

## Coarse epistemes

### Skill, craftsmanship and tacit knowledge in the grit of the world

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TITLE

# Coarse epistemes: Skill, craftsmanship and tacit knowledge in the grit of the world

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ABSTRACT

In the words of Dutch archaeologist Maikel Kuijpers, craft is “a way of exploring and understanding the material world”. This definition suggests that craftsmanship can be understood as a touchstone for a theory of knowledge in material productions. By exploring the role of skill in the processes of making and its epistemic correspondence, I develop the hypothesis that craftsmanship is as a perceptive-cognitive enactment within the making process, a form of attunement with production. The argument is that the material, productive side of work deploys and operates a particular epistemological regime, based on types of practical engagement deeply related to the possibilities and contingencies of objective, concrete reality. Making means implicating oneself with the material world, embedding the body in the processes of transforming matter and partaking in the flows of forces that form things. Thus, the knowledge in the making – skill – can be understood as the invention or establishment of a new mode of perception through action that is enacted by tools, movements, techniques etc. This practical

perception acts as the foundational basis on which craftsmanship is performed, representing its conditions of possibility. Given the perceptual, embodied nature of craftsmanship, its transmission is rendered impossible outside the actual engagement with production. As such, this interpretation refers back to the original distinctions made by Gilbert Ryle of “knowing that” and “knowing how” that influenced Michael Polanyi in his definition of tacit knowledge. The particular epistemic rationality of crafts provides insights for understanding knowledge inside disciplines involved with creative practice, such as architecture. The epistemic coupling with production helps to understand how architects design, but it also reveals a general epistemic schism in the discipline, founded in the inconsistency between abstract designerly knowledge and the craftsmanship of construction.

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Perhaps the most common example of Michael Polanyi’s concept of tacit knowledge is riding a bicycle. First introduced by Polanyi himself, <sup>1</sup> the example is very effective in transmitting the general quality of being non-explicit, but does not easily relate to other ways of knowing, such as theoretical knowledge. To remedy this distance, much ink has been spilt on the notions embodied, practical and somatic knowledge, <sup>2</sup> in an attempt to bridge the two. Nonetheless, I believe yet another line of investigation might prove useful. Notably, while the definition of the ability to ride a bicycle as knowledge is not straightforward, there is little disagreement that it requires skill.

It seems important that Polanyi’s own example of tacit knowledge is so recognisable as a skill. However, it little helps

to conceptually understand tacit knowledge, since what is meant by 'skill' is often obscure. From a scholarly perspective, one quickly notices how underexamined the notion of 'skill' actually is. Classical epistemology has dwelt little on the concept, understanding that it accounts only for the application of knowledge, without being a proper instance of knowing. Knowledge and truth appear related, while 'skill' simply denotes a subsidiary, more significant to labour than to philosophy, in a schism dating back to Plato and Aristotle.<sup>3</sup> Mimicking classical epistemologists, studies on professionalism disappoint as well. Donald Schön argues that in the field, biased by 'Technical Rationality', skills are thought of as 'an ambiguous, secondary kind of knowledge'.<sup>4</sup> Schön's departure from this perspective is significant, but he does not directly develop it as a concept, focusing instead on the 'knowing in action' that takes place in skilled practice.<sup>5</sup> However, scholars from anthropology, archaeology, and cultural studies seek to understand skilled practice by focusing on the concrete environment of production. Following the works of David Pye and Peter Dormer, Richard Sennett's *The Craftsman* brought notable attention to the topic.<sup>6</sup> Ever since, the growing field of research known as 'craft theory'<sup>7</sup> has attempted to theorise skill. Amongst many craft theory scholars, perhaps the most prominent is the British anthropologist, Tim Ingold.

Ingold argues that making is not a process of translating a conceptual idea into matter, but rather the process where one finds one's way by following the material's properties.<sup>8</sup> In opposition to Aristotelianhylomorphism, Ingold rejects a dualism between form and substance and suggests that artefacts come to be as they are woven in the 'flow of forces' of skilled practice.<sup>9</sup> This would imply that craftspeople do not

impose ideal forms into nature, but engage nature in a ‘form-generating process’, <sup>10</sup> or morphogenesis, in which the properties of materials, the affordances of tools, and the perception and movements of the maker come together in a creative action. Form, he proposes, is generated through this encounter – it grows out of the process itself.

Ingold’s view makes it possible to theorise skill as something other than the mere application of knowledge. As pointed out by Carlos Sautchuk, this conception of skill betrays a deep phenomenological influence. Ingold proposes a ‘generative relation between the person–organism and the environment’ <sup>11</sup> that conditions the development of skill and, therefore, takes into account the experience of the contextual world as an active process that affects both maker and matter. <sup>12</sup> In the apprenticeship of skill, practitioners ‘watch and feel as they work’, in a process of ‘rediscovery’ <sup>13</sup> that brings to the fore the properties of materials as they appear ‘directly implicated in the form-generating process’. <sup>14</sup> In other words, rather than the capacity to manifest exterior codes and form into a particular medium, skill is acquired through ‘an attentive, perceptual involvement’ with materials in a productive setting, within the processes of the craft. <sup>15</sup>

Walking the same path, Dutch archaeologist Maikel Kuijpers understands skill as a form of ‘recognition of and response to material’. <sup>16</sup> Associating the resulting quality with how skilful or unskilled makers are, he argues that skill allows different individuals to ‘respond differently towards the material’. <sup>17</sup> While this capacity of (differential) response might be interpreted as an application of external knowledge, Kuijpers argues that it is through perception enacted in practice that knowledge of material comes to the craftsperson. In other

words, ‘recognition’ and the ‘response’ are made possible by means of an ‘intimate relationship between the maker and material ... achieved through the hands, eyes, and tools’. <sup>18</sup> This is a way of ‘sensate understanding’. <sup>19</sup> As Kuijpers phrases it, ‘craftspeople aim to express the qualities rather than properties of a material’, meaning that instead of knowing materials by properties such as chemical percentages, deformability, and so on, they interact with their medium through what can be sensorially apprehended in practice. <sup>20</sup> While this knowledge ‘is not necessarily of the kind that can explain why something happens’, and therefore not strictly ‘theoretical’, it allows for a phenomenal relationship to be ‘clearly recognized, understood, and acted upon’ <sup>21</sup> in a particular and relational process:

In every encounter between material and craftsperson this dialogue is repeated; the idea shaping the material as the material tweaks the idea. This interaction takes place at the level where craftspeople are able to perceive and understand their material through their senses and with their tools. A craftsperson will listen and learn from material, how it behaves, and what it presents. <sup>22</sup>

To demonstrate his point, Kuijpers argues that unskilled makers ‘might not even recognize’ the qualities of a material, and thus respond differently to it than a skilled craftsperson. <sup>23</sup> This leads us to another important point about its nature: while skill is dependent on perception, it also implies a change in it. Perception does not stay the same, whether skill is involved or not. It is precisely this change that creates the possibility for a

different ‘response’ or action. What distinguishes the skilled and the unskilled is not only a different capacity to act, but a different capacity to perceive that affords action. Additionally, the change in perception is not simply physical, but involves ‘recognition’ – it is epistemic. Skill is not the capacity to see the grain of wood, but to see meaning in the grain of wood.

What I argue is that this epistemic shift in perception defines skill. To be more precise, skill should be understood not solely as a capacity made possible via a change in perception, but as the establishment of this transformation. It is the change in perception and its association with practical meaning related to the processes of making that qualifies skill; after all, the capacity to perform a particular task is conditioned by the ability for the task to be posed. It is only the skilled who know what to do and are able to perform it when faced with a problem. <sup>24</sup> In other words, skill is the establishment of perceptual fields that allows knowledge of a practical syntax to be developed. It is the ability to see, with the material, the virtuality of action – thus, its language is that of craft.

If skill can be understood as the establishment of perceptual-epistemic fields, it is effected through experience, slowly constructed by the active engagement with materials, tools, and techniques in the process of making. In other words, it is by experiencing that the craftsperson gets the ‘feel’ of things. Through this feeling, understanding is constructed, and theoretical knowledge can be associated with practice. This process explains the incapacity of artisans to explain things in scientific ways, because it bypasses the need for explication. In it, the hierarchy between research and practice is inverted, if not dissolved altogether. What could be the equivalent of research, in crafts, does not stem from a teleological drive for

discovery, but is prompted in practice because of the intrinsically experimental nature of practical action.

Take, for example, blacksmiths. They measure the steel's temperature by colour, and gauge the transformation it allows without the need for a scientific explanation of the quantum mechanics and chemistry involved. Blacksmiths 'use' these disciplines without theoretically 'knowing' them because their ways of knowing are that of the exploration of the world and its phenomena. The heating of steel produces blackbody radiation and simultaneously makes the material pliable, and different amounts of heat serve different functions in the craft (forging, hardening, tempering, etc.). This variation in temperature is perceivable most directly by colour. From 'cherry-red' to 'white', blacksmiths gauge the temperature of the steel with the precision required by their works, without the need of an objective codification – degrees alone, either Celsius or Kelvin, tell one little about when to quench a blade if one lacks a thermometer, in addition to the abstract knowledge of metallurgy. Across centuries of exploration, blacksmiths came to know the phenomena of quantum mechanics and chemistry in action, without knowing them in descriptive terms. They know it because they use it, insofar as it is a component of their craft, and they slowly developed the mode of perception that allows this engagement. As Marchand argues, 'the process of learning through exploration, experimentation, and reflection brings about new knowledge or a new way of knowing (or getting to know) something'. <sup>25</sup>

In the terms of the French philosopher Gilbert Simondon, this sensate engagement affords information – a difference that makes a difference, as described by Bateson; <sup>26</sup> a difference that, in relation to the task at hand, opens a horizon of



possibility.<sup>27</sup> For Simondon, information is not a discrete, absolute thing that stands in its own right, and the question is that of meaning, which is the mode of perception referred to here – it is the capacity to find a particular meaning in the changes of colour of heated steel related to the task at hand that defines the skill of the blacksmith. This meaning is not absolute or autonomous, but connected to a network of flows, forces, contingencies, and tendencies.

In this framework, it is also possible to see how theoretical knowledge can act on skill but not guarantee or equate to it. To coalesce in skill, any information gathered through other means must establish a change in perceptual capacity. Acquiring or improving skills via theoretical, representational sources is a translation of properties into qualities, in a reverse process to that suggested by Kuijpers as necessary to (theoretically) understand skilled practice. Going back to the example of blacksmithing and quantum mechanics, many modern blacksmiths incorporate the use of magnets to test the temperature of steel for hardening. As it happens, the hardening temperature of steel – more technically, when the transformation of its molecular grain structure from ferrite to austenite is significant – generally sits below its Currie Temperature, in which the material loses its magnetic properties. Blacksmiths, then, converted this piece of metallurgical information into a perceptive tool, understanding the properties to access the qualities of their material. They will test if the steel is magnetic and, if not, know that it is (probably) hot enough for hardening. Skills, as such, can be located in the boundaries between the concrete and abstract aspects of knowledge and, more importantly, establish their connection. They operate as the bridge between descriptive, operative, and projective knowledge; that is, between the information of a

given state, the processes to transform it, and its possible development into a new state. As Trevor Marchand puts it, the ‘process – the act of making – is what counts in this context ... thinking and learning through making are at the core of the act of craft’. <sup>28</sup>

Especially important in this interpretation is the relationship established between maker and the world. The complexity of craftwork requires the awareness of the worker in relation to a multitude of variants, with which s/he has to engage rationally in the course of the production. Craftwork is constantly marked by problem solving <sup>29</sup> in a structure encompassing many dimensions and contributions from material, social, and cultural perspectives. ‘In craft’, Marchand states, ‘problems emerge in tandem with identifying mistakes or registering deficiencies, and they arise while learning technique, and alongside experimentation, improvisation, and innovation’. <sup>30</sup> These tasks are closely related to the agency of the artisan, and in Theodor Adorno’s words, rich in ‘rationality’, because ‘the means have their own logic, a logic that points beyond them’, meaning the connection with an objective, concrete reality that has to be addressed in every instance of making. <sup>31</sup> As a reflection, materials and things have resistance – a sort of reaction that does not require intentionality. The world has a grain, and making implies a way of dealing with that grain. This can be seen as a form of agency, <sup>32</sup> in the sense that it generates ‘affordances’ in the way something is to be perceived, signified, read – i.e., the way in which it responds to action. <sup>33</sup> The corollary, as Ingold put it, is that

makers have to work in a world that does not stand still until the job is completed, and with materials that

have properties of their own and are not necessarily predisposed to fall into the shapes required of them, let alone to stay in them indefinitely. <sup>34</sup>

A good example of how this problem-solving aspect of making relies on agency can be found in the relationship makers have with tools. In Kuipers's analysis, tools mediate skilled practice by being simultaneously perceptive and transformative. As such, they can be understood as extensions of the body that allow one to perceive the material according to the conditions of its transformation. Tools provide a way of sensing that is directly coupled with the possibility of action: a chisel allows one to 'feel' the wood in its resistances (and affordances) to being carved; a hammer, to 'feel' the steel in the way it bends to a blow.

While it is common amongst modern theorists to understand tools as extensions of the body, <sup>35</sup> Sautchuk points out that this is not the only possible expression of their use. Depending on the action performed, tools can be seen as completely external elements to whose subjectivity the craftsperson must relate, or even be part of. Both expressions can be seen in the case of the divergent relation fishermen from Northern Brazil have with the fish hook, <sup>36</sup> according to the contingencies of the processes in which the hook is active, and the kind of engagement it makes happen. For fishermen in the lakes, the hook is an extension of the arm, enlarging their bodily potentials, while coastal fishermen address their body as part of a larger mechanism, or technical object <sup>37</sup> – on the fishing boat, artifacts and tools can work together as 'partners' or 'betray' the fishermen. <sup>38</sup> This differential relationship with tools, Sautchuk argues, implicates different notions of personhood

and agency. The hook, in these environments, acquires different meanings, without any change in its primary or technological form.

The common ground between the analyses of Kuijpers and Sautchuck is the perception that the relationship between workers and tools or materials is not as solid as it is professed to be, nor does it take a single format. More than a territory in which the categories of subject and object are given, making is the territory where they are developed. Tools make possible the establishment of a relationship between agencies precisely because skill is perceptual. To acquire skill, one must personally engage the work and the craft, testing the networks of resistance and affordance in relation to one's own capacities and limitations. In a craft apprenticeship, the master shows the apprentice the starting and finishing points of a procedure, as well as the objective path between the two – but the semantics of the action are constructed mainly by the apprentice.

Perhaps this schema seems needlessly to reestablish a duality between subject and object, but what is happening in the moment of making is not seen as, nor describes, such duality, but (potentially) actualises it. In the process of making, agencies are established and a complex intersubjective relationship is founded, or better yet, negotiated. The more skilled a craftsperson, the easier s/he will engage with production and make the specific network of agency of their craft emerge, securing their position in it. In other words, as experience builds up, the flow of forces between agents coalesces into a more (but never completely) stable form. Making is as much a merger between the maker and material as their continuous tension, and every instance of making engenders a particular relationship of agency. Thus, there is not

one mode of relationship between maker and what is made, or even between subjects, objects, and processes, for that matter, but many. Consequently, there is not one epistemology of making, but countless.

The production of crafts has to respond to this complex reality, and craftsmanship can be understood as the enactment of skill as such a response. The virtuality of action provided by skill becomes the actual in a process of intersubjective encounter: craftsmanship is this actualisation. Contrary to the idea of genius, craftsmanship is not an autonomous quality or capacity that exists in a latent state, but an emerging phenomenon. It is not located in the subject, as something waiting to be put to practice, neither is it embedded in the object. Rather, it circles back to the active moment of practice, in the encounter of objective and epistemic entities that constitute making, and is actualised there. Craftsmanship is only real in the moment of its operation, in the actual engagement between the maker and the process. Rather than being, craftsmanship is always performed.

If ‘all craft is approximation’, as Pye suggests, meaning that the way of knowing of craftspeople is that of tendencies, it is also a metaphorical reduction of distance between the world of the maker and the material environment of production.<sup>39</sup> More than an established way of traversing complexity, skill represents the ability to perceive a horizon of possibilities in such paths. Thus, increases in skill are not directly matters of efficiency, but of expansion and diversification of this horizon. Skills provide the craftsperson with possibilities of action, pathways that allow one to move towards the intended goal. Accordingly, archaeologist Heide W. Nørgaard observes that ‘[c]hoices taken within a working process can be viewed as a

“sorting out of possibilities”<sup>40</sup>. As with any journey, there is not a single possible trajectory, and their plurality emerges from the variation in their contexts. Making is just so, in a landscape populated by materials, techniques, and tools.

However, the choices in the craftsperson’s repertoire respond not solely to the physical materiality (the properties and qualities of materials), but to many other contingencies that are active in the processes of making. There is a level of ‘wayfaring’, as Ingold would put it,<sup>41</sup> and a level of cultural and historical hylomorphism given by a social landscape that conditions what is judged valuable or useful. The work of the artisan involves the mediation between those dimensions, and it is by enacting the dimensions of a socially established production that craftsmanship comes to be. Craftsmanship happens within the network of agents in a particular morphogenetic assemblage, through the employment of a perceptive–transformative dialectic in practice. In simple terms, it is the enactment of skill: if skill is what affords action, craftsmanship is the realisation of action in a particular way.

A way to summarise things is to say that craftsmanship is a perceptive–cognitive alignment with making processes in which the particularities of production are negotiated with the material world. Craftsmanship is a creative event taking place in-between subject and object, practitioner and material, connecting things in their dynamic flow and weaving the world of life – or, more precisely, a form-giving process that arises from the manipulation of things and materials following their specific embedded proprieties and qualities. It is a process of coupling the information afforded by skill as an attunement in practice. From these perspectives, it becomes clear that indeed, as Kuijpers argues, ‘craft is not a set of fine products, or even a

set of skills; it's "a way of exploring and understanding the material world". <sup>42</sup>

This is why skill and craftsmanship are, by nature, tacit. The relationship established between maker and the world is one that is developed under the terms of their encounter in practice. It is relative to an objective, external reality that could potentially be codified and represented, but is only accessible from a situated and embodied position. Being modes of perception, skills are built on personal experience and are simultaneously shared among a community of practice and particular to each individual. The specific character of a person's body, their ways of thinking and cognitive capacities, and the conditions of their particular situation in action – say, for example, their mood – will define their relationship with the material world, influencing their craftsmanship and the development of skill.

While material properties can be expressed in transferable formulas, equations, or descriptions, material qualities are felt: they are sensorial. The translation between the two will invariably remove this sensorial quality, which explains the frequent use of metaphors in craft apprenticeships. This is a way to counteract the loss in perceptive potential, by relating one action to other common phenomena with similar sensorial qualities. This knowledge is discussed and flows within the community of practice, serving as a device of communication between practitioners. Such displacement, however, is not complete and cannot fully transmit, to the linguistic version, the entirety of its original potential. Ultimately, the metaphor in craft points to the existence of a knowledge that is not linguistic in nature, but refers to the practice itself.

In relation to epistemology, the framework presented here resonates best with the work of Gilbert Ryle, whose postulations revolve not around explicit and tacit forms of knowledge, but about knowing how and knowing that.<sup>43</sup> Ryle's work is a critique of the idea that there is an external intellectual background to knowing, a 'ghost in the machine' that exercises knowledge through the application of rules and theory prior to practice. Knowing how, therefore, is not merely an expression of knowing that, as a command from mind to body, but an instance of understanding. Knowing how is a form of intelligence, a 'disposition' to think and learn and be 'on guard' to possible problems in action.<sup>44</sup> The parallel to skill is evident, and although Ryle does not relate it directly to perception, he expands the concept of the mind in terms that resonate greatly with skill. He states that a skilled practitioner, such as a chess-player, and a skilled observer share the same 'path', as they both can identify and 'be on the alert to detect' the same mistakes, opportunities, and so on.<sup>45</sup> These operations are not located solely in the mind understood as a purely theoretical place, 'for the mind is not even a metaphorical "place"'. On the contrary, the chessboard, the platform, the scholar's desk, the judge's bench, the lorry-driver's seat, the studio and the football field are among its places'.<sup>46</sup> The mind, for Ryle, is not set in opposition with the body, the tools, and the world, but flows into and emerges from them.<sup>47</sup> Knowing, in his conception, is linked to practice much in the same way skill is connected to craftsmanship.

What Polanyi fails to properly address, in the bicycle example, is that what is at play is not only the movements required to steer the bicycle or keep it from falling. It is that these actions, the feel for the bicycle and its particular way of moving through



space, are developed within a perceptive–bodily development. The formation of the bicycle rider is an invention of themselves in the encounter of wheels, eyes, roads, muscles, chains, wind, and so on. Perhaps, under this framework, rather than understanding skill as a form of tacit knowing, the opposite should be done.

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47. In this specific topic, Ryle's interpretation is developed in a very similar fashion to that professed later by scholars such as Marcel Mauss, Maurice Merleau-Ponty, and Tim Ingold.

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## TACK Talk #2: How to define what belongs where?

Resources

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