, a gimlet. Solution: for hanging the third cord, the gimlet is used.

The "pliers problem:" A board (perhaps 8 inches broad) is to be made firm on to supports (as "flower stand or the like"). On the table lie, among other things, two iron joints (for fastening bars and the like on stands), a wooden bar perhaps 8 inches long (as the one "support") and the crucial object: the pliers. Solution: this pair of pliers is utilized as the second support of the board... the bar was nailed to the board and had to be freed with the help of the pliers.

The "weight problem:" A pendulum, consisting of a cord and a weight, is to be hung from a nail. To this end, the nail must be driven into the wall. On the table lies, among other things, the crucial object: a weight. Solution: with this weight (as "hammer"), the nail is driven into the wall...the weight is given expressly as pendulum-weight (with string already tied to it).

The "paperclip problem:" A piece of white cardboard with four black squares fastened to it is to be hung on an eyelet screwed into the low ceiling. On the table lie paperclips, among other things. Solution: a paperclip is unbent, one end is fastened to the eyelet and the other put through the cardboard...the four black squares [were] previously attached to the cardboard with paperclips.

The “cork problem:” A triangle was to be drawn on a piece of cardboard which was in turn to be fastened to a wooden bar. The wooden bar was then to be fixed in a doorframe without the help of nails. But the bar was about 2 cm shorter than the distance between the two sides of the frame. On the table lay, among other things, the crucial object: a cork. Solution: With the help of the cork, the bar is wedged between the sides of the frame...the cork [was] stuck as a stopper in an ink bottle, from which the ink for drawing the triangle was to be taken.”

6

As Duncker examines the process of solving a problem through a series of proposed or hypothetical solutions, he mentions a distinction that Kohlers makes between “good” and “stupid” errors.

“In the case of good, intelligent errors, at least the general functional value of the situation is correctly outlined, only the specific manner of its realization is not adequate. For example, an ape stands a box on its corner under the goal object, which hangs high above, because in this way the box comes closer to be sure, at the price of its stability. In the case of stupid errors, on the other hand, the outward form of an earlier, or an imitated solution is blindly reproduced without functional understanding. For example, an ape jumps into the air from a box- but the goal object is hanging at quite a different spot.” [Duncker, On Problem Solving]

7

I am very excited by this new term, Functional Dynamism. It is an idea that should and will have further text written about it. Visit [russellhallstudio.com](http://russellhallstudio.com) and sign up for the mailing list to be informed when further talks or papers are planned.

8

Crawford, Mathew, 2009, *Shop Class as Soulcraft: An Inquiry Into the Value of Work*, Penguin

Morozov, Evgeny, “Making It” [http://www.newyorker.com/arts/critics/at-large/2014/01/13/140113crat\\_atlarge\\_morozov](http://www.newyorker.com/arts/critics/at-large/2014/01/13/140113crat_atlarge_morozov)

Louridas, P. 1999. Design as bricolage: anthropology meets design thinking. (Nov 1999) *Design Studies*, Vol. 20, Issue 6, pp. 517-535.

Sung, J., Grinter, R. E., and Christensen, H. I. 2009. “Pimp My Roomba”: design-

ing for personalization. In Proc. CHI '09. ACM, New York, NY, 193-196.

Rosner, D. & Bean, J. 2009. "Learning from IKEA Hacking: "I'm Not One to De-coupage a Tabletop and Call It a Day. "pp. 419-422 in Proc. CHI 2009.

9

"The Coconut Revolution" Watch full documentary on Youtube: [http://www.youtube.com/watch?v=LDpvxQe\\_Jhg](http://www.youtube.com/watch?v=LDpvxQe_Jhg), more info at <http://www.imdb.com/title/tt0479000/>

10

"Technological Disobedience", Ernesto Oroza <http://mkshft.org/2012/07/technological-disobedience/> and <http://www.ernestooroza.com>

11

The personal details presented in this section are from an interview with Paula van Den Bosch. It is published in the Phaidon Press book titled "Roman Signer", this is the same book that has the Gerhard Mack text and a text by Jeremy Millar.

12

Kamps, Toby, Answers to Questions, Contemporary Arts Museum Houston, 2011

13

Kamps, Toby, Answers to Questions, Contemporary Arts Museum Houston, 2011

14

1) Great comedians don't just talk, but use visual humor as well. Using their body as a tool:

- a. There is comedy potential in every body part.
- b. Clothes play a big part (too small or too big).
- c. Character can look funny.
- d. (My addition) The body can interact with other props to create humor (or alone).

2) Funny Things: Three Basic Principles:

- a. Objects behave in an unexpected way
- b. Objects go to or appear in an unexpected place.
- c. Objects shown the wrong size.
  - Combining these three principles may not make the business more

funny.

- Jokes depend on sudden shocks and strange transformations that undermine the laws of our existence.

- 3) Slapstick and Violence (the earliest and perhaps most crude form):
  - a. The more realistic, the funnier the gag.
  - b. The more dignified the victim, the funnier the gag.
  - c. Shock of violence must be separate from the reality of pain.
  - d. Use of overstatement or understatement create this comedy.
- 4) Magic & Surrealism (the comedian uses the Illusionist's tricks):
  - a. Appearing and Disappearing - gags are funnier if the character disappears.
  - b. Transformation - must be absurd as well as astonishing
  - c. Speeding things up (or slowing down)
  - d. Comedy rooted in fear
  - e. Strange images
- 5) Imitation & Parody (a step up, but not the highest form of comedy):
  - a. Exaggeration creates a parody
  - b. Representing authority creates satire.
  - c. Using others' stories or material can create comedy, but the effect lessens with the popularity of the others' material.
- 6) Mime & Body Language (Moving into character and situational comedy):
  - a. Create an interesting character.
  - b. Can be simply in the shading of a facial expression.
  - c. Not about doing funny things but doing normal things in a funny way with personality.
  - d. New attitudes make the old joke new.
    1. Dim (stupid) - knows less than the audience - has a bewildered innocence.
    2. Aggressive - lack of consideration for others.
    3. Crude - comedy of social embarrassment or vulgarity.
    4. Etc.
  - e. Only if you identify with an attitude will you laugh.
  - f. Charlie Chaplin is one of the most skilled at this type of comedy, but doesn't always get the laugh (while he does draw smiles and emotions).
- 7) Qualities that transcend time: The character of the physical comedian.
  - a. Like us but different - an alien on the other side of the mirror.
  - b. Innocence - born yesterday  
Battles with normal objects  
Constantly makes mistakes  
Tenacity - keeps doing things when others would've given up.

- c. Socially Inept - either doesn't understand conventions or doesn't know how to follow them.
- d. Drunkenness is an alternative to childishness
- e. Hard to form normal relationships
- f. Constant hostility from all quarters
- g. The comedian can't die or get seriously hurt.

8) The opposite of all rules are true: ALL rules can be broken.

15

This section on how humor relates to my practice is another example of a section that deserves to be its own paper. Humor is not just related to my work, it's integral. Visit [russellhallstudio.com](http://russellhallstudio.com) to sign up for my email list to get updates on shows, talks, or new papers that might expand on this subject. Also, if you ever get a chance to talk to Lindsey White, do so, she has much wisdom on this topic.

16

Koki Tanaka - "Everything is Everything"

<https://www.youtube.com/watch?v=yM0LaSAn5n8>

[www.kktnk.com](http://www.kktnk.com)

## Glossary

---

**Problem Solving** : Problem-solving is a mental process that involves discovering, analyzing and solving problems. The ultimate goal of problem-solving is to overcome obstacles and find a solution that best resolves the issue.

**Productive Thinking** : The ability to problem solve

**Creativity** : the ability to come up with novel and appropriate solutions to a given problem

**Functional Fixedness** : The inability to see a use for an object outside of its intended use.

**Functional Transcendence** : The transition of an object from its original intended function into a larger functional whole

**"Good" Errors** : Good, intelligent errors, at least the general functional value of the situation is correctly outlined, only the specific manner of its realization is not adequate (box on corner)

**"Stupid" Errors** : The outward form of an earlier, or an imitated solution is blindly reproduced without functional understanding (box not even near bananas)

**Successive Phases of Problem Solving** : Phases which (with the exception of the first phase) have, in retrospect the character of a solution and (with the exception of the last phase), in prospect, that of a problem

**Problem-Situation** : The context around which a problem is framed

**Crucial Object** : The object that has the inherent ability to act as the "solution object" but has not yet done so

**Solution-Object** : The "crucial object" after it has been re-framed as being suitable to solve the problem

**Centering**: The normal association or expected function of an object

**Re-centering** : to create a new association/expectation that is outside of its normal function.

**Pre-utilization** : The object has already been used in the same problem-context, but in another way, in another function.

**Without Pre-utilization (W.P)**: The test was conducted in such a way that the subject did not have to use the object first.

**After Pre-utilization (A.P)**: The test was conducted in such a way that

the subject had to directly use the crucial-object.

**Statically Fixed** : Embodying a previous function without any intervention or activation by a person. (e.g. cork in bottle)

**Bisociation** : Perceiving of a situation or idea [...] in two self-consistent but habitually incompatible frames of reference.

**Automatism** : The stereotyping of a machine's function, in such a way it becomes so specific in its use that it is nearly useless in any other way.

**Functional Dynamism**: The understanding that an object has nearly infinite potential; that one's own understanding of an object's function is inherently limited and therefore can forever be expanded upon.

# Bibliography

---

Mack, Gerhard, Modulations of Time and Space The Work of Roman Signer, Phaidon, 2006

Millar, Jeremy, Wanderweg, Phaidon, 2006

Millar, Jeremy, Fischli and Weiss The Way Things Go, Afterall Books, 2007

Kubler, George, The Shape of Time, Yale University Press, 1962

Oroza, Ernesto, Technological Disobedience, <http://mkshft.org/2012/07/technological-disobedience/>,

Rotheroe, Dom, The Coconut Revolution, [http://www.youtube.com/watch?v=LDpvxQe\\_Jhg](http://www.youtube.com/watch?v=LDpvxQe_Jhg)

Baudrillard, Jean, System of Objects, London Verso, 1996

Koestler, Arthur, The Act of Creation, London:Picador, 1975

Duncker, Karl, On Problem Solving, Psychological Monographs, Vol. 58 No. 5, American Psychological Association Inc, 1945

Millar, Jeremy, Catastrophe Practice, Butler Gallery, 2001

Levi-Strauss, Claude, The Raw and the Cooked, University of Chicago Press, 1983

Kamps, Toby, Answers to Questions, Contemporary Arts Museum Houston, 2011

Bourn, Ian, John Wood and Paul Harrison The Men Inside my Television, Carrol/Fletcher Gallery, 2012

Stevenson, Diana, Things That Happen, Carrol/Fletcher Gallery, 2012

Batchelor, David, Falling Over, ellipsis, 2000

Esche, Charles, Nohow On, ellipsis, 2000

Butler, Brian, Roman Signer Sculpting in Time, Kerber Art, 2008

Kataoka, Mami, Where one thing ends and another begins, The Human Factor, 2012

McCaffrey, Tony, Behind every innovative solution lies an obscure feature, Knowledge Management & Learning Vol.4, No.2, 2012

Critchley, Simon, Humour: Thinking in Action

Schnall, Simone, Life as the Problem: Karl Duncker's Context

Adamson, Robert, Functional Fixedness as related to Problem Solving

Morozov, Evgeny, Making It. [http://www.newyorker.com/arts/critics/at-large/2014/01/13/140113crat\\_atlarge\\_morozov](http://www.newyorker.com/arts/critics/at-large/2014/01/13/140113crat_atlarge_morozov)

Liechti, Peter, Signers Koffer, DVD, absolut Medien, 2012





A project  
presented to  
The Graduate Faculty

California College of the Arts

Submitted in partial fulfillment  
of the requirements for the degree  
Master of Fine Arts 2014 by

Calen Russell Barca-Hall

Approved:

---

Joshua Greene, Main Graduate Adviser

---

Maria Porges, Thesis Adviser

---

Amy Balkin, Graduate Office representative

(April, 2014)

