

Steiner's exercise as a Goethean approach to human artifacts

The following description is excerpted from a long paper on the application of Johann Wolfgang von Goethe's scientific approach to the study of human artifacts. This excerpt below describes a case study where I used a Rudolf Steiner exercise in the study of an arbitrary artifact. For more information on Goethe's approach, other systematic ways of using his approach, and an evaluation of the process and results, please see the full paper, available at <http://www.gocatgo.com/texts/goethe.artifact.pdf>. A shorter version is also available at <http://www.gocatgo.com/texts/history.talk.pdf>. The numbers in parentheses following Goethe quotes refer to page numbers in Miller (1998). - jd

Another expression of the Goethean approach can be derived from an exercise designed by Rudolf Steiner¹ to develop the control of thinking. The first of Steiner's "basic" training exercises uses an implicit Goethean approach to studying a simple object (Steiner, 1997). The goal of the exercise is to develop the capacity of controlled and focused thinking. The object being studied is arbitrary. The goal of the exercise is *not* to understand the object itself, but to develop the particular skill of thinking in a deliberate, willful, structured and focused way. The simple, commonplace object provides a baseline against which one can recognize intrusive random or speculative thoughts and dismiss them. The exercise incorporates the main features of the Goethean approach. Floris Lowndes (2000) provides a series of structuring questions for the exercise, and which can easily be adapted to frame a Goethean approach to the investigation of human-made artifacts, and through them to broader social and historical processes.

As preparation for the exercise, one first chooses an object of investigation. For the sake of the exercise the object should be a human-made object. Preferred objects are those with no moving parts, and of simple construction. Once the object has been selected, one should learn as much about it as possible -- its history, the manufacturing process, uses, inventor(s), predecessors, and so on.

The actual exercise consists of thinking about the object, and only the object. Ideally, this should be done as a daily exercise for 15 to 30 minutes at first, and for less time after practice. Lowndes suggests using a seven-part sequence to structure the thinking, which can be organized as a series of questions:

- a. physical: What is it made of? What are its properties?
- b. historical: How is it made? How is it used?
- c. emotional: Why this design? What are my feelings about it?
- d. creative: Who created it? Invented it?
- e. desire/need: What need or desire led to its invention?
- f. origins, background: What preceded it? What was its context?
- g. archetype: What is the concept of the thing? Other forms?

¹ Rudolf Steiner (1861 - 1925), among many other accomplishments, was a scholar of Goethe. He edited and wrote introductions for Goethe's scientific work for the Kürschner edition of German literature (Barnes, 2000), a fourteen year project. During that time he also wrote two books about the philosophical implications of Goethe's scientific work (*A theory of knowledge implicit in Goethe's world conception* written in 1886, and *Goethe's conception of the world* written in 1897, near the end of the Kürschner project). His *Philosophy of freedom* (1894), written during that period also incorporated Goethean themes. This work was undertaken several years before Steiner founded the anthroposophical movement. Goethe's approach to the world provided an inspiration and starting point for Steiner's subsequent research and activity.

The investigation moves through the questions in sequence. As the investigation develops, new questions about the phenomena will occur, requiring further research. As one becomes proficient with the questions, Lowndes suggests running through the sequence in reverse order.

This exercise shares the same basic structure as the process described by Holdrege and Brook. The preparatory phase includes selecting the object of investigation, but approaching it with a set of generic riddles (i.e., Lowndes questions). The exercise adds the activity of preparatory research, to provide additional ready-made observations to incorporate into the study of the object. The implicit prejudices that one brings to a natural object are explicit and external in this exercise, which helps one recognize them as add-ons to the process. The explicit preparatory research and the structuring questions make this approach especially useful for studying human artifacts, where much of the artifacts existence has transpired beyond the realm of direct experience.

The actual investigation begins with a focused study of the physical object, and although this is only one of seven categories of investigation, it is the foundation of the rest of the exercise. This empirical study is complemented by the other categories. The imaginative recreation of the process through time comes into play with the biographical and origin questions. The other questions lead to other imaginations which culminate in the question of archetype. The questions themselves formalize the conversation which leads from the physical object to a form that can only be grasped via the intuitive thinking, the "now I am knowing."

Because the object of investigation is a human-made artifact and not a natural phenomenon, it incorporates dimensions that natural objects do not. For example, human-made objects are the products of human societies, social relations, economic ties, intentions, creativity, hopes, desires, and so on. The human artifact brings with it the human world, and the series of questions helps to structure an investigation that otherwise can easily runaway with itself. While the human-made artifact is no more complex than a plant or animal or even a rock, it is no less complex either.²

Human artifact case study

How might this third example work in practice as a Goethean approach? This section describes such an application to the study of a simple human-made artifact. The following description should be read as a proof-of-concept, to suggest the kinds of results that are possible. Just as minerals, plants, animals and ecosystems each have special characteristics that direct the investigation, so too do human artifacts, which will be apparent in the following report.

I chose a cast-iron frying pan as the object of my study.³ The frying pan satisfied the criteria of being human-made, and of simple construction. As part of the preparatory work, I read

² It should be noted also that this human dimension also exists for natural phenomena. Humans interact with nature, and in many cases have played an important role in shaping the context in which the natural object exists. The plant may be an "exotic", or only grow in boundary areas of human activity (e.g., roadsides). There are very few spaces that have not been touched directly by human hands, and it is fair to say that the entire planet is indirectly being shaped by human activity. Lowndes's questions can also help to structure the exploration of the human dimension of natural objects.

³ I thought about what to use for some time. Steiner (1997) uses a pin and pencil as examples; Lowndes uses a pencil. Neither of these seemed compelling to me. By choosing something different from what Lowndes described, I avoided taking on his thoughts as my own. The frying pan also had a resonance for me -- it was something I used, it had some personal significance through my mother and my childhood, it also represented a simplicity, earthiness, and retro-industrial quality that also appealed. However, for the purpose of the *exercise*, the choice should be

Wikipedia (2006) articles on iron and cast iron and read esoteric perspectives on iron (Pelikan, 1973). As the exercise progressed, I became more attentive to references to iron and cooking utensils in things I read or saw and these in turn informed my exercise.

a. Physical: What is it made of? What are its properties?

The exercise began with a methodical examination of the frying pan. However, in the course of the focused examination, I can't help that various things I have read about iron and metallurgy and biology occur to me in the course of this study, expanding my thinking about the physical pan.

I try to look at it as "just a thing": fairly heavy for its size, hard to the touch inside and out, smooth in spots but caked with flaking residue of some sort around the outside, various shades of black in color (though if tilted in the light, there are various reds and blues reflecting off of the surface, not unlike light reflected off oily water). Although opaque and mostly black (the center of the bottom is a shiny gray), it still is capable of reflecting some images in a bright light. In the winter, in the morning, it is cool to the touch; in the summer, in the warm room, the pan too is warm -- it picks up heat. From cooking with a similar pan, I also know that it holds and transfers heat well. When struck with a knuckle, the pan makes a ringing noise, though the nature of the ring varies with how the pan is held -- it also transmits sound. The pan has a particular shape: circular, with sloping sides, the top rim modified by two pouring lips on opposite sides, and a short looped handle.⁴ The pan has the smell of old grease. A magnet sticks to the pan.

I have been told that similar pans are cast iron, though to be honest I do not know how exactly to determine this for myself. I proceed with the assumption that the frying pan is indeed cast iron. From my prior research, I learn a number of things about iron and cast iron: Iron is an element, considered a metal, and it is the heaviest substance that can be formed out of normal solar fusion. This makes it the most abundant heavy metal in the universe, and the most common metal on our planet. The core of our planet is believed to be iron, or mostly iron, giving the planet its magnetic field. Iron has a high melting point. By itself, iron is relatively soft and of little practical use. However, when a small amount of carbon (2-4%), silicon (1-2%) and other trace elements are mixed in, the melting point drops by several hundred degrees to a temperature that can be obtained in a relatively simple air furnace. The molten fluid can be cast into molds, hence "cast iron." The resulting alloy is hard, but also brittle. The articles indicate that the silicon interacts with the carbon to enable the carbon to take the form of graphite, which gives this type of cast iron the grey color I see on the bottom of the pan. The graphite gives cast iron its thermal and sound conductivity. The presence of the trace elements gives cast iron its special character -- this interests me.

From high school biology I remember that iron plays an important role in human metabolism. The iron in hemoglobin allows red blood cells to bind oxygen from the lungs and transport it to the cells. Through other reading I learn about the other side of this process -- iron also readily

irrelevant, although compelling enough to allow one to stick for some period with what could easily become a tedious exercise. If my goal was to come to a greater understanding of the object, the choice of research object would of course be very significant.

⁴ I note that identifying the lips as "lips" and the handle as "handle" betrays some prior knowledge. I might be able to infer these functions if I had never seen such an object.

gives up its oxygen partner which is why hemoglobin can effectively transport the oxygen (I imagine a tussle with the UPS driver to let go of the package he is supposed to deliver.) In addition to the Earth's iron, iron also rains down on the planet from space in the form of meteorites. The element iron has been cross-culturally associated with the planet Mars. Goethe described iron as a "confidant for the rigid body of the earth, a metal the least fragment of which tells us about what is taking place in the entire mass." (158)

I am struck by how constant, stable, and *inert* the frying pan is. It has accumulated dust over time, but I can wipe that off and the underlying pan seems to be unchanged. From my readings, I learn that cast iron should be seasoned by heating cooking oil to a high temperature in the pan; this will provide a non-stick surface by filling in pores in the metal, and also keep the iron from rusting. I suspect that if the pan was stripped of its encrustation and seasoning, it would rust if exposed to water. As a cooking instrument, it is repeatedly heated several hundred degrees and cooled, but remains for the most part unchanged (except for the growing encrustation on the sides). Properly cared for cast iron cookware can last for generations. I am convinced that the frying pan, just sitting on my floor, undergoes a very slow process of change over time, although mostly? or exclusively? due to external processes affecting it: moisture, dust, oil from my fingertips, perhaps sunlight, auto exhaust from the Kennedy Expressway I can hear in the distance. The pan shares the solidity and relative stability of un-worked minerals. The relative unchanging-ness of the cast iron is itself a question worth exploring. How different the frying pan is from the cat that insists on my attention!

The pan is iron and carbon and silicon, basic elements of nature. And so the frying pan is nature also, and in its mineral-ness shares the possibilities of the Goethean approach to minerals -- more paths of investigation.

"Form" and "content" take on concreteness. The content of the frying pan is cast iron, which heats quickly, holds on to the heat, and transfers it throughout the pan. The form of the frying pan is its shape described above. The unity of these two properties gives the frying pan its particular utility as a cooking instrument.

I realize that there are many further possible investigations into the physical frying pan. What is the residue caked on the outside? What are the magnetic properties of the pan? How brittle is it? I read about a kind of relationship, a polarity, between hemoglobin and chlorophyll, the animal world and the plant world (Pelikan, 1973). What is that about? What does iron look like in the wild? How much iron falls on the earth? And so on.

b. Biographical: How is it made? How is it used?

Although Lowndes describes this category as "history", I think "biography" is more accurate, as the category describes the life history of the artifact.

The previous owner of our house, a woman in her mid-60s, had passed away, and her son who inherited the house had no interest in the contents. We bought the house and the woman's household, including the frying pan, seven years ago.

Most of the biography of the frying pan must be imagined, as there are no identifying marks on the pan as to manufacturer or country of origin (perhaps under the residue?). I prefer to work backwards: frying pan as object of contemplation -> gathering dust, unused part of estate -> a cooking instrument, used in preparing meals -> how many generations in the family? purchased? traded? at some point it transformed from inventory item in a shop or on a merchant's cart to a useful cooking instrument -> some indeterminate sequence of steps from the point of sale back to the manufacturer (unshelved, boxed, shipped, unboxed unwrapped, back to its moment of creation as a frying pan. Its birth, as it were, takes place when workers bring the iron ore and heat together in a foundry. *Ore* and *coal* are destroyed as such, reappearing as cast iron in a particular shape, giving it a particular utility. Before that, there were the moments of mining the ore and coal, and the processes before that that created the tools and fuel needed to wrest the raw materials from the earth. And before that, the biological, geological and cosmological processes that formed the planet.

It seems silly to even write this, but there are many levels of detail skipped over in such a schematic treatment. I want to speed up "the life of the pan" because the day-to-day unchangingness of the pan makes for a very slow biography. Questions occur to me: how is the slow unchangingness of the frying pan the same or different from the slow unchangingness of the rocks in, say, the Colorado canyonlands? The canyonland rocks are varied, complex compared to this human artifact.

I can't help thinking that the history of the frying pan transpired under specific social conditions. Marx's analysis of the commodity keeps popping up in my contemplation, which leads me to an awareness that the biography transpires in multiple dimensions. It exists as various forms of minerals and energy transformed into the thing before me. It exists as matrix of social relations as capital flowing through various transformations up to the moment of consumption, the point where the value in the frying pan commodity is, as Marx would say, "realized," and its use value or utility can be realized by its new owner.

No, those words are abstractions, overlays. I find it very easy to drift from the frying pan and the concreteness of its history into analysis and abstraction. So instead I try to imagine the ironworkers, miners, drivers, accountants, retail clerks, working away. Also shareholders, brokers, speculators. Muscle and nerves, also human feelings and dreams, and also power relations -- some own, most do not. That word "owner" implies property, legal structures, social relations; the foundry and raw materials are "property"; the frying pan is also property.

As an object of utility in the kitchen the frying pan has another life as a cooking tool, an extension of the cook, interacting with the world, transforming groceries into meals, and all of the connections that flow from that. The act of cooking comprises functional and creative moments; meals connect to family, social moments, and emotions, feelings, etc. Meals also suggest renewal and new life. Domestic life connects back to social relations. The renewed family member becomes worker again, new family members become future workers. The frying pan plays a part in that.

As a human artifact produced under social conditions, the frying pan biography invokes the vast web of the world economy. The frying pan, despite its iron opacity, becomes a window to a social world. At various stages of the life of the pan, threads lead off, threads that can be followed as part of the life of the pan: the lives of the people who enjoyed meals cooked in the pan; the uncountable workers who touched the life of the pan at some point. These workers are all *people*, and the labels I conjure merely locate them as nodes within a system of production. As human beings, these people have lives far beyond the narrow categories of their concrete labor. They each have a *human* biography that reaches across time, faintly echoed, if I listen carefully enough, in my frying pan.

c. Emotional: Why this design? What are my feelings about it?

Lowndes says to "always remain factual and objective, keeping the object in close view and avoiding a particular slant or interpretation." (p. 67) I find this question to be the most elusive. Do I have feelings about the pan? Does its design evoke any particular aesthetic feelings?

Hmmm. The pan has a functional, simple design, with no adornment. It is solid, and one continuous piece. The circular shape conforms to the shape of a gas or electric burner; the circularity probably has some functionality in evenly distributing heat in the pan.⁵ The sloping sides make it easy to clean. The two lips on the rim of the pan simplify pouring hot liquids from the pan. The handle features a loop for hanging. The pan expresses a solid, grounded functionality and simplicity. I guess that this design has not changed significantly in maybe 200 years. I realize that the simplicity, the un-pretentiousness, the durability appeal to me. It resonates with what Goethe called "the economy of nature" (155), the engineer's KISS acronym, Occam's Razor. The simple, functional features are part of what drew me to the frying pan for this exercise.

The pan suggests the domestic arts, cooking. The pan is similar to one I inherited from my mother, though smaller. The pan in front of me reminds me of my mother, her cooking, my family, my growing up. I use her pan now and I like the way it cooks food. Cast iron cookware requires some extra attention to keep it properly seasoned. Using the pan and taking care of it makes me feel connected to a tradition. It is also a tool, and it helps to pull me out of the abstract computer work I usually do, and connects me to tangible, physical things. I relate to the world in a very present way when I use it. I realize that I like that.

d. Creative: Who created it? Invented it?

The question of "who created the pan" is not so much a question of how to attribute authorship as accessing the experience of creativity. Lowndes describes this as "the birth of the concept in the inventor's mind" (p. 71). The creative moment represents the point at which many threads come together, the Aha! moment, and the transformation from imagination into external object begins to take place. For my frying pan, where was that moment? Or the many moments?

⁵ I bother to note this because one manufacturer has recently come out with a line of (very expensive) oval-shaped frying pans. See, e.g., <http://www.pans.com/products/bourgeat-oval-frying-pan-14-2-inches-1-7-quarts-6738.html>

The multiple dimensions of the frying pan become especially vivid when I consider who created the pan. Was it the person or persons in China who built the first oven lined with ceramic tiles to reflect heat back into the heart of the oven, raising the temperature enough to melt iron alloys? Whoever discovered that small amounts of carbon and silicon mixed with iron, and heated in the oven would melt and could be cast into shapes? Was it the person who realized that cast iron could make a useful cooking utensil? Or whoever actually cast the iron into a pan shape for cooking? Can these moments even be assigned to individuals? Well certainly, but did not many individuals collaborate actively or unknowingly to bring the first frying pan into existence? Here the invention, the creation is both a combination of many individual excitements of bringing something into being; and at the same time part of a broader social process of communication, collaboration, imitation, exchange.

Perhaps I am forcing this notion of "inside" and "out", "imagination" and world." Or the notion of creativity as a "moment", a point in time, rather than a space or process or timeless present. Perhaps those notions are historical constructions, indications of a particular stage in the long process of the evolution of consciousness.

I think that there is a process of creating "the first frying pan", a new configuration of cast iron for a particular utility, but there is also the creation of the pan in front of me. I could consider the creation of the individual instance in front of me the result of the production process, a process of replication. But I think of something Marx wrote, that the act of labor is preceded by the act of imagination -- "But what distinguishes the worst architect from the best of bees is this, that the architect raises his structure in imagination before he erects it in reality. At the end of every labor-process, we get a result that already existed in the imagination of the laborer at its commencement." (Marx, 1967, p. 174) So I contemplate this aspect of creativity -- the act of imagination that precedes production.

One could argue that the creator of my frying pan was the entrepreneur who brought together the capital and labor, the designers and production workers, who organized and directed the production and marketing process -- in a sense this person is the creator. But today, in a developed capitalist system, rarely is one individual responsible. Capital comes from many sources; the enterprise is likely owned by many shareholders. Through the financial system, the production process is connected with every other capitalist. Did the system as a whole create the frying pan? But then the experience of creation -- is it abstracted out of the process, and perhaps even disappears?

On the other hand, the actual production work, the process of transforming iron ore and coal into frying pan is carried out by human beings in their status as workers. Again I think of Marx and labor and value. The most fundamental creative act in capitalism is the production of value by workers. Were these workers alienated from their labor? Was there any joy or feeling of creativity at the foundry? I doubt that the pan was produced by an artisan blacksmith, but if so, perhaps he or she felt affinity for the work. I caution myself -- there are many types of labor. There is also the designer of the pan, who sketched the blueprints, added the lips, calculated the length of the handle in relation to the diameter of the pan, defined the thickness -- another creator.

I think of one more dimension -- the pan is a cooking utensil, a tool. Someone used the pan. The pan was the site of transformations, from raw foods to cooked ones, to create meals. Here was another opportunity for creativity. So even for the single frying pan in front of me, so many acts of creation took place. What a faculty, so universal and everywhere!

e. Desire/need: What need or desire led to its invention?

The desire or need that led to the frying pan again converges from several paths from different periods. What led to the invention of the frying pan?

There is a sensuous desire -- cooked food tastes better. But what does "tastes better" mean? The question of "desire" leads to fundamental questions of perception, qualia, pleasure, consciousness, biological need, will, etc. Cooking breaks down complex protein molecules and plant material, making food easier for humans to digest and yielding more nutrition. Evolutionary psychology would probably hold that a preference for cooked food derived from this benefit. Likewise, humans perhaps evolved a taste for fats, and therefore fried foods, to ensure enough oils were consumed to complement the lean hunter-gatherer diet. And these evolved predispositions were expressed in a desire for a way to replicate the experience of fried food? This may have been a desire prompting the invention of something to fry in; it would also be a desire of the cook who wanted the cooking utensil.

Cooking certain foods in a frying pan is quick and efficient. It also produces specific results that are difficult with other kinds of cookware (I think grilled cheese sandwich or a fried egg). From my readings, I learn that while a cast-iron pot can also be used for frying, the deep walls trap moisture around the food during frying, and affect the cooked food. So the frying pan satisfies a rather complex set of desires, including sensuous, aesthetic, and economic desires.

For the entrepreneur or manufacturer, one goal of production is the accumulation of wealth, another type of desire that led to the frying pan before me. This desire could only be consummated because of the desire for the frying pan by a consumer; and also by the existence of workers capable of activating the machinery of production and manipulating the materials. The workers who sold their ability to work probably did not want to make frying pans per se. A confluence of social conditions brought about the need to sell their labor power; as well as the opportunity to sell it to the cast iron cookware manufacturer.

The frying pan lies at the end of a long line of desires. Before the frying pan, there were other desires: the desire for better ovens, better metals, and better tools that led to the discovery of the cast iron metallurgy. Curiosity is also a kind of desire, also social recognition. These help to propel the creative, inventive process forward.

I must be careful in thinking through this question of desire. The frying pan is the product of human intentionality; designed and manufactured to satisfy various desires. But human desires are a complicated mix of things. Certainly we have biological needs, including the need for fat in our diet. But attributing human desires like "fried food" to evolution, while perhaps providing a

neat answer, is a hypothesis that cannot be proved or disproved. The fondness for fried food could just as much arise from advertising, junk food in schools, economic pressures that favor fast food, and so on. I remind myself that the Goethean question is not "why is there a frying pan?" but rather "under what conditions does the frying pan arise?" This leads to the next question.

f. History, origins, background: What preceded it? What was its context?

As the exercise proceeds, the areas of exploration broaden. There are many currents that lead to the frying pan. I realize how sketchy my knowledge of history is. The thoughts that arise in this stage are as much questions as realizations.

The obvious context for the frying pan is as a cooking instrument. One avenue of exploration then is the history of cooking. It makes sense to me that the various desires mentioned above drove the development of cooking technique and cooking tools. Cooking also implies fire, and the discovery how to make fire was an important marker in human evolution.

Following from my consideration of the physical properties of the pan in the first step, I note that the cast iron frying pan falls into several general categories. As a container, it separates the heated substance from a flame. This allows flammable substances (e.g., cooking oil) to be heated without combusting. It also provides a way to heat liquids. The pan then is a boundary, defining an organized inside and a chaotic outside. But both inside and out are hot, as expressed in the idiom "out of the frying pan, into the fire." That this idiom exists indicates a cultural vector to explore -- human production activity becoming metaphor for other social experience.

The properties of cast iron allow it to transfer heat but remain basically unchanged (within certain boundaries). This enables a cast iron container to be used in the heating and transforming of many substances, not just food. Such containers could also be used for metallurgy itself, or for other chemical processing. Perhaps this use pre-dated the use of cast iron for cooking. Cooking is also a chemical process, a process of transformations. In this sense it is related to chemistry and metallurgy. What mental transformations took place -- take place -- in the act of transforming substances? One learns that one can change the world through interacting with it. Cooking is the alchemy of food.⁶ What realizations happened over a frying pan?

One observation leads to another. As a domestic art, cooking and the frying pan invokes the social division of labor along gender lines, the obscured role of women in the advance of technology, and the diminution of women's work in general.

From my bit of research, I learn that cast iron was one of many developments that converged to make the Industrial Revolution possible. New casting techniques in the early 1700s allowed for thinner casts and cheaper ironware. Cast iron provided a cheap and durable material for the first steam engines and railroads and other machinery, structural material for bridges, and fire-proof construction material for early factories. Other powerful historical currents flow into the process.

⁶I think I am being clever when I think of this, but googling on "alchemy of food" phrase on September 3, 2006 turns up 1,040 hits.

The frying pan is part of the history of cooking. It is part of the history of metallurgy. It is part of social history. It is also part of the history of tools, of people constructing tools and using them to interact and change their environment, and in the process, change themselves. I have a powerful sensation of human history, a thrum of human activity.

g. Archetype: What is the concept of the thing? Other forms?

In the case of human made artifacts, or in particular, my frying pan -- what is the archetype? I am not sure that I can provide a satisfactory answer to this question.

My first attempt at this question is to think of archetype as a general category. There is the defining content (cast iron) plus form (frying pan shape), what makes it a "frying pan" as opposed to a wok or dutch oven (much less a cannonball or a Franklin stove). I can relax the form constraint a bit, so that cast-iron cookware describes the category: I can visualize different shapes and functions by stretching or shrinking the handle and sides and diameter of the pan to come up with a range of utensils. I can constrain the form and function and release the constraint on content -- I can visualize various types (aluminum, Teflon coated, stainless steel) and various sizes of frying pans. Or perhaps "containers" captures the archetype.

Thinking of archetype as general category is too forced, too artificial, applying some outside definition to the thing. I re-read the way Holdrege (2005) writes about archetype -- he describes it as "seeing the wholeness" of the thing, as the "quality of knowing itself", something that emerges out of a process and context, described often as a "governing idea" (118), but an idea that is *expressed, experienced*.

The most fruitful thought I had about the archetype arose after waving the pan around and thinking about the handle and weight. The archetype, I thought, has something to do with "hand tool." There is a certain lawfulness about hand tools in that the weight and size are bounded by what can be safely and efficiently wielded by hands. The hand tool has a handle and a working surface. Within that general constraint, I imagined extending and shrinking and metamorphosing parts into different tools: other kinds of cookware, then hammers of different shapes, carpentry tools, garden implements and so forth. (This stretching and shrinking I pick up from Goethe's description of animal type.) Beyond a certain size, the tool requires multiple hands, or external power sources, requiring another order of organization to operate; it ceases to be a "hand tool."

Moreover, this broad conception of "hand tool" tied together thoughts arising from the other questions. Tools are made of nature. For example, my frying pan is made of iron and trace elements; it comes from the mineral world. Tools incorporate nature and the process of humans interacting with nature. At the same time, humans interact with nature *using* tools. We experience nature differently via tools -- the relationship is mediated. I think of Marshal McLuhan's work (e.g., 1967), that tools extend the human. Tools require skills; they help a person develop intellectually, socially, creatively. I think of Engels's (1987) essay on "the role of labor in the transition from ape to man": By using tools we change ourselves. We also change the boundaries of the possible and with it the topography of the human-nature relationship.

I remember a poster for a museum exhibit on tools I saw some 20 years ago, showing 30 or more different kinds of hammers, each tailored to a specific task. This reminds me of George Basalla's book (1988) on the evolution of technology: Tools change over time, and this process can be seen as an evolutionary process, with various factors shaping the development, adoption, dispersion and extinction of tools and the skills that go along with them. The threads of human history and desire and labor and creativity and nature seem to come together. In this thought of archetypal frying pan as hand tool, I feel like I have arrived at what Goethe described as "the pregnant point from which several things may be derived" (41).

Did I see the archetype? I don't know, or rather, I'm not sure. A better question is, was I knowing the thing? I think yes. I also realize that "knowing the thing" is not a destination. It is instead an unfolding; also (as Holdrege (2005) notes) "at once a completion of a process and the beginning of a new one." (p. 51)

With the archetype question, the exercise reaches a turning point. By working through the exercise from (a) to (g), as described above, the exercise follows Goethe's "genetic method" of proceeding from empirical observation to archetype. By reversing the order, so that it flows from archetype to object, the process mirrors organic processes of evolution and development. Lowndes (2000), in describing the process as "seven stages of descent", uses biological terms: "(1) archetype (2) descent through the 'family tree' (3) the dawning intention and discovery (as conception), motivation for its creation (4) creation (5) 'embryo stage' (6) birth and growth (7) maturing, perfection/completion." (p. 73) The replaying of the sequence, from archetype to object recapitulates an imagined process of the object in its becoming, out of a historic context, sparked by desire, shaped by ingenuity and creativity and artfulness, emerging out of the mode of production, shaped and used by human hands. When I try imagining this, the sensation is like fast-forwarding through history, or riding along the crest of a wave about to break on the shore.

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