

soft control

behavioral matter & the art of replicability

Ana Piñeyro and Joffrey Becker – November 9, 2023

• *behavioral matter* • *active filament morphologies* • *replicability* • *operational sequences* • *anthropology of technique* • *active textiles*

Intertwining the work of designer Ana Piñeyro and anthropologist Joffrey Becker, this video.able essay presents an archeology of the processes involved in the transformation of matter and the manifestation of its behavior.

Renewed attitudes toward matter, as framed within the philosophical stances of the new materialisms (e.g., De Landa 1997; Braidotti 2000; Barad 2003), have prompted researchers and designers to explore the performance and behavior of materials by tapping into their inherent morphogenetic and self-organizing capacities (Leach 2017; Menges 2006). Designer Ana Piñeyro follows this path. Building on the introduction of heat-responsive, twisted, and coiled polymeric actuators in the field of material science (Haines et al. 2014), her research explores the emergence of filament forms and their associated shape-change behavior in response to heat, with the aim of broadening available opportunities to design with active flexible materials in the field of textiles (Piñeyro 2020).

Engaging in spontaneous, hands-on dialogue with the material as a means to expand the creative space (Piñeyro 2019) calls for a subsequent formalization of arising material transformations in order to enable their further application, thus raising the epistemological issue of the replicability of results (Popper 1959). As a condition of scientific knowledge, replicability invites the consideration of the performative aspects of practice and thus addresses its contingency in a reflexive manner (Pickering 1995). To this end, we provide insights on the search for replicable outcomes by bringing together the fields of arts and design with that of the anthropology of techniques.

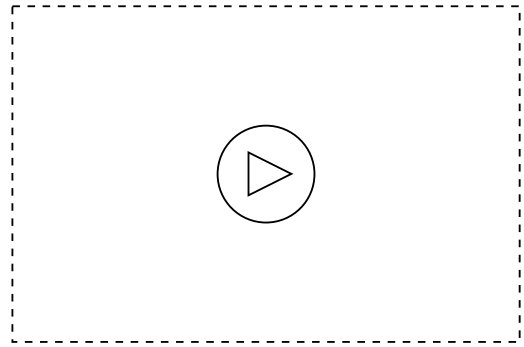
The reflexive work we present raises questions on least at two levels traditionally linked to two very distinct epistemic cultures (Knorr-Cetina 1999). Arts and social anthropology have an ambiguous relationship with replication, a notion that has raised issues in both arts (Debord 1994; Benjamin 1969) and sciences (Baker 2016). The scope of our contribution goes beyond this ambiguity. It extends to the search for the very conditions of replicability by paying particular attention to the parameters that can make it operational in a given context by considering the various operations required in its achievement in a reflexive manner. In doing so, we reflect on the role of the formal diversity that arises from variations that permeate the making process, identifying their influence on the material's aesthetic and expressive qualities.

What steps are required to achieve replicable results?
What forms of tinkering and what means are used to learn about and document processes that reveal the aesthetic and expressive potentials of materials?
How does the milieu influence the outcomes of practice?

A multidisciplinary dialogue between textile and material design practice and the anthropology of techniques contextualizes prerecorded visuals to reflect on the influence of the flowing negotiation between material, environment, and practitioner on the outcomes of material transformation processes. This is what we regard as a soft form of control. Setting off from the notion of the recipe, we consider the chains of operation and sequences of actions (Leroi-Gourhan 1993; Lemonnier 1992; Sellet 1993; Coupaye 2009) involved in understanding material behavior, focusing on the ways in which the former are shaped through the sensory experience of matter.

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credits

authors: Ana Piñeyro and Joffrey Becker

visual designer: Ana Piñeyro

sound designer: Joffrey Becker

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about the authors

Ana Piñeyro (PhD) is a textile and material designer and researcher specialized in active soft technologies. She received her PhD from the Royal College of Art, London, and is currently a post-doctoral researcher at EnsadLab, Chair of Eco-design, École des Arts Décoratifs, Paris.

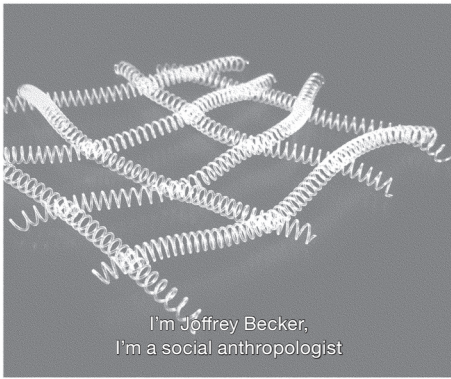
Joffrey Becker (PhD) trained in social anthropology at EHESS and was a member of the SPEAP program created by Bruno Latour. He holds a teaching chair at the École nationale supérieure de l'électronique et de ses applications and his research is conducted at the Neurocybernetics Team of the ETIS Lab.



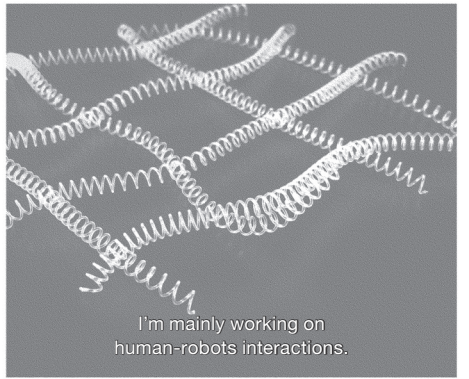
SOFTCONTROL
behavioral matter and the art of replicability

Joffrey Becker
social anthropologist

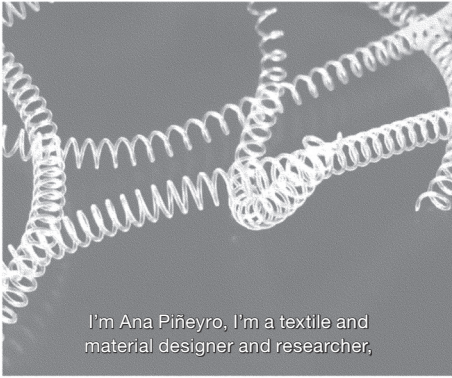
Ana Piñeyro
textiles & materials designer & researcher



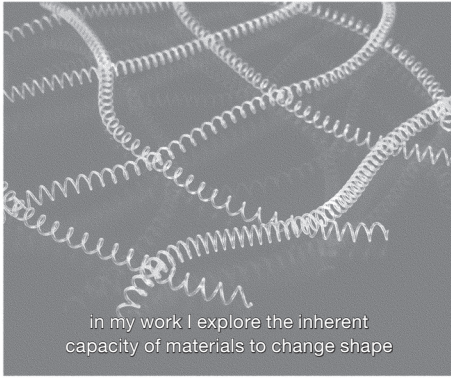
I'm Joffrey Becker,
I'm a social anthropologist



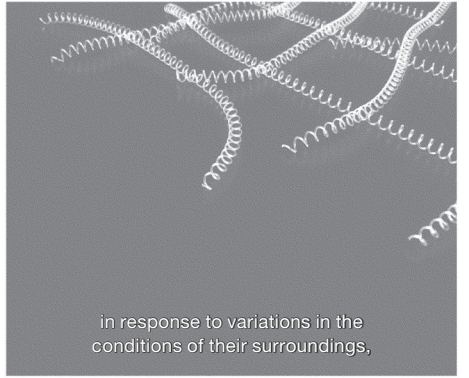
I'm mainly working on
human-robots interactions.



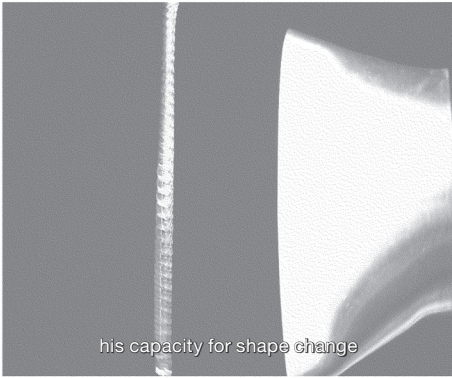
I'm Ana Piñeyro, I'm a textile and
material designer and researcher,



in my work I explore the inherent
capacity of materials to change shape



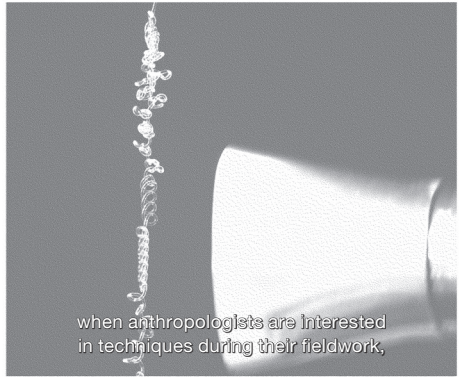
in response to variations in the
conditions of their surroundings,



his capacity for shape change



brings new opportunities for
the design of active textiles.



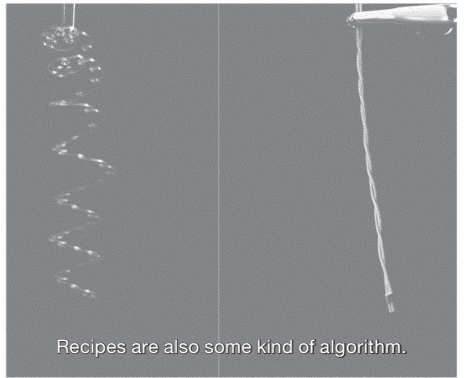
when anthropologists are interested
in techniques during their fieldwork,



they try to document
every aspect, every step



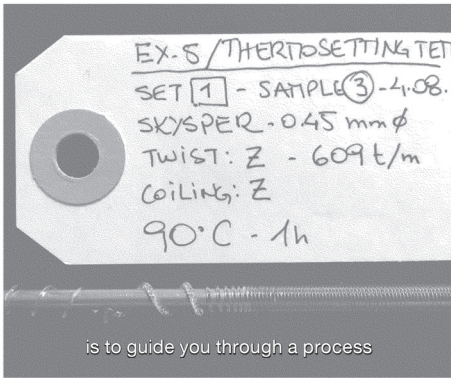
So you have to make a kind of recipe
to guide you through a process of transforming
the plain filament into a certain form;



Recipes are also some kind of algorithm.

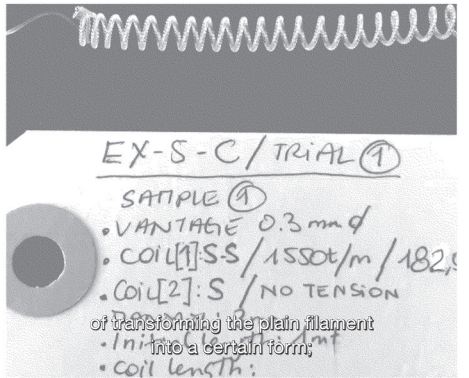


my recipes, what they attempt



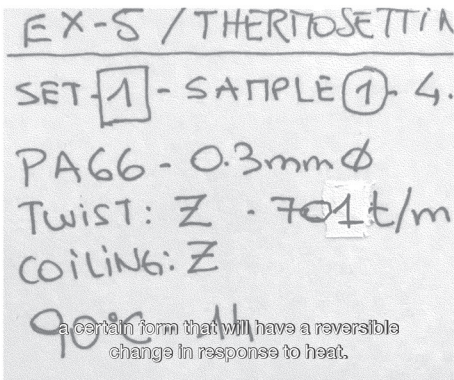
EX-S / THERMOSETTING TET
SET [1] - SAMPLE [3] - 4.08.
SKYSPER - 0.45 mm φ
TWIST: Z - 609 t/m
COILING: Z
90°C - 1h

is to guide you through a process

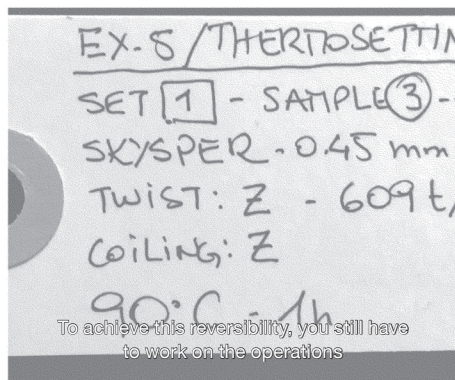


EX-S-C / TRIAL [1]

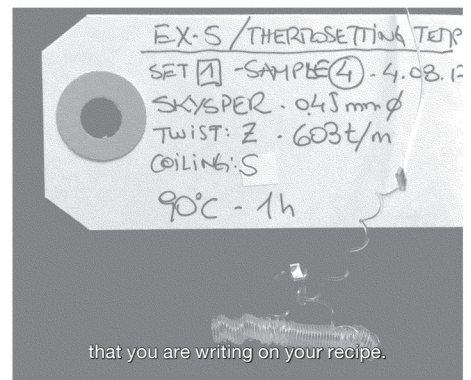
- SAMPLE [1]
- VANTAGE 0.3 mm φ
 - COIL [1]: S / 1550 t/m / 182 t
 - COIL [2]: S / NO TENSION
- of transforming the plain filament
into a certain form;
- In...
 - coil length:



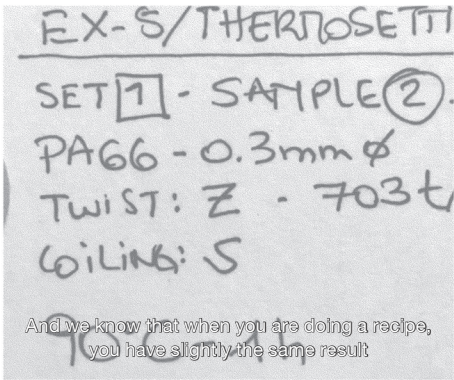
a certain form that will have a reversible change in response to heat.



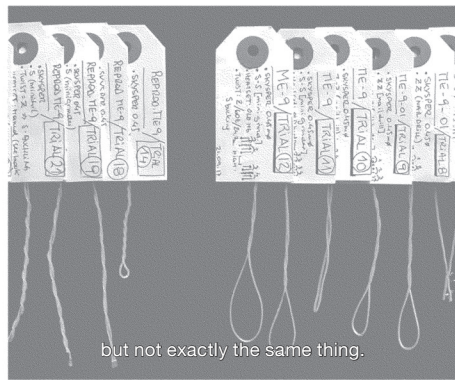
To achieve this reversibility, you still have to work on the operations



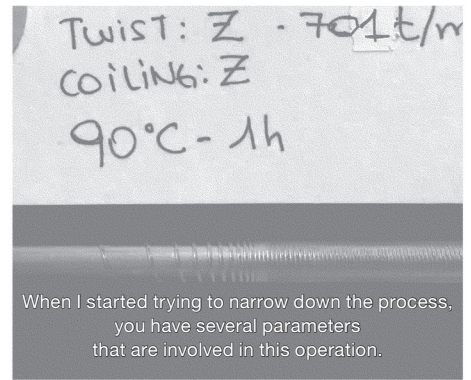
that you are writing on your recipe.



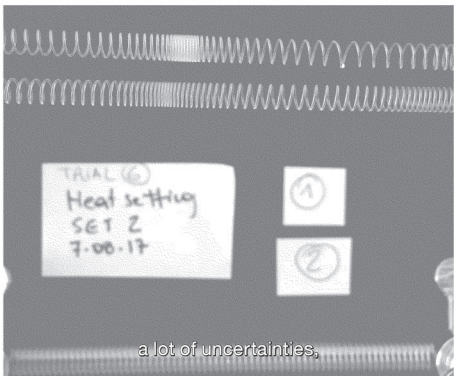
And we know that when you are doing a recipe, you have slightly the same result



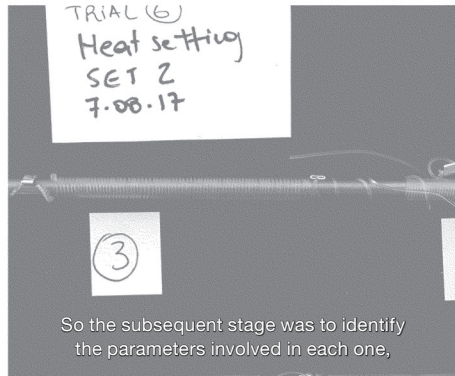
but not exactly the same thing.



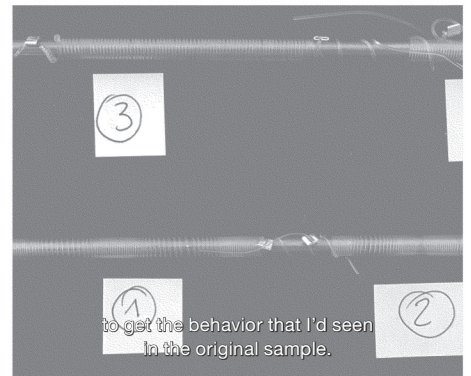
When I started trying to narrow down the process, you have several parameters that are involved in this operation.



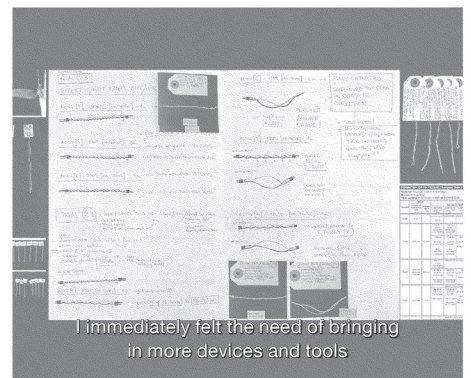
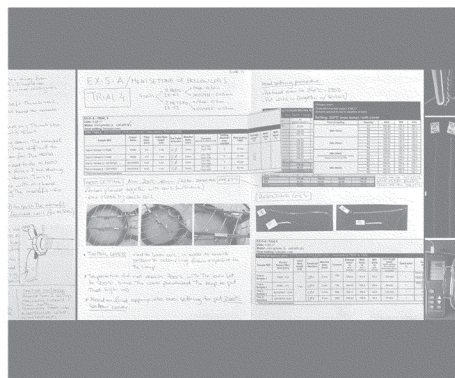
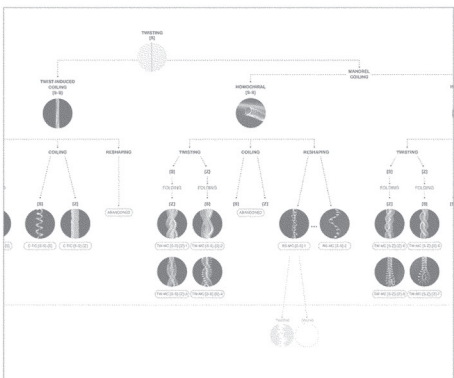
a lot of uncertainties,



So the subsequent stage was to identify the parameters involved in each one,



to get the behavior that I'd seen in the original sample.



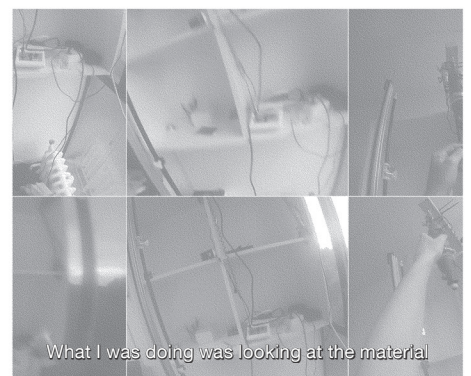
I immediately felt the need of bringing in more devices and tools



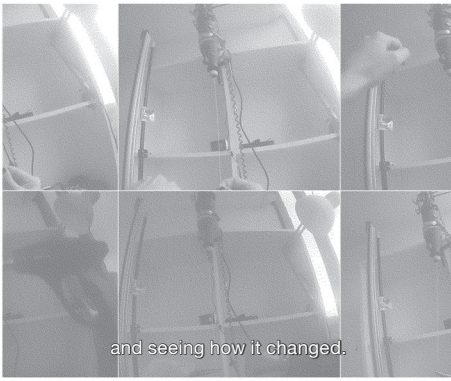
that allowed me to measure, to gain precision in the repetition of operations.



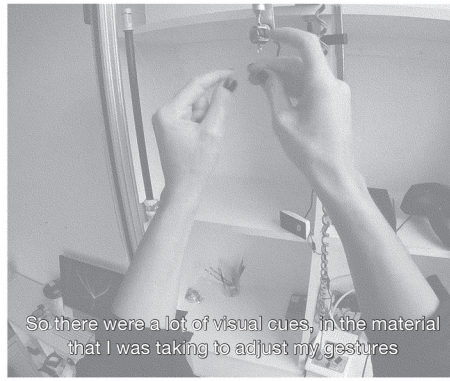
This switch first implied analyzing my intuitive, spontaneous way of working,



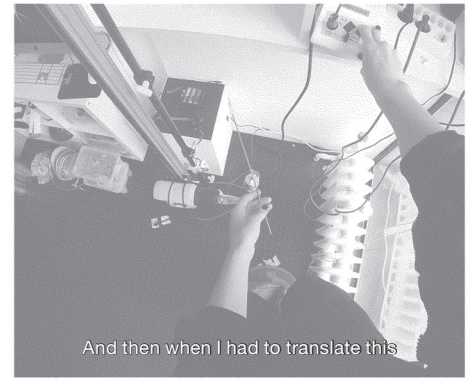
What I was doing was looking at the material



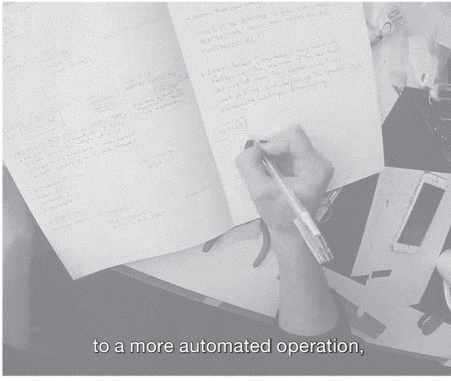
and seeing how it changed.



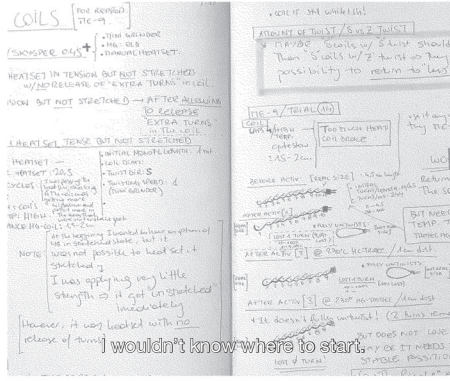
So there were a lot of visual cues, in the material that I was taking to adjust my gestures



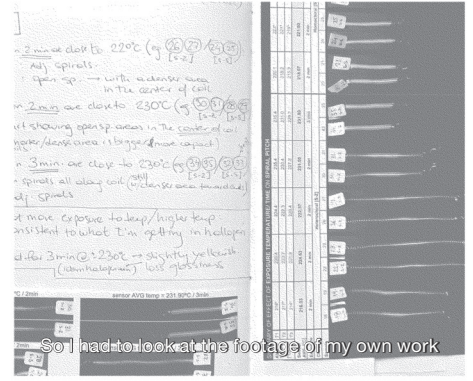
And then when I had to translate this



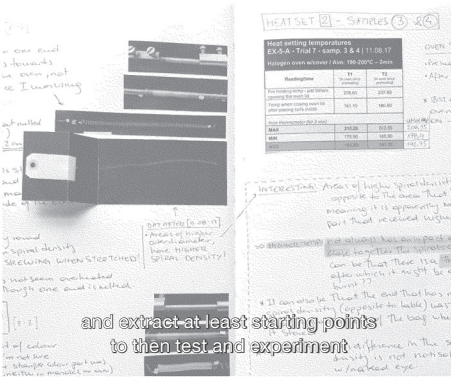
to a more automated operation,



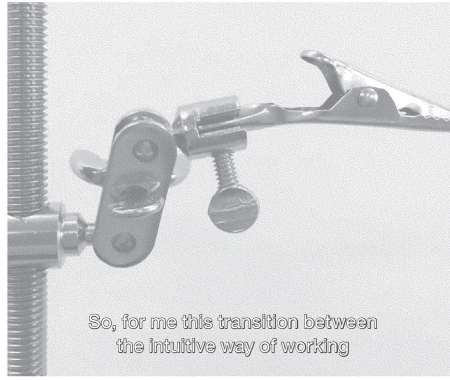
I wouldn't know where to start



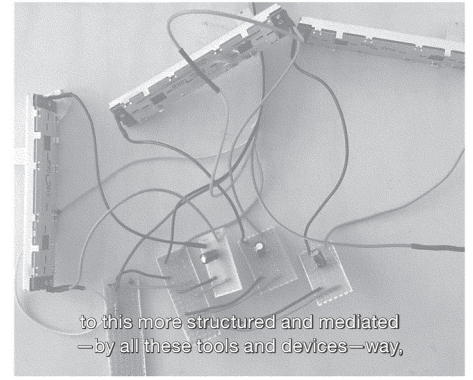
So I had to look at the footage of my own work



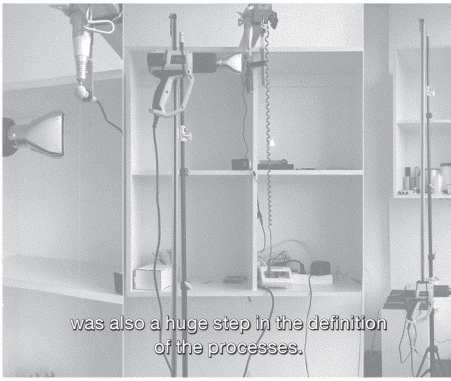
and extract at least starting points to then test and experiment



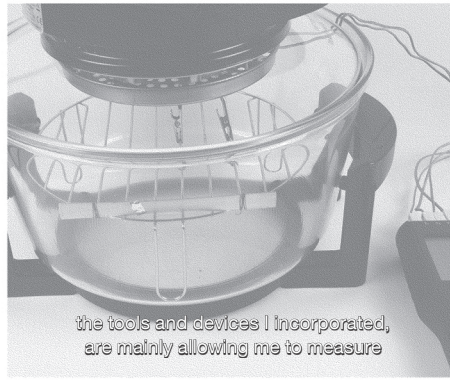
So, for me this transition between the intuitive way of working



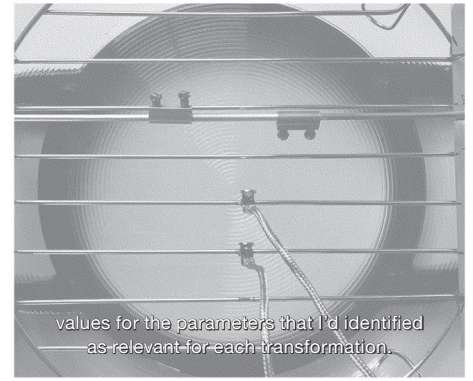
to this more structured and mediated —by all these tools and devices—way,



was also a huge step in the definition of the processes.



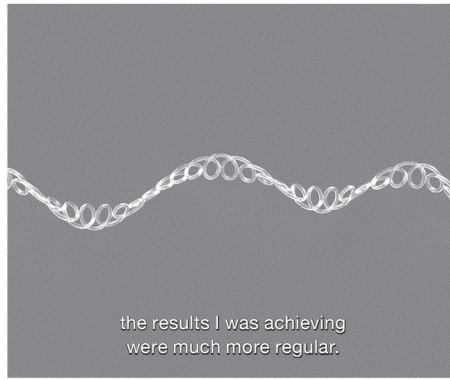
the tools and devices I incorporated, are mainly allowing me to measure



values for the parameters that I'd identified as relevant for each transformation.



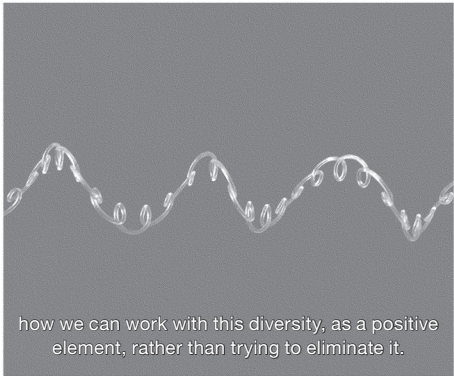
After I started working in this way,



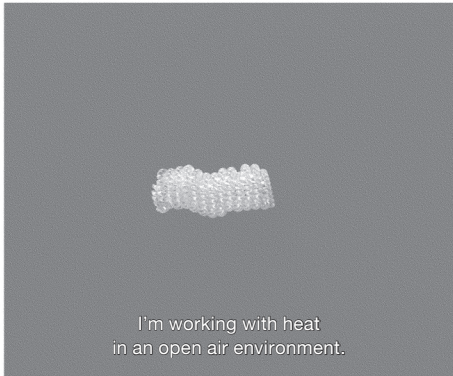
the results I was achieving were much more regular.



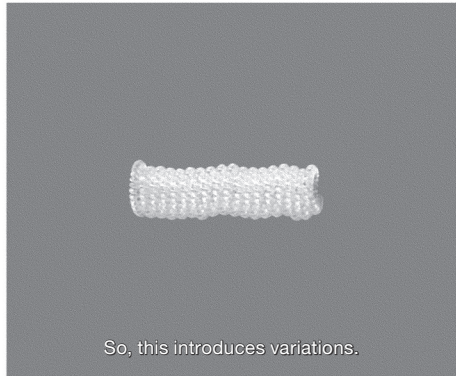
to realize the relevance of the diversity



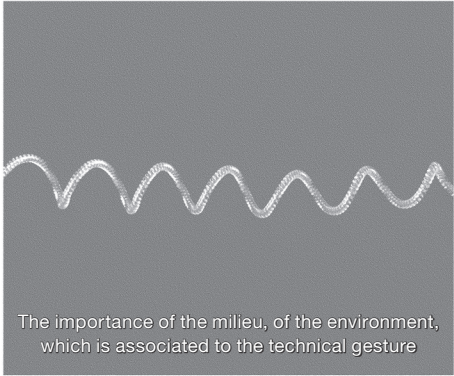
how we can work with this diversity, as a positive element, rather than trying to eliminate it.



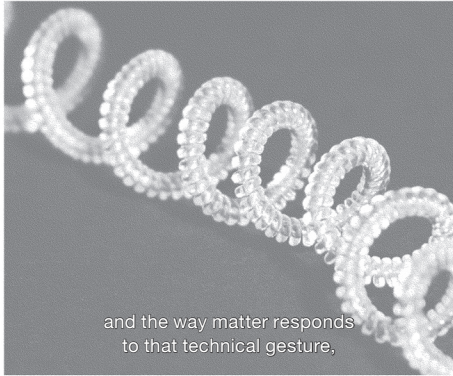
I'm working with heat in an open air environment.



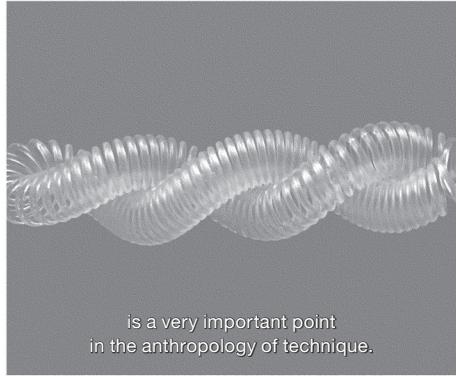
So, this introduces variations.



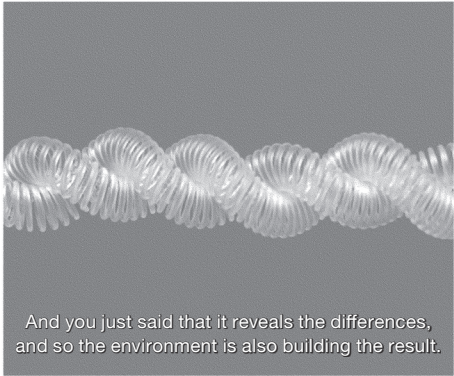
The importance of the milieu, of the environment, which is associated to the technical gesture



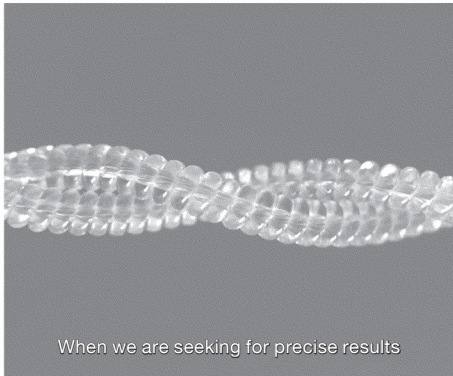
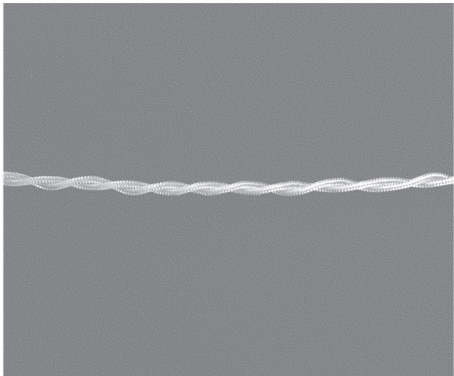
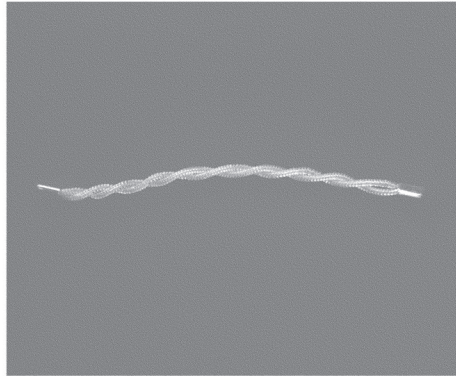
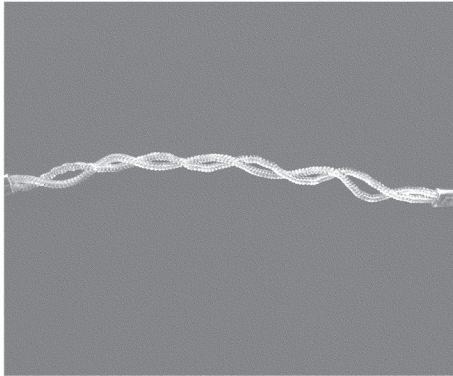
and the way matter responds to that technical gesture,



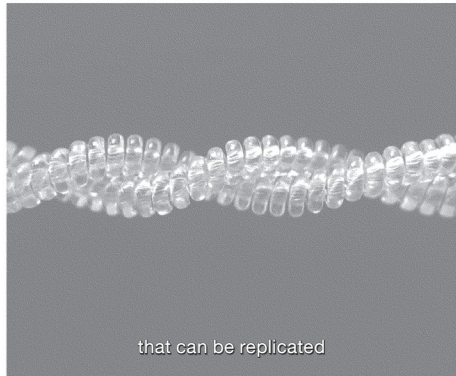
is a very important point in the anthropology of technique.



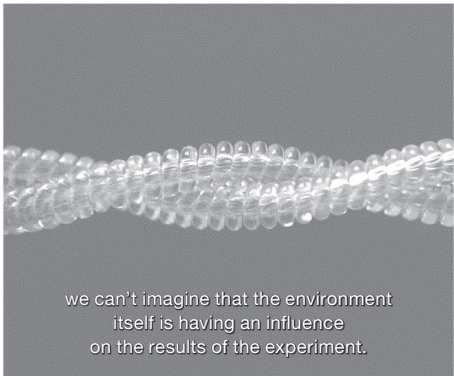
And you just said that it reveals the differences, and so the environment is also building the result.



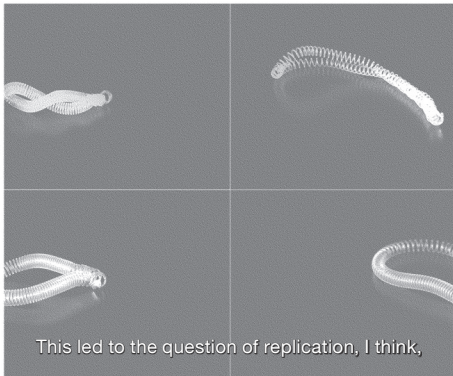
When we are seeking for precise results



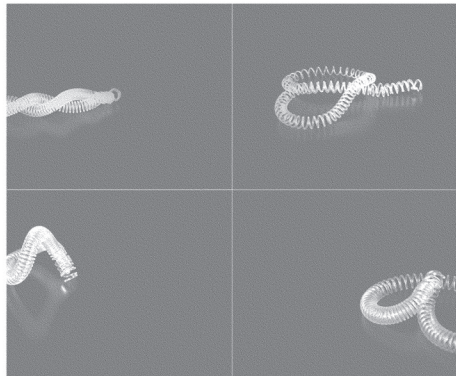
that can be replicated

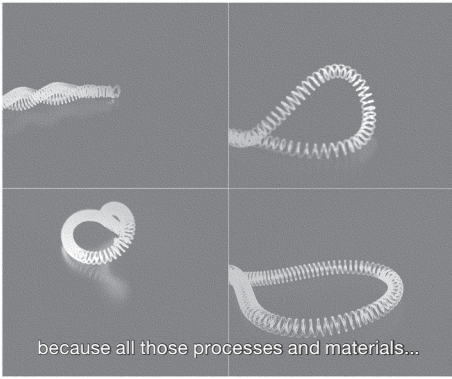


we can't imagine that the environment itself is having an influence on the results of the experiment.

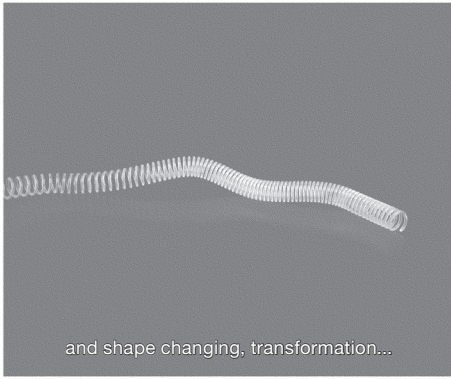


This led to the question of replication, I think,

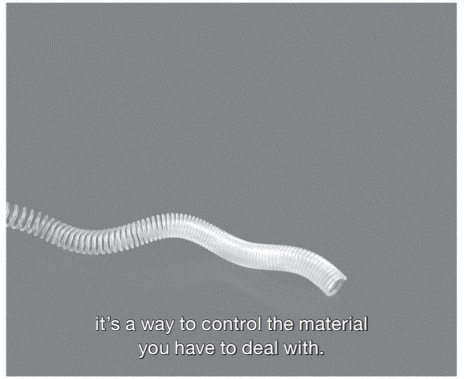




because all those processes and materials...



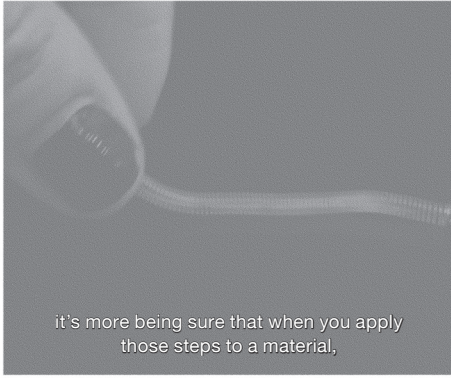
and shape changing, transformation...



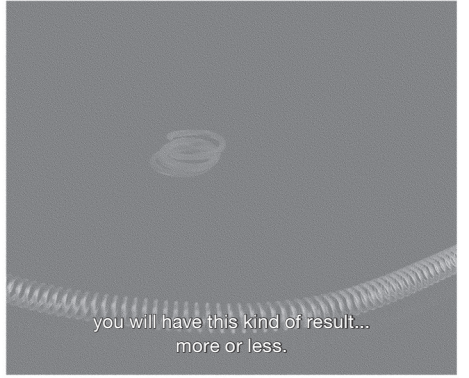
it's a way to control the material you have to deal with.



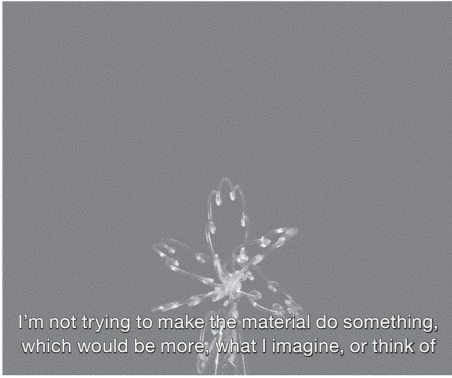
To do something with it you have to control it, but not controlling in a very hard way



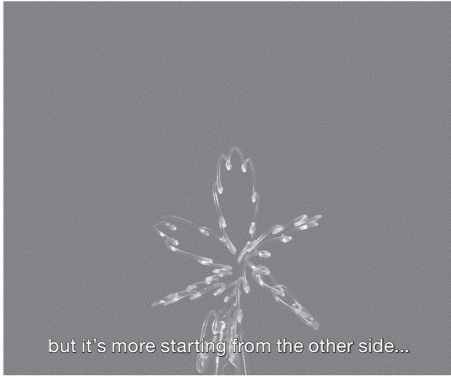
it's more being sure that when you apply those steps to a material,



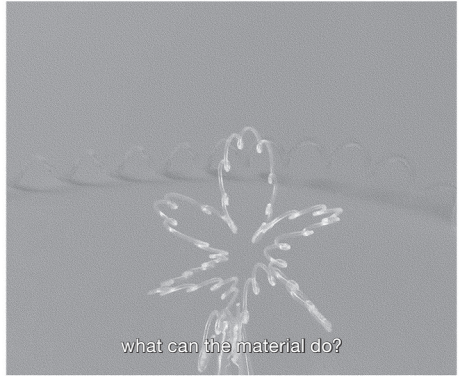
you will have this kind of result... more or less.



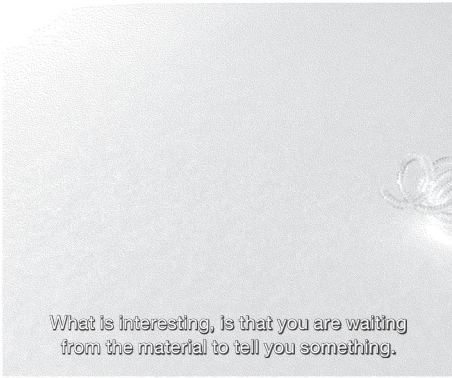
I'm not trying to make the material do something, which would be more, what I imagine, or think of



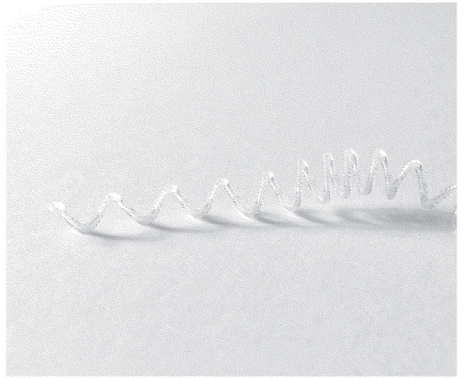
but it's more starting from the other side...



what can the material do?



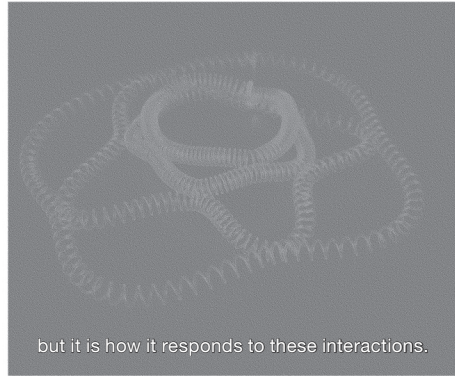
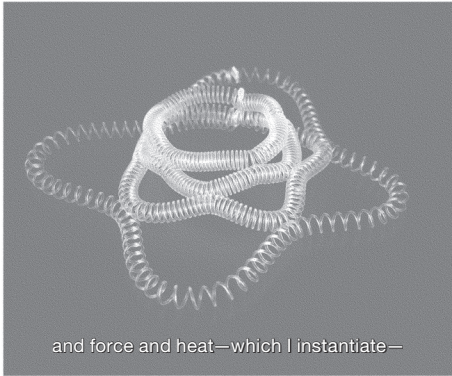
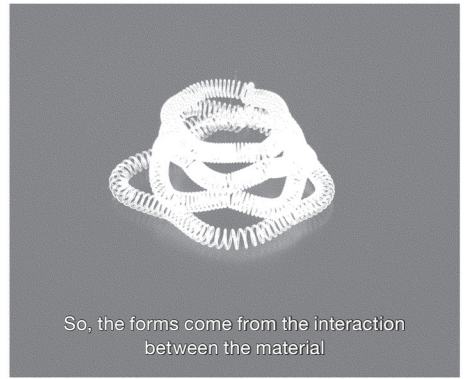
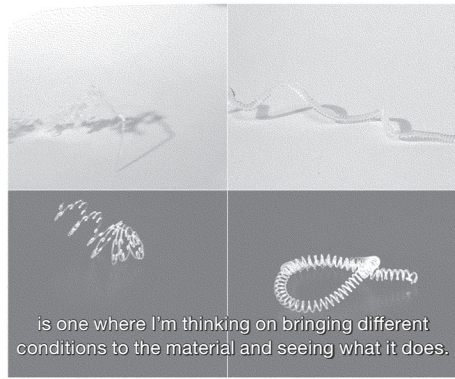
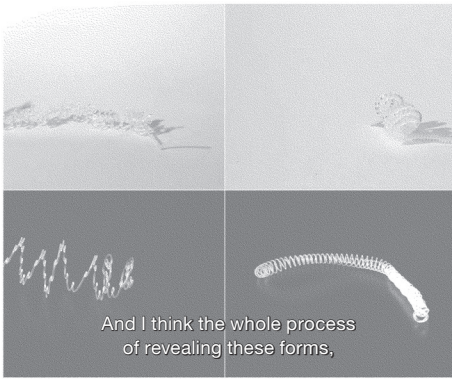
What is interesting, is that you are waiting from the material to tell you something.



And it seems to be very important



to have this kind of dialog with matter.



references and rights

illustration rights and references

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bibliography and references

- Baker, Monya. 2016. "1500 scientists lift the lid on reproducibility." *Nature* 533, 452–454.
- Barad, Karen. 2003. "Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter." *Signs: Journal of Women in Culture and Society* 28, no. 3: 801–831, <https://doi.org/10.1086/345321>.
- Benjamin, Walter. 1969. *Illuminations*. Translated by Harry Zohn. New York: Schocken Books.
- Braidotti, Rosi. 2000. "Teratologies." In *Deleuze and Feminist Theory*, edited by Ian Buchanan and Claire Colebrook, 156–172. Edinburgh: Edinburgh University Press.
- Coupaye, Ludovic. 2009. "Ways of Enchanting: Chaînes Opératoires and Yam Cultivation in Nyamikum Village, Maprik, Papua New Guinea." *Journal of Material Culture* 14, no. 4: 433–458.
- Debord, Guy. 1994. *The Society of the Spectacle*. Translated by Donald Nicholson-Smith. New York: Zone Books.
- De Landa, Manuel. 1997. *A Thousand Years of Nonlinear History*. New York: Zone Books.
- Haines, Carter S., Márcio D. Lima, Na Li, Geoffrey M. Spinks, Javad Foroughi, John D. W. Madden, Shi Hyeong Kim, et al. 2014. "Artificial Muscles from Fishing Line and Sewing Thread." *Science* 343, no. 6173: 868–872, <https://doi.org/10.1126/science.1246906>.
- Knorr-Cetina, Karin. 1999. *Epistemic Cultures: How the Sciences Make Knowledge* Cambridge, MA: Harvard University Press.
- Leach, Neil. 2017. "Matter Matters: A Philosophical Preface." In *Active Matter*, edited by Skylar Tibbits, 18–23. Cambridge, MA: MIT Press.
- Lemonnier, Pierre. 1992. *Elements for an Anthropology of Technology*. Ann Arbor: University of Michigan Press.
- Leroi-Gourhan, André. 1993. *Gesture and Speech*. Translated by Anna Bostock Berger. Cambridge, MA: MIT Press.
- Menges, Achim. 2006. "Polymorphism." *Architectural Design* 76, no. 2: 78–87, <https://doi.org/10.1002/ad.243>.
- Pickering, Andrew. 1995. *The Mangle of Practice: Time, Agency, and Science*. Chicago, IL: University of Chicago Press.
- Piñeyro, Ana. 2019. "Kinetic Morphologies. Revealing Opportunity from Mistake." *Supplement, The Design Journal*, no. 22, no. S1: 1871–1882, <https://doi.org/10.1080/14606925.2019.1595027>.
- Piñeyro, Ana. 2020. "Animating matter: A material-led exploration into the kinetic potential of nylon monofilament." PhD thesis, Royal College of Art, London.
- Popper, Karl. 1959. *The Logic of Scientific Discovery*. London: Routledge.
- Sellet, Frédéric. 1993. "Chaîne Opératoire: The Concept and Its Applications." *Lithic Technology* 18, nos. 1–2: 106–112.

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