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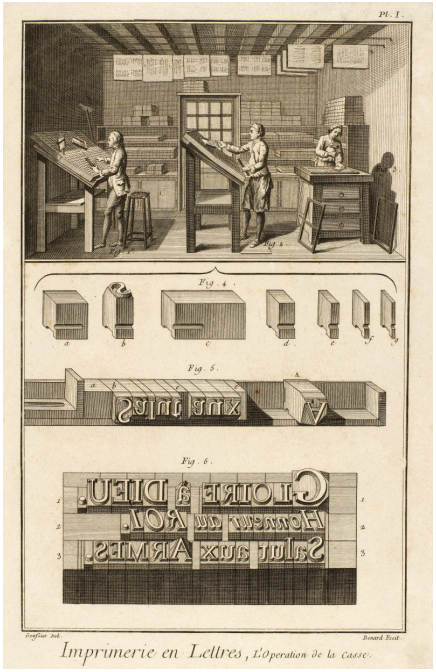
Hyper-parametric Machines

From making objects to setting conditions for machine work.

Hyper-parametric work names a shift in the relation between intention, instrument, and object. The term uses model settings as an analogy for research and design. In craft, hand, tool, and material form a close circuit. Industrial machinery inserts an apparatus between worker and object. Digital parametric design treats the object as a set of variable relations. With artificial intelligence, the worker defines the conditions under which a system elaborates goals, sources, parameters, drafts, and alternatives.



Goussier and Robert Benard, Imprimerie en Lettres, L'Operation de la casse, plate from Diderot and d'Alembert's Encyclopedie; Paris Musees / Musee Carnavalet, CC0.

Table of Contents

Work changes as the object moves farther from the hand. The artisan begins with mediation because a knife, hammer, awl, loom, or chisel already carries memory, rhythm, and constraint. The relation stays near enough for correction to happen inside the gesture. The worker feels the material resist, adjusts pressure, and learns through touch, sight, and habit. Leroi-Gourhan's account of gesture and technics gives this opening claim its anthropological basis: technical action and thought develop together, with the tool exteriorizing the hand while the hand remains an organ of judgment.[1]

1 Direct Work

In direct work, body, material, inherited technique, and local feedback are tightly coupled. Its parameters are tacit: the angle of a blade, the dryness of wood, the tension of thread, and the pressure of the wrist enter practice before they appear as abstract inputs. They are learned as repeatable differences inside use. Craft anchors the argument because every technical system redistributes perception and action through an instrument.

A late-medieval volvelle shows manual computation by encoding relation in a movable instrument read through use.

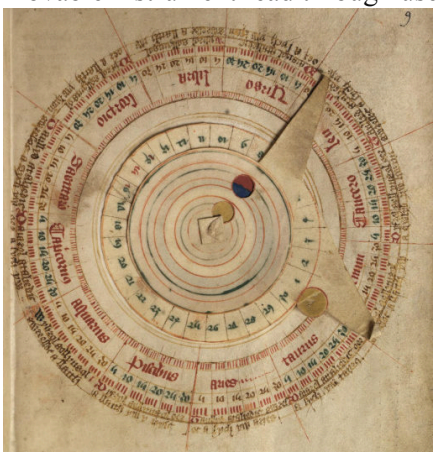


Figure 1. Gutun Owain, lunar volvelle from National Library of Wales MS 3026C, between 1488 and 1498. The rotating paper device gives an analog image of parameter setting through aligned relations; Wikimedia Commons / National Library of Wales, CC0.

2 Industrial Parameters

With industrial machinery, parameters move into the apparatus. Marx's chapter on machinery and modern industry marks the decisive point: in manufacture, cooperation and division of labor are organized among workers; in large-scale industry, that organization is materialized in the machine system.[2] The machine turns a single gesture into a repeatable system. It absorbs timings, tolerances, power sources, and repeated operations into an objective condition that faces the worker.

In the Jacquard loom, a woven pattern becomes a sequence of holes on cards. The card belongs to the procedure, separate from cloth and hand motion. It arranges motion before the work is performed. Babbage saw in programmable textile machinery a model for calculation; computing inherits this industrial abstraction of procedure. The object of work is approached through encodings that stand between intention and result.

Figure 2. Punch cards used by a Jacquard loom, photographed at the Museum of Science and Industry, Manchester. The card sequence is an early material image of work as encoded variation.

Babbage's 1840 plan for the Analytical Engine shows procedure in technical form before the machine exists as a working object. Storage, calculation, motion, and control appear as drawn relations.

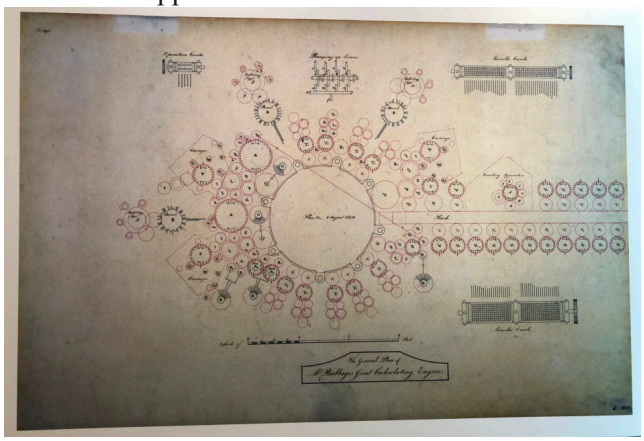


Figure 3. Babbage Analytical Engine Plan, 1840, photographed at the Computer History Museum by ArnoldReinhold; Wikimedia Commons, CC BY 4.0.

Simondon treats machines as cultural and operational objects with their own histories, margins, and modes of functioning.[3] Industrial parameters distance the worker from the object and concentrate prior human knowledge inside the apparatus.

3 Digital Parametricism

In the digital era, the parameter becomes a design medium. Sutherland's *Sketchpad*, a 1963 computer-graphics system, gave screen drawing a relational status: lines, points, and constraints became editable relations.[4] In later parametric modeling, a design becomes a variable system whose state changes with its inputs. Woodbury describes this as a way to represent designs that change with input data.[5]

In architecture, parametricism turns relations among elements, systems, and urban fields into a design problem. Schumacher framed this as both a style and a method.[6] Cedric Price gives an earlier architectural case because his projects place adaptation, program, and change at the center of design. The Fun Palace, developed in London from the early 1960s with Joan Littlewood and later Gordon Pask's cybernetic involvement, was conceived as an interactive cultural complex organized around changing activities, audiences, and control systems.[7]

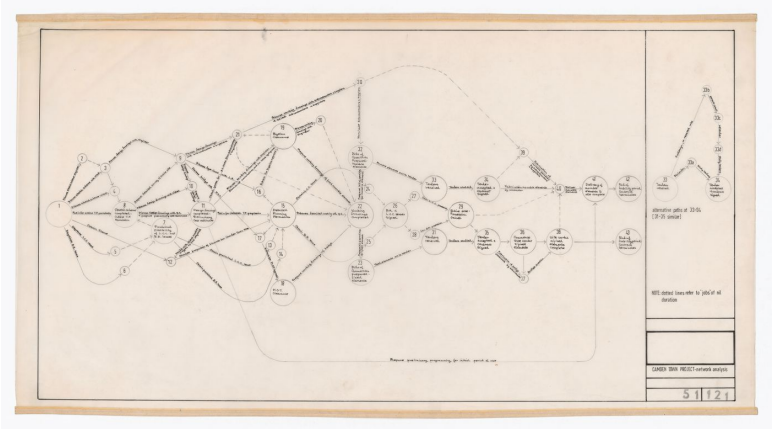


Figure 4. Cedric Price, Fun Palace: network analysis, 1964 or 1965, DR1995:0188:246. The project appears here as a diagram of relations and flows; Cedric Price fonds, CCA.

Price's Generator project, designed in the late 1970s for the Gilman Paper Company at White Oak Plantation in Florida, brought that adaptive logic into a computational design problem. It proposed a reconfigurable complex of mobile components whose arrangements could respond to user demands and computer consultation; John and Julia Frazer's computational role makes the project a hinge between cybernetics and design software.[8][9]

4 Hyper-parameters

With artificial intelligence, parameterization moves outward from the model to the working situation. In a parametric model, the designer chooses variables and relationships, then explores the family of possible outputs. In AI-assisted work, the operator often starts one level higher. A prompt, research goal, source boundary, tone constraint, or evaluation criterion becomes the condition from which the system proposes its own operative parameters. A commission such as "write a short research essay" can unfold into a source map, structure, citation strategy, image plan, drafting sequence, and review chain.

Hyper-parametric names this shift: work increasingly acts on the conditions that generate work. The object now includes the artifact, the instruction space, the memory carried forward from prior interactions, the tooling available to the system, and the tests by which the result will be judged. The worker's local decisions move into constraints, examples, priorities, and checks. The craft is the specification of that working field.

5 Command Depth

The hyper-parametric machine turns requests into procedures through command. A shallow command asks for an outcome and leaves the system to infer the route. A deeper command carries relations among goal, source, constraint, sequence, stopping condition, and evaluation. The practical question is command depth: how much of the work's field has been specified, and how much has been left for the machine to invent.

To work with this machine well is to learn where a goal becomes a parameter, where a parameter becomes a plan, where a plan becomes an artifact, and where the artifact must return as feedback. The craft question changes form: what kind of touch is possible when the hand reaches material through conditions set for another system?

6 References

[1] Andre Leroi-Gourhan, *Gesture and Speech*.
[2] Karl Marx, *Capital*, vol. I, chapter 15.
[3] Gilbert Simondon, *On the Mode of Existence of Technical Objects*.
[4] Computer History Museum, Sutherland's *Sketchpad*, 1963.
[5] Robert Woodbury, *Elements of Parametric Design*.
[6] Patrik Schumacher, "Parametricism," 2009.
[7] CCA, Cedric Price fonds, Fun Palace Project.
[8] CCA, Cedric Price fonds, Generator.
[9] Interactive Architecture Lab, "The Generator Project."