Schematism and Technology from Kant to Simondon: Towards an Experiential Schematism of the Imagination

Vincent Beaubois

Abstract:
This article explores the evolution of the concept of 'schematism' from the work of Emmanuel Kant to that of Gilbert Simondon. It focuses on how these philosophers link imagination to the understanding of images and technical objects. Kant defines schematism as the process by which the imagination connects pure concepts with sensory information obtained through experience, thereby creating a link between understanding and intuition. In contrast, Simondon reconceptualises schematism as a process central to the dynamics of invention and technological experience. He critiques the traditional notion of imagination as a mental faculty for producing internal images. Instead, he argues that imagination is primarily a mode of reception and interaction with external images, whether material or mental. According to Simondon, images and, by extension, objects possess an autonomy and dynamism, acting as mediators between humans and the world. To further explore this concept of imagination, we will demonstrate how Simondon reinterprets Kant's schematism in the context of technological invention. He thus redefines imagination as participatory and experiential engagement with material reality. His philosophy offers an original version of Kant's schematism by positioning technology as a metaphysical field of openness, through which imagination becomes the key to understanding invention as a co-creative process between humans and the dynamic world of things.

Keywords: *Schematism; Imagination; Technical objects; Technology; Ivention; Transcendental philosophy; Image theory; Simondon; Kant*

CONTACT: Vincent Beaubois, Associate Professor at the Institut de Recherches Philosophiques – Université Paris Nanterre. Email: vbeaubois@parisnanterre.fr

Résumé:
Cet article explore l'évolution du concept de « schématisme » d'Emmanuel Kant à Gilbert Simondon. Kant définit le schématisme comme le processus par lequel l'imagination lie les concepts purs aux data sensibles issues de l'expérience, établissant ainsi un pont entre l'entendement et l'intuition. Simondon reconceptualise le schématisme comme un processus central à la dynamique de l'invention et à l'expérience technologique. Il remet ainsi en question la notion traditionnelle de l'imagination en tant que faculté mentale permettant de produire des images internes. Il soutient plutôt l'idée que l'imagination est avant tout un mode d'accueil et d'interaction avec des images provenant de l'extérieur du sujet, que celles-ci soient matérielles ou mentales. Selon lui, les images et, par extension, les objets possèdent une autonomie et un dynamisme qui leur permettent d'agir comme médiateurs entre les humains et le monde. Pour nourrir cette pensée de l'imagination, nous souhaitons montrer que Simondon réinterprète le schématisme de Kant à la lumière de l'invention technologique. Il en vient ainsi à redéfinir l'imagination comme un engagement participatif et expérientiel avec la réalité matérielle. Sa philosophie offre ainsi une version originale au schématisme de Kant, en positionnant la technologie comme un champ métaphysique d'ouverture par lequel l'imagination devient la clé pour comprendre l'invention comme un processus co-créatif entre les humains et le monde
dynamique des choses.

Mots clés
Schématisme ; Imagination ; Objets techniques ; Technologie ; Invention ; Philosophie transcendantale ; Théorie de l'image ; Simondon ; Kant

---

Gilbert Simondon's problem of imagination

In *Imagination and Invention,* written in 1965-1966, Gilbert Simondon proposes an original theory of images. This text is essentially a course delivered at the Sorbonne University. In the preamble, Simondon emphasizes that "this course proposes a theory.[1]" It should therefore be understood as a genuine philosophical proposition of his own. However, contrary to what the title suggests, this proposition reflects more on the mode of existence of "images" than on "imagination" itself. Simondon's originality lies in showing that an image is not the product of a representation or the aim of consciousness, but rather an autonomous entity. Images must be considered as having a "relative independence[2]" from the subject that perceives them. Indeed, Simondon makes no distinction between "mental" and "material" images: for him, both types participate in the same process of mediation between the living subject and its environment.

[1] Simondon, G., *Imagination and Invention*, Eng. trans. by J. Hughes and C. Wall-Romana, Minneapolis, University of Minnesota Press, 2022 [*Imagination et invention (1965-1966)*, Paris, Presses universitaires de France, 2014], p.3.
[2] *Ibid*., p.9.

He invites us to consider images as "quasi-organisms[3]" in their own right, manifesting their own dynamism through *objective media* (such as a printed image or an object that can be perceived) or *subjective media* (such as a memory or an image that crosses one's mind or even colonizes one's unconscious). According to Simondon, the mode of existence of the image is not directed by the will of the subject because it "presents itself according to its own forces, living in our consciousness like an intruder disturbing the order of a household[4]?"

Without delving into the specifics of the "cycle of images" that Simondon presents in this work, it is crucial to grasp that *Imagination and Invention* is essentially a theory of "images," detailing how they facilitate our connections with our natural and cultural surroundings. One might expect this theory of images to imply a theory of imagination. However, the question of "imagination" is never addressed in itself. In fact, Simondon is rather uncomfortable with the concept of "imagination." He argues that this notion "can lead to misunderstandings[5]" because it refers back primarily to "faculty psychology" of the subject, suggesting that the subject produces images according to an internalist view. According to Simondon, thinking about images based on imagination "tends to exclude the hypothesis of a primordial exteriority of images in relation to the subject[6]."

However, this work quickly outlines a positive definition of imagination. In the introduction to *Imagination and Invention*, Simondon emphasizes that imagination should not be considered as a mere "activity of image production or evocation[7]," but rather as "the mode of receiving images concretized as objects, the discovery of their sense, of the perspective of a new existence for them[8]." According to this definition, imagination is primarily a "mode of receiving" external images within us. These images transcend us and emanate from objects in the world. They exist outside us ("concretized as objects") and imagination is the capacity to receive this exteriority within us. Unfortunately, *Imagination and Invention* leaves this question at the level of mere evocation without precisely developing the specific movement of this imaginative and inventive capacity. The text describes different types of images but never explicitly develops a philosophy of imagination.

The aim of this article is to flesh out this conception of imagination. To understand how imagination works in Simondon, however, we must move beyond *Imagination and Invention* and delve into his writings on technical invention. At least, that is the hypothesis I would like to explore. This is not obvious because the question of "imagination" is never directly addressed in his texts on technology, as *On the Mode of Existence of Technical Objects* as well as the unpublished texts compiled in the volumes *Sur la technique (1953-1983) (On Technology)* and *Sur la philosophie (1950-1980) (On Philosophy)*, published in 2014 and 2016, respectively. While the notion of "imagination" is not developed, these works repeatedly use the notions of "schema" and "schematism" to consider the relationship between knowledge and the invention of technical objects. Indeed, beginning with his earliest writings in 1953 and continuing through his major work, *On the Mode of Existence of Technical Objects* (1958), the concepts of "technical schema" and "operational schematism" are used consistently to

[3] *Ibid.*, p.13.
[4] *Ibid.*, p.7.
[5] *Ibid.*
[6] *Ibid.*, p.7.
[7] *Ibid.*, p.14.
[8] *Ibid.*

describe one's knowledge of a technical object (e.g., in the design or maintenance of an object). This operational schematism, at the heart of technical imagination, must be understood through an original dialogue with Kantian schematism and his philosophy of imagination.

The challenge of the *Critique of Pure Reason* is to define the *a priori* conditions of all possible experience, as well as the judgment responsible for describing it. Kant's solution is to describe this transcendental realm consisting of two *a priori* forms of intuition (space and time) and twelve pure concepts (e.g., unity, causality, and necessity) that are not acquired through experience. Rather, they constitute the possibility of phenomenal experience. The schematism of the imagination, introduced in the "Analytics of Principles" after the "Transcendental Deduction," is a pivotal moment in the first *Critique*. It addresses the issue of applying pure concepts of understanding to the sensible realm. Although these twelve categories are completely independent of the sensible world, they must be applied to it to give form to experience. In doing so, they become sensible in one way or another. Transcendental imagination becomes the solution to this problem by bridging the gap between pure understanding and sensibility during the process of knowledge.

Simondon's schematism does not address the same problem. It is not a matter of justifying the process of knowledge *a priori* but rather of accounting for the process of invention. How can something new come into being? My aim is to demonstrate that Simondon's use of the terms "schema" and "schematism" reveals a subtle dialogue with Kantian thought. This dialogue is intended to establish an original philosophy of imagination, which we can conceptualize as a "mode of receiving images," as discussed in *Imagination and Invention*[9]. My argument aims to show that this technological schematism allows us to think of the imaginative process as participation in something that transcends us and enables invention.

This schematism is established before any division between subject and object. It engages a form of *technical participation*. For example, when I tinker with a machine to understand it better, such as to repair or adjust it, my thinking becomes coupled with and aligned to the machine's functioning. *Schematism is the name for this coupling relationship*. Imagination designates not so much an activity specific to a "faculty" of the subject as it does a participation in the intrinsic dynamism of objects themselves, thereby offering the possibility of reinventing them.

I will demonstrate how this schematism illuminates the question of invention—thinking about the possibility of producing something new—while avoiding the pitfall of viewing invention as either a pure power of the subject or a pure product of chance. Therefore, Gilbert Simondon's philosophy of imagination allows us to answer the question, "How does inventive capacity come into play?"

To accomplish this, I will proceed in two stages. First, I will return to Kant's schematism of the imagination to demonstrate how the concept of technological imagination is already present at the margins of Kantian thought. Next, I will explain how Simondon understood the notion of "schematism" in relation to his thinking on invention. This will enable me to demonstrate the role of technology in his philosophy of invention. Technology refers not only to a set of material objects but also to a field of experience that stimulates the imagination in the production of possibilities.

[9] It should be noted that, in all his writings on technology, Simondon refers to "schemas," rather than "images," as in *Imagination and Invention*. The idea is that the "schema" is a dynamic image, an entity that transcends itself in a process of invention, as stated in relation to the image in the 1965-1966 course.

A return to Kant's schematism of the imagination

As we have seen, Immanuel Kant introduced the concept of "schematism" to address the difficulty of applying *pure* concepts of understanding to the sensible world. In order to resolve this issue, he identified a third faculty that bridges the gap between pure understanding and sensibility: *transcendental imagination*. This process is referred to as schematism. The imagination, through the production of schemas that translate categories into regulated, temporalized procedures, renders the categories of understanding compatible with phenomena in general. It is through time that the imagination's mediating function can reach the world of phenomena. In this sense, imagination functions less as a generator of images and more as a set of *a priori* rules that enable such production. This suggests that categories are not confined within the mind, but rather, they are open to the world through schematization. Transcendental schemas prepare us to welcome the objects of experience *a priori.*

All of this highlights the primary significance of schematism for Kant: above all, it is a *transcendental* issue. However, it should be noted that Kant distinguishes between three types of "concept," each of which requires a form of schematism to ensure the transition from the general to the particular. Alongside the *pure concepts of the understanding* (the twelve categories) are *pure sensuous concepts* (mathematical concepts) and *empirical concepts.* Thus, although schematism was initially conceived by Kant as a means of answering the question of how pure concepts of the understanding can be applied, it also applies to these other types of concepts. A new schematizing role is therefore found for imagination in the case of empirical concepts, such as the concept of "dog" that is used as an example by Kant. When I think of the concept of a dog, I have a particular mental image of a dog in my mind (for example, a Chihuahua). This transition from the general concept of a dog to a particular mental image corresponds to the schematizing activity of the imagination. In this case, schematism helps us to understand how we apply our empirical concepts to sensory data. Kant introduces the notion of "image" (*Bild*) in this context. The schema is the "representation of a general procedure of the imagination for providing a concept with its image[10]." Here we are on the fringes of Kantian thought, where the application of a concept to a given empirical case is not at all Kant's central objective, but rather a possibility left open by his philosophical system. The concept of "image" only appears negatively, as a counterpoint to his analysis, because he is specifically interested in concepts *that cannot be represented by images:* the pure categories of the understanding. However, let us imagine that we start with the general concept of a dog and try to form a mental image of one. The transition from the general concept to the particular image in our minds is the process of schematization, or giving a concept an image. Therefore, the schema is a process, or more precisely, a *construction operation*. We construct an image based on the rules of composition ordered by the concept—e.g., a four-legged animal with a snout, ears, and a particular way of moving—and these rules define the nature of the schema. While the case of the "dog" offers a compelling illustration of such a schematic construction[11],

[10] Kant, I., *Critique of Pure Reason*, Eng. trans. by P. Guyer and A. W. Wood, Cambridge, Cambridge University Press, 1998 *[Kritik der reinen Vernunft*, 1781], p.273.

[11] What would the set of temporalized rules (sequences of construction) would allow me to "construct" an image of a dog? What would the common schema be for a Great Dane, a Poodle, and a Basset hound? Empirical concepts present a complexity that cannot be expressed by the simple transition from the general to the particular because dogs of different species have extremely different ways of being "dog." The french philosopher Jocelyn Benoist examines this problem in his article "Appliquer ses concepts", in Kant, J.-M. Vaysse (ed.), Paris, Éditions du Cerf, 2008, pp.91–127.

Kant's example of a technical object is considerably more intriguing.

Indeed, while Kant provides few examples of the schematizing operation of the empirical imagination in the *Critique of Pure Reason* (discussing the examples of the dog and the plate), another text illustrates this concept using a technical object: *a clock.* Entitled "What real progress has metaphysics made in Germany since the time of Leibniz and Wolff?" and written in 1793, this text was published after Kant's death in 1804. In the text, Kant compares *schematism* and *symbolization.* Schematism refers to the operation that gives a *concept* its image. Symbolization, for Kant, characterizes the operation that gives an *idea* its image. To understand this difference, we must remember Kant's distinction between "concept" and "idea." A concept is a product of the *understanding (Verstand)* that applies to a sensory intuition. For example, there is a concept of "dog" or "plate" insofar as one can have a sensory experience of a dog or plate. An idea, on the other hand, is a product of the *reason (Vernunft)*, i.e., a concept that does not refer to any possible sensory intuition:

> If objective reality is accorded to the concept directly *(directe)* through the intuition that corresponds to it, i.e., if the concept is immediately presented, this act is called schematism; but if it cannot be presented immediately, but only in its consequences *(indirecte)*, it may be called the symbolization of the concept. The first occurs with concepts of the sensible, the second is an expedient for concepts of the super-sensible which are therefore not truly presented, and can be given in no possible experience, though they still necessarily appertain to a cognition, even if it were possible merely as a practical one[12].

In this passage, Kant aims to show that, although symbolization is legitimate, it lacks the value of objective knowledge, unlike schematism. Nevertheless, it is still possible to think of this operation of symbolization *by analogy* with schematism. To give an example of this difference, Kant compares the watchmaker as the cause of a simple clock—an operation that falls under schematism—and God as the cause of the products of nature—a judgment that falls solely under symbolization:

> The symbol of an Idea (or a concept of reason) is a representation of the object by analogy, i.e., by the same relationship to certain consequences as that which is attributed to the object in respect of its own consequences, even though the objects themselves are of entirely different kinds; for example, if I conceive of certain products of Nature, such as organized things, animals or plants, in a relation to their cause *like that of a clock to man, as its maker*, viz., in a relationship of causality as such, *qua* category, which is the same in both cases, albeit that the subject of this relation remains unknown to me in its inner nature, so that only the one can be presented, and the other not at all[13].

[12] Kant, I., *Theoretical Philosophy after 1781*, Eng. trans. by G. Hatfield, M. Friedman, H. Allison and P. Heath, Cambridge, Cambridge University Press, 2002, p.370.

[13] *Ibid*., emphasis added.

Kant argues that God, as the cause of nature's organized purposefulness, can only be conceived as an idea of reason. The image of the watchmaker only serves as a symbol for thinking analogically about the transcendent power of creation that God embodies. As a symbol, it provides an image of the supersensible concept without claiming to have any objective value as knowledge.

Why is this example, mentioned briefly by Kant, interesting in the context of schematism? By referring to the technical activity of the watchmaker, Kant considers schematism as *the construction of a material object* rather than the production of a mental image (as in the *Critique of Pure Reason*). Returning to the definition of the schema as the "general procedure of the imagination for providing a concept with its image," we can define the act of constructing the clock as transforming the clockmaker's conceptual knowledge, acquired through training and experience, into the material image of the constructed clock. In this sense, Kant invites us to think of the technical manufacture of a clock on the principle of schematism. Thus, we have *an empirical concept of a clock* held by the clockmaker, *the schematism of this concept* corresponding to the actual act of manufacturing the clock, and finally, *the particular image* of the clock corresponding to the clock constructed. At first glance, the material clock seems to be simply the product of the empirical actualization of the concept of a clock, giving primacy to the concept and considering the material object only as an "application" of the concept. However, the example chosen by Kant seems to go beyond his original intentions and subverts the mere idea of "application." The clockmaker's goal is to create a clock *that works*, i.e., a clock capable of measuring time with a certain degree of accuracy. In this sense, he does not construct it "any old way," but rather according to a methodical, a *regulated* process. Thus, we find the regulated procedure that characterizes the Kantian schema. This leads us to ask where the rules implemented by the watchmaker in his work come from. Orthodox Kantians who rely on the conceptual knowledge of the watchmaker forget what makes a technical object intrinsically normative. The set of materials used to construct the watch, how they are shaped, their forms, and how they interact with each other determine whether the object will function properly.

The question of schematism arises in Gilbert Simondon's work precisely here: the schema no longer derives from an internal cognitive activity, as it does in Kant, but from a dialogue with technical materiality. Although Simondon does not mention Kant, he extends this idea using the example of a clock while reversing its logic. This results in a new perspective on the schematism of the imagination in Simondon's philosophy of technology.

Gilbert Simondon's operational schematism

Simondon would agree with Kant's idea of making the schema a regulated operation. However, the fundamental point of divergence between Kantian and Simondonian schematism concerns *the origin of the applicable rule.* For Kant, the rule originates from the concept — one might even say the rule is the concept — because he considers only the moment when the watchmaker's technological knowledge *has been acquired* and only needs to be applied skillfully. Technique is thus conceived as stabilized knowledge in a subject and, in this sense, only needs to be applied. The rule then comes from the subject-watchmaker, or more precisely, from her or his understanding *(Verstand).* For Simondon, the watchmaker designs and manufactures the object by listening to the material form taking shape, with the clock's functioning

carrying its own normativity. Consequently, two clocks produced by the same clockmaker will not be identical, even if they embody the same technical functioning. The clockmaker adapts to the singularity of the materials and the functional resonance effects produced when the overall mechanism is set in motion. In this sense, technology is not primarily a set of acquired knowledge for Simondon, but rather an inventive practice. For Simondon, technical objects primarily exist in an *evolutionary manner.* A technical invention serves as a premise for new inventions, which serve as premises for further inventions. Therefore, it is up to technical objects to embody perpetual genesis: "The technical object is that which is not anterior to its coming-into-being, but is present at each stage of its coming-into-being; the technical object in its oneness is a unit of coming-into-being[14]."

Thus, evolution and transformation are essential characteristics of technologies, not contingent ones. The rules that enable the construction of new technical objects do not preexist; they must be invented from existing technical objects. In this sense, a clockmaker cannot simply prescribe the construction of a new, more efficient clock because he or she does not yet know the new rule that enables this innovation. New design and manufacturing rules for more efficient clocks can only emerge through observing how existing clocks work, especially the malfunctions that persist in these objects. Therefore, it is the technical object itself that *prescribes* possible lines of evolution through its functioning, especially its operating limits.

To understand this, we must distinguish between the two functional parts of a clock: the timekeeping mechanism, which uses a series of gears connected to the hands, and the driving mechanism, which provides the force, such as the weight of a pendulum. Rocker clocks, which were common during Kant's time, exhibited functional antagonism between these parts because the movement of the weight could interfere with the hands' movement to indicate time. Replacing the weight with a spiral spring reduced this antagonism:

> The improvement of clocks consisted in making the operation of the device constituting the time base as independent as possible from variations in the driving force (allowing weights to be replaced by springs), from the position relative to the vertical (replacement of the pendulum by the spiral spring balance wheel), and finally from variations in temperature and other causes of disturbance (compensating systems)[15].

Understanding these functional antagonisms and the normativity inherent in the object's functioning is what makes inventions possible. As we have seen, Kant always positioned himself from a place of acquired and established technological knowledge. For him, the rule comes from the understanding of the clockmaker, who merely *applies* this knowledge. However, he leaves the creation of this rule in the shadows, which can only come from the object's own normativity. Technological analysis of the clock reveals the emergence of new construction rules, as evidenced by the replacement of the pendulum with a spiral spring. This example is important because it shows that a new rule for constructing the object "clock" emerges *from a better understanding of how the clock works.* The clockmaker alone does not decide to invent a new clock. The invention first emerges from an observation of existing clocks as if they

[14] Simondon, G., *On the Mode of Existence of Technical Objects*, Eng. trans. by C. Malaspina and J. Rogove, Minneapolis, Univocal Publishing, 2017 [*Du mode d'existence des objets techniques,* Paris, Aubier, 1958], p.26.

[15] Simondon, G., *L'invention dans les techniques : cours et conférences,* J.-Y. Chateau (ed.), Paris, Éditions du Seuil, 2005, p.210, my translation.

were reinventing themselves through the clockmaker. In Gilbert Simondon's philosophy, this process is called the "process of concretization[16]."

The mode of practical knowledge at play in this invention process corresponds precisely to what Simondon calls "schematism." Throughout his work[17], he outlines an original schematism of the imagination that is inseparable from the question of invention. This schematism deploys a precise typology of the modes of existence of the schema as a mode of knowledge-action. Simondon has reflected on this concept since the beginning of his research on individuation. In a draft introduction to *Individuation in Light of Notions of Form and Information* dated 1955, he describes this project as "operative schematism":

> At the most basic level, crystallization and, at a higher level, the relationship between humans and objects in technical acts are similar processes linked by an analogy of patterns. It is by implementing the highest problematic relationship (reflexive thought), that we can understand the *operational schematism* of the simplest forms, which are the also the furthest removed from relationships in which human subjects can engage[18].

Understanding the individuation of a crystal or the invention of a technical object requires entering into the operational schematism of a structure coming-into-being. Therefore, the schema is not primarily a mental entity, but rather an operation that takes place *in and through things.* Thus, our natural and technical environment presents itself as a reservoir of schemas that can be invested in the creation of new effects. Unlike in Kantian schematism, where the rule of construction is provided from the outset by the watchmaker's understanding, this schematism focuses on creating new rules prescribed *by the objects themselves*. In this sense, schematism is not a power of the subject but rather a means by which the subject can observe and understand an operative schematism primarily located in things.

This explains why Simondon refers to the operating principle of a material structure as a "technical schema": the term primarily refers to the way an object functions. In *On the Mode of Existence of Technical Objects,* Simondon characterizes the specific mode of existence of technical objects based on their *functioning.* He repeatedly refers to this functioning as a "dynamic schema[19]." The schema is the *operation* that a technical structure materializes. For instance, the technical schema of a heat engine refers to the process of converting thermal energy into mechanical energy.

More precisely, the schema refers *not only to an objective operation* (the functioning of the object), but also to *the way in which the subject understands this operation.* Simondon uses the term "intuition" to describe this mode of knowledge, which is neither strictly intellectual nor strictly sensible:

[16] Simondon, G., *On the Mode of Existence of Technical Objects*, op. cit., p.20.

[17] The question of the imagination's schematic mode of operation is present in *On the Mode of Existence of Technical Objects* (1958), *Imagination and Invention* (1965–1966), and the article "Technical Mentality" (1961), as well as in three unpublished texts written while *On the Mode of Existence of Technical Objects* was being drafted: « De l'implication technologique dans les fondements d'une culture » ; « L'objet technique comme paradigme d'intelligibilité universelle » ; « L'ordre des objets techniques comme paradigme d'universalité axiologique dans la relation interhumaine » (Simondon, G., *Sur la philosophie* (1950-1980), Paris, Presses universitaires de France, 2016, p.341-453). The term "schematism" appears 22 times in these last three texts.

[18] Simondon, G., *Sur la philosophie* (1950-1980), op. cit., p.23, emphasis added, my translation.

[19] Simondon, G., *On the Mode of Existence of Technical Objects*, op. cit., p.34.

> […] knowledge by way of intuition is a grasping of being that is neither *a priori* nor *a posteriori*, but contemporaneous with the existence of the being it grasps, and which is at the same level as this being; […]. Intuition is neither sensible nor intellectual; it is the analogy between the coming-into-being of known being and the coming-into-being of the subject, the coincidence of two comings-into-being[20].

In this sense, knowledge of the schema is neither *a priori* nor *a posteriori,* but *a praesenti,* that is, simultaneous with the material operation itself, coupled with the dynamism of the thing being studied. The cognitive schema is constructed through exposure to the technical schema, meaning that observing a machine *in action* allows me to understand its operational behavior. Understanding how a machine works—such as a four-stroke engine—means mentally running the engine and replaying the four stages of intake, compression, combustion, and exhaust of the fuel mixture in the cylinder in one's imagination. Thought is shaped by this process, becoming an engine itself.

Therefore, a schema is an entity that is both *cognitive*—it is a product of thought—and *a characteristic of real technical exteriority.* However, unlike the Kantian perspective, the schema does not go from reason to phenomenon; rather, it follows the opposite path. For Simondon, to schematize is to embrace the dynamic image of an operation that first exists materially. Therefore, the schema can be seen as a product of thought that I can only construct by involving myself and 'merging' with the objective operations embodied by a thing. In this sense, the schema always resists me. It can only be constructed through frequent exposure to technical functions and operations. For example, it is by manipulating an engine, dismantling it and observing its operating diagrams that I begin to understand its dynamic schema.

Therefore, we can say that understanding a technical operation involves constructing its schema. The cognitive and technical schemas are two sides of the same participatory relationship with a technical object. Imagination refers to the relationship of attention to the schemas operating within things:

> The imagination is not simply the faculty of inventing or eliciting representations outside sensation; it is also the capacity of the prediction of qualities that are not practical in certain objects, that are neither directly sensorial nor entirely geometric, that relate neither to pure matter nor to pure form, but are at this intermediate level of schemas[21].

In this quote from *On the Mode of Existence of Technical Objects*, Simondon presents the concept of imagination as a way of accepting an operative reality. In other words, it is the capacity to perceive the regulated dynamic relationships that animate a structure's functioning. Thus, Simondon strips imagination of its status as an internal power of the subject, turning it into a practice disseminated throughout things. Imagination refers to a «particular sensitivity[22]» that takes shape from material structures or, rather, the operational «regimes» carried out by these structures. This knowledge of schemas is not purely conceptual; it is primarily the

[20] *Ibid.,* p.242.
[21] *Ibid.,* p.74.
[22] *Ibid.*

result of a sensitive relationship, a practice, and a cognitive and emotional interaction between the person who «conceives» and the material structures that inhabit them.

Three levels of expression of the schema: from material to formal

Simondon emphasizes the hybrid nature of the schema, which is found at the point where the material and the formal meet. But how can a schema be both *material* and *formal*? Simondon identifies three levels of technical schema expression, ranging from the most material to the most abstract[23]. To illustrate this, I will use a simple technical object, a valve, to highlight the different levels of expressiveness of a technical schema. A valve is a technical object that conducts a fluid in one direction[24]. From a Simondonian perspective, the valve schema can be described on three different levels.

If we focus on a particular valve, i.e., a technical structure determined by its material and history—for example, a ball check valve—we will be interested in its *singular schema*. This schema is characterized by its material singularity, and it is very close to the characteristics of the material and the specific relationships that are established in this particular valve. This schema merges with the structure of the object as it functions. In this case:

> The technical object is limited to itself, because instead of specific qualities, it has a function that lies in its schematism, in its structure; this function is the technical object in its individuality, grasped in its complete reality. Indeed, each technical object has its own particular characteristics of functioning, resulting from its adjustment, degree of wear and tear, and previous use; it is not exactly identical to another object manufactured in the same way and used by the same person[25].

The schema's effectiveness under given conditions is what makes it particular.

On the other hand, if we focus on what is common to the *technical lineage* of check valves, we abandon particular schemas (such as ball, flap and disc valves) and focus on their *lineal schema.* This schema begins to detach itself from the historical contingencies of a particular structure, in order to characterise what is specific to a technical lineage—in this case, mechanical valves. Rather than expressing the operation of a particular object, the lineal schema expresses the operation of an *operational community* centered on the articulation between different types of mechanical valves. This level is important for Simondon because it allows us to trace the evolution of such an operational community over time. By placing himself at this scale, he is able to define technical progress in terms of "concretization". The particular schema opens up potential for trans-structural inventions while remaining grounded in the materiality of the structures under consideration:

[23] In an article published in 2015, I discussed these different levels of expression of technical schemas. See Beaubois, V., 2015, "Un schématisme pratique de l'imagination", in Appareil, Issue No.16, https://doi.org/10.4000/appareil.2247 (last consultation : May 29, 2025). Allow me to revisit the example of "valves" that I presented in that text.

[24] *In On the Mode of Existence of Technical Objects,* Simondon uses the lineage of thermoelectric diodes to illustrate these levels of expression. A diode is an asymmetrical conductor of electrical current; a valve plays a similar role in the flow of fluids. We chose to discuss this example in mechanics rather than electronics to more easily explain the creative analogies it provides on different scales (notably architectural and human body scales).

[25] Simondon, G., *Sur la philosophie (1950-1980)*, op. cit., p.348, my translation.

> For a technique to develop, its schemas must be a constant demand for invention; but, for one invention to lead to another, it must first be realized, because it is only from a realization that a new demand for invention can arise[26].

Finally, Simondon defines a third level of schema expression that is different from the particular and lineal levels: "beyond this genus there is a *pure schema of functioning* that is transposable to other structures[27]."

The *pure schema* describes the formal dynamic principle of valve operation: ensuring asymmetrical flow. This schema allows a common operation to be characterized within and between technical lineages, forming a trans-lineal community that includes *mechanical valves* (e.g., check valves), *organic valves* (e.g., the heart, arteries, and veins that ensure asymmetrical blood flow), *electronic valves* (e.g., diodes that conduct electron flow in one direction), and *architectural valves* (e.g., locks that conduct fluid in one direction due to potential energy from the difference in height between basins). According to Kantian terminology, this "pure" schema is the *least technically pure* because it is no longer linked to a particular materiality; rather, it operates analog communication between these structures. The pure schema brings together seemingly disparate things (valves, locks, hearts, and diodes) that share a same type of operation. All of these things function *analogously*, embodying the same pure, dynamic schema of asymmetrical flow.

To clearly demonstrate the usefulness of the concept of 'pure schema', I invite you to consider a well-known experiment highlighted by modern philosophy: Descartes' experiment with a "piece of wax". Indeed, such a schematic transposition can shed new light on Descartes's famous example. In his Second Meditation, Descartes attempts to identify the human faculty capable of producing general knowledge of external things by starting with the piece of wax in front of him. The philosopher's answer is well known: if the senses have access only to the variable properties of wax and the imagination has limited power, then "only an inspection of the mind[28]" can provide access to wax's general essence as "something extended, flexible, and mutable[29]." In other words, understanding is said to be the sole source of knowledge "in general" as a power of subsumption by Descartes. However, the "generality" of the pure schema offers alternative interpretations of this experience. The flexible and mutable nature of wax, which can be molded when heated and hardens when cooled, is actually a feature of its operational schema that corresponds to the molecular properties of its matter. I can abstract from this particular morsel of wax a particular schema. I can then use this schema to consider the operational behavior of other pieces of wax. I can even use it to consider the operational behavior of other operations belonging to the same modality. Moreover, it is precisely because Descartes grasped the wax's schema through his direct experience with it and the relationship of participation he established with it ("it is hard, cold, plastic, and if you strike it, it will make some sound") that he was able to abstract it to the level of a pure schema and transpose it into

[26] *Ibid.*, p.445, my translation.

[27] Simondon, G., *On the Mode of Existence of Technical Objects, op. cit.,* p.45.

[28] Descartes, R., *Metaphysical Meditations,* Eng. trans. by G.B. Rawlings, London, Scott Library, 1901 [1640], p.137.

[29] *Ibid.*, p.136.

his *Rules for the Direction of the Mind* to qualify the modification of the sensing body in the test of sensation:

> One has, then, to conceive, first, that all the external senses, in so far as they are parts of the body, even if we do apply them to objects by means of an activity, namely, by means of local motion, still sense, strictly speaking, merely by means of passivity, in the same way in which wax receives an impression from a seal. Nor should one think that this is said merely by way of analogy: rather, one must conceive that the external shape of the sentient body is really changed by the object in exactly the same way as the shape of the surface of the wax is changed by the seal[30].

Here, we are not interested in the Cartesian thesis on sensation itself, but rather in the real analogical transfer Descartes uses to explain it. Descartes unwittingly gives rise to a *schematic* rather than *conceptual* understanding by constructing a *plasticity schema* that allows him to describe the deformation process under the effect of a force that persists even after it has disappeared. This schema is not a concept because it has a tangible aspect, which is always associated with specific structures that materialize its function.

Therefore, the essential characteristic of the schema is its *transposability*. This transposability allows Simondon's schematism of the imagination to serve as a basis for *inventive thinking*. Establishing operational analogies between different structures can lead to the invention of new structures by transposing schemas. For example, the analogy between the operating schemas of a check valve and a blood vessel could lead to the design of new types of mechanical valves through biomimicry. Thus, operational analogy is at the heart of imaginative capacity. It enables us to leap from one field to another in an attempt to transcend the limits of a particular structure to solve the problems posed by that structure itself. Hence, there is a fertility of the schema in producing new structures.

> The technical object does not have the immediate radiance of a symbol; materially speaking, it is limited to itself, but in its relationship with humans, it offers a fecundity that imbues its structure and schematism with a sense of exceeding the simple qualities of the materials from which it is made. Unlike an aesthetic object, the technical object does not exert its dynamism through radiance. Rather, it does so through its "provignement," which is associated with the human being who operates it[31].

Simondon uses a beautiful agricultural (more specifically, viticultural) image to illustrate this opening up of the technical object: "provignement" consists of laying a vine shoot from the parent vine and planting it in the ground until it takes root. Once the shoot has taken root, it can be separated from the parent vine. This process makes it possible to extend the life of a vine indefinitely. Analogously, the invention of a new structure prolongs the existence of a schema beyond its previous structures.

[30] Descartes, R., *Regulae ad Directionem Ingenii / Rules for the Direction of the Natural Intelligence,* Eng. trans. by G. Hefferman, Amsterdam-Atlanta, Rodopi, 1998 [1701], p.141.

[31] Simondon, G., *Sur la philosophie (1950-1980*), op. cit., p.347, my translation.

Gilbert Simondon's technical schematism can be described as "experiential" because it is based on direct experience of technical structures. It is worth noting that Simondon's work incorporates the Kantian framework, which defines schematism as 1) a constructive principle, 2) an intermediary between material and formal, and 3) a principle of understanding. In this sense, it is appropriate to speak of a "schematism of the imagination." In Kant, the schema is a method (a "how-to") or a regulated "operation" that gives consistency to an image. In Simondon, it plays an analogous role: the schema designates the operational unity of a structure and its mode of understanding and reinvention. Similarly, the schema is both *formal* and *material* because it is impossible to conceive of the "pure schema" of a structure separately from its expression in different particular schemas. Finally, for Simondon, schematizing is an activity of understanding, but it is not directed toward an act of *representation*; rather, it is directed toward an act of *invention*. The major difference between Simondonian and Kantian schematism is that the former is not an activity initiated or internal to the subject. Rather, it is a movement of opening up to and welcoming an operative meaning that first exists *in and through things.* Thus, imagination is no longer an "a hidden art in the depths of the human soul[32]," but rather something established through a relationship of participation with things and empathy with their principle of functioning. This explains why the domain of technical objects—the technological plane—is valuable to Simondon. It allows us to clearly demonstrate how the imagination works. Thus, technology has paradigmatic value for thinking about the imagination as a plane of participation and contamination by the dynamics of things in the world, whether technical or not. Therefore, Simondon emphasizes the "non-systemic" nature of technology, which is, above all, a place of indeterminacy and openness.

> […] there is no absolute coherence or convergence in the technical world, which is why it cannot close itself off. Neither causes nor ends are organized into systems. Technical reality is neither in the past nor in the future; it exists in the present, which is what makes it free. It is not dominated by a *vis a tergo* or a *vis ab ante*. It is not an effect, but an operation[33].

Technology allows us to grasp the fundamental openness of the inventive gesture. In this sense, technology acquires a status that Simondon would describe as "metaphysical," since it refers to the prototypical experience of openness to the new. Technology signifies not only a human endeavor of production but, above all, an inclination to transcend, to unveil novel possibilities. Technological experience is the gateway to what exceeds all present experience in the production of the new. Imagination is no longer the Kantian transcendental faculty that establishes the conditions of experience; rather, it designates the realm of openness to the possible. Technology becomes the *schema* that allows us to understand the operation of imagination. It offers itself as *the schema of the schema*, or the schema of imaginative schematism itself. It enables us to understand inventive imagination as an operative dialogue with schemas.

Conclusion

In a sense, Simondon revives the pre-critical notion of schematism as a *transition from one form to another* while expanding upon Kant's concept of the schema as a regulated pro-

[32] *Ibid.*, p.273, my translation.
[33] *Ibid.*, p.350, my translation.

cess that connects the formal and the material. The term "schematism" had a precise meaning in Kant's time, which is why it was chosen to describe the imagination's activity. In the theological register, the verb "to schematize oneself into" means "to take the sensible form of," as Roger Daval points out in his work on Kant's metaphysics[34]. "Schematism" referred to an operation of "metamorphosis" before Kant gave it a specific meaning. The idea of transitioning from one form to another is also found in the term "meta-schematism" in a letter Leibniz wrote to Arnauld on April 30, 1687: "The ancients were mistaken in introducing the transmigration of souls instead of the transformations of the same animal which always preserves the same soul; they put *metempsychoses pro metaschematismis* [change of souls in place of change of shape][35]."

In his concept of "schematism," Simondon retains the idea of a transformative process driving invention. However, he grounds this pre-critical notion in Kant's philosophy because imagination itself drives this movement based on our experience of things and their operational nature. Thus, Simondon inaugurates a form of inverted Kantian schematism. While Kant placed the general on the side of the subject's understanding and the particular on the side of images and objects, Simondon held the opposite view. He claimed that the generality of the schema came from its transposable nature, or that which circulates through structures. On the other hand, thought always takes the side of inventing particular structures.

This way of thinking about imagination in Simondon is also different from the new place Kant gives to the imagination in the *Critique of Judgment*, where he revalues knowledge of the particular as a driving force for thought. For Simondon, inventive capacity is not a matter of reflective judgment because it is not a judgment. Rather, it is an experiential relationship with things, participating in their schematic essence. This essence is as much knowledge as it is affect and action.

[34] Daval, R., *La Métaphysique de Kant,* Paris, Presses universitaires de France, 1951, p.6.

[35] Leibniz, G. W., *Philosophical Essays*, Eng. trans. by R. Ariew and D. Garber, Indianapolis, Hackett Publishing, 1989, p.88.

Bibliography

Beaubois, V., 2015, “Un schématisme pratique de l’imagination”, in *Appareil*, Issue No.16, https://doi.org/10.4000/appareil.2247 (last consultation : May 29, 2025).

Benoist, J., “Appliquer ses concepts”, in Kant, J.-M. Vaysse (ed.), Paris, Éditions du Cerf, 2008, pp.91-127.

Daval, R., *La Métaphysique de Kant*, Paris, Presses universitaires de France, 1951.

Descartes, R., *Metaphysical Meditations,* Eng. trans. by G.B. Rawlings, London, Scott Library, 1901 [1640].

Descartes, R., *Regulae ad Directionem Ingenii / Rules for the Direction of the Natural Intelligence,* Eng. trans. by G. Hefferman, Amsterdam-Atlanta, Rodopi, 1998 [1701].

Kant, I., *Critique of Pure Reason,* Eng. trans. by P. Guyer and A. W. Wood, Cambridge, Cambridge University Press, 1998 [*Kritik der reinen Vernunft*, 1781].

Kant, I., *Theoretical Philosophy after 1781,* Eng. trans. by G. Hatfield, M. Friedman, H. Allison and P. Heath, Cambridge, Cambridge University Press, 2002.

Leibniz, G. W., *Philosophical Essays,* Eng. trans. by R. Ariew and D. Garber, Indianapolis, Hackett Publishing, 1989.

Simondon, G., *On the Mode of Existence of Technical Objects,* Eng. trans. by C. Malaspina and J. Rogove, Minneapolis, Univocal Publishing, 2017 [*Du mode d’existence des objets techniques*, Paris, Aubier, 1958].

Simondon, G., *Imagination and Invention,* Eng. trans. by J. Hughes and C. Wall-Romana, Minneapolis, University of Minnesota Press, 2022 [*Imagination et invention* (1965-1966), Paris, Presses universitaires de France, 2014].

Simondon, G., *L’invention dans les techniques : cours et conférences,* J.-Y. Chateau (éd.), Paris, Éditions du Seuil, 2005.

Simondon, G., *Sur la technique (1953-1983),* Paris, Presses universitaires de France, 2013.

Simondon, G., *Sur la philosophie (1950-1980)*, Paris, Presses universitaires de France, 2016.

Simondon, G., 2012, *Technical Mentality,* Eng. trans. by A. De Boever, in *Gilbert Simondon. Being and Technology*, De Boever, A., Murray, A. and Roffe, J. (eds), 2012, Edinburgh, Edinburgh University Press, pp. 1-16 [La mentalité technique », in *Sur la technique (1953-1983),* Paris, Presses universitaires de France, 2013, p. 295-313].