computability
in the light of the Master Argument

PhD Kolloquium WS 2012/13

vera bühlmann, February 19th 2013

structure of the presentation today

1   **Epilog of Vuillemin's book**: the quantum view

2   **the three premises of the Master Argument, and the challenges they pose:** *Exhaustive amount of information, statements about the future, constitutive role of speculation/imagination* for method.

3   **the relevance of the Master Argument for a notion of computability**: *simulation* as *ontodramatization*

4   **our algebraic number theory discussions and an outlook**: complex coefficients sum up to a *non-totalizable unity*

1

Vuillemin's epilog: the quantum view

„When an Aristotle, an Epicurus, a Carneades or a Plato challenge one or another of the Master Argument's implicit logical premises, they do so in the name of a certain conception of physics and a determinate principle of causality." (p.133)

Cleanthes and Chrysippus, in contesting the argument's first and second premises respectively, were not acting solely as logicians. They also presuppose:

1) a *physical image of the world* and consequently a
2) certain *representation of causality*.

Cleanthes: numerically identical eternal recurrence
the sympathy of connection where there was room left for spontaneity

Chrysippus: confatalia
the constantly renewed order of palingenesis

chance: having their final cause outside of themselves; fortune: effects of chance that can be chosen
fall of the atoms through empty space, causing chance inclinations within determinism (confatalia)
Personified Will behind Fate (which unifies the spiritual movement) (God)
Personified Tempers and Emotions (as allegorical Gods and mythical figures)

Chance and *fortune*
the *clinamen*
the *specificity of deliberate cause*
and the *specificity of spiritual movement*
.... are all brought in for freedom's sake.

"logical quibbles do violence to common sense"
–> naive realism, postulates epistemic immediacy to the factual

The impasse of natural language

"a possible destined not to be realized is not a possible, but only a word."
–> nominalism, no scope of deliberation with regard to the real
The probable is "virtual", not "real" as a possibility is
–> but this virtual is only *apparent*
The probable is distinct from the possible in that the possible applies to individuals, while the probable applies to "sets of like events".
–> the problem is how to determine the "likeness" in a set of events ?

A probabilistic reconstruction of the Master Argument: Diodorus' solution.

applying a calculus (statistics), and replacing the *principle of sufficient reason* with the *principle of sufficient amounts of trials*
–> "The realization of an event corresponding to a very small probability would require, in order for the number of repeatable trials to be sufficient, a cosmic homogeneity rendering possible the formation of the same combinations; and this is nothing but a puerile and anthropocentric representation of an infinite universe". (Vuillemin p. 255)

The special status of premise (C): Chrysippus' solution and the 'Unique Law of Chance'.

introduces the distinction between *real possibility, statistical virtual probability* (adding of possibilities), and *probability amplitudes* (product of complex coefficients) as a means to calculate virtual probabilities.
–> ends with the dilemma of what to do with two kinds of "possibles", one natural and physical, and one due to human ignorance

Contingency and ignorance: The statistical mix.

Vuillemin argues for Diodorus' solution – yet with the crucial modification that the virtuality of the probable is to be considered as not only *apparent* but *real – it describes nature.*
–> resolves the dilemma of what to do with two kinds of "possibles", one natural and physical, and one due to human ignorance, by postulating that physical reality is not immediately, and not in a sterile (non-engendering) manner, observable.

Contingency and nature: The state of superposition.

a the *new distinction in the history of modal notions* between a *probability* and a *probability amplitude*.

from a quantum theory point of view, a probability must be *obtained* by multiplying two conjugated probability amplitudes

not more than an suggestive observation: a synonym for obtaining is purchasing...

tracing and anticipating the path of a particle

"Classical physics was content with the opposition 'This particle passes through A' versus 'This particle has the probability *IT* of passing through A'. This opposition has nothing to do with ontology: it *incorporates what is due to our ignorance into the determination of natural phenomena*. Instead of attributing a property or magnitude to a physical system, we attribute it a *disposition* or propensity *to have* that property or magnitude. Probability measures that disposition or propensity that belongs to the system in act."

"A probability amplitude is something altogether different. We can compare it to an embryonic probability as the inventors of the infinitesimal calculus compared the "moment" of motion to an embryonic motion that an integration would bring to a state of "whole" motion. But the comparison limps. For the probability amplitude, which is generally a complex quantity, does not figure among the elements of reality. To obtain a probability we must multiply two conjugated probability amplitudes. This means that, when we attribute that amplitude to a system, it is attributed neither as an actual property or magnitude nor as an actual disposition or propensity to having such property or magnitude, but as a purely virtual disposition or propensity to having it. The second-order potentiality, as it were, thus put into play is no longer the measure of an ignorance that might have some chance of being only provisional. It is physical. It describes nature."

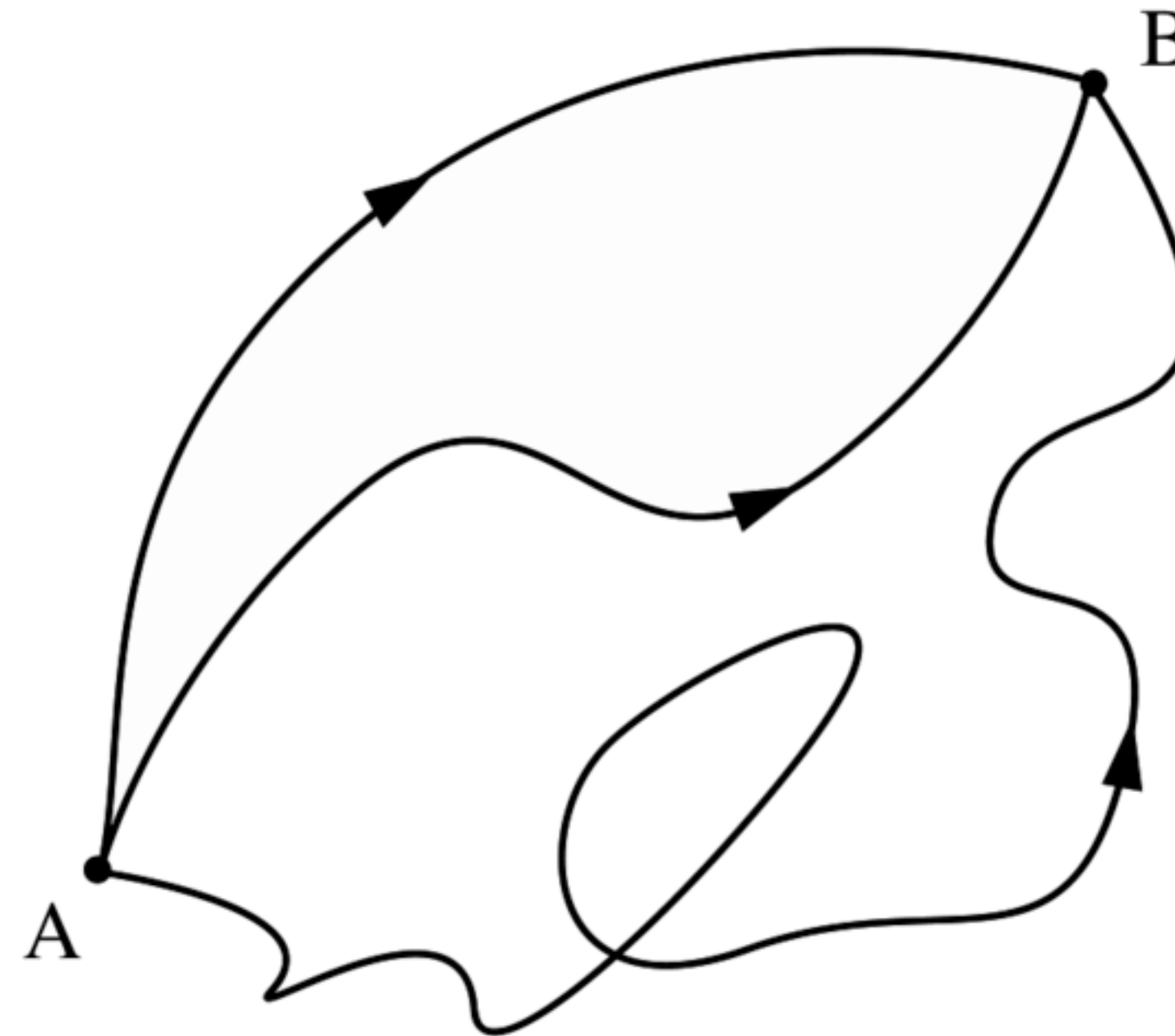(Vuillemin, on the last two pages of THE MASTER ARGUMENT)

Richard Feynman

path integral

The path integral formulation of quantum mechanics is a description of quantum theory which *generalizes the action principle* of classical mechanics. It replaces the classical notion of a single, unique trajectory for a system with a sum, or functional integral, *over an infinity of possible trajectories* to compute a quantum amplitude.

summing to unity with complex coefficients is not a "unitary" unity!
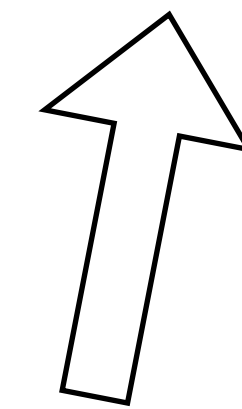
considering opposites not in *mutually exclusive* terms but in *mutually implicative* terms.

the formulation of an identity can be *more or less saturated with differences.*

the injection of differences applies to both sides of the articulated whole (and need not be derived from the dominating part, e.g. femininity in terms of non-maleness, safety in terms of risk etc)

from studying *systems-in-act* to computing in terms of *virtual realism*

main statements of Michael Epperson's talk
at the last metalithikum Klausur:

The popularized version of quantum theory says:

"everything that can happen does happen - in one of the parallel worlds"

against this he holds:

"this cannot be science because it is not empirically testable! Physical cosmology and philosophical cosmology get conflated."

his approach:

"we have to *demonstrate* the intuitiveness"

"quantum theory *qualifies* quantities"

"a probability distribution is always validated to sum up as 1 – virtually"

"measuring a system is *preparing* the system to take an outcome state"

2

the three premises of the master argument, and the challenges they pose

the Master Argument

1 Every true proposition about the past is necessary.

can we ever have an exhaustive / sufficient amount of information?

a *true* proposition states something (gives an account of something) *as it has actually happened.*

if it gives an account of something as it has actually happened, it could not possibly be stated in any other way.

Every true statement is, then, a *necessary* statement.

the Master Argument

2 The impossible does not logically follow from the possible.

can we make statements about the future ?

if we allow for statements to be "possibly true", we can not *deduce* necessities from it.

All we can make is assuming:

the *probable* is bound by circumstances.

a) *probable* inference, or

the *predetermined* is bound by a power that is transcendent to our reasoning.

b) relate inference to recognition of something which is *predetermined*, or

the *happenings that are constitutive for the social* are bound by history as absolute subjectivity.

c) relate inference to recognition of something which is *happening and which constitutes social reality*

the Master Argument

3   What neither is presently true nor will be so is impossible.

what is the role of speculation, imagination and fictitiousness in logical inference ?

everything we can regard as possible must be true.

this is crucial for Quantum Science, and its notion of *many worlds*.

When we include speculation into logics, as an account of something *as it might possibly happen*, we must deal with the idea that every fictitious speculation will realize itself at one point.

3

## the relevance of the Master Argument for a notion of computability

the master argument –

threats identity as a tautology to be spelled out

Identity Late Latin (5c.) *identitatem* (nom. *identitas*) "sameness, "treating of a thing as the same as another," from French *identification*, probably from *identifier* (see identify). Sense of "becoming or feeling oneself one with another" is from 1857. Sense of "determination of identity" is from 1859.

–> before the 19th century: *symbol*, literally "that which is thrown or cast together," from *syn-* "together" (see syn-) + *bole* "a throwing, a casting, the stroke of a missile, bolt, beam," from *bol-*, nom. stem of *ballein* "to throw" (see ballistics). The sense evolution in Greek is from "throwing things together" to "contrasting" to "comparing" to "token used in comparisons to determine if something is genuine."

self-reference
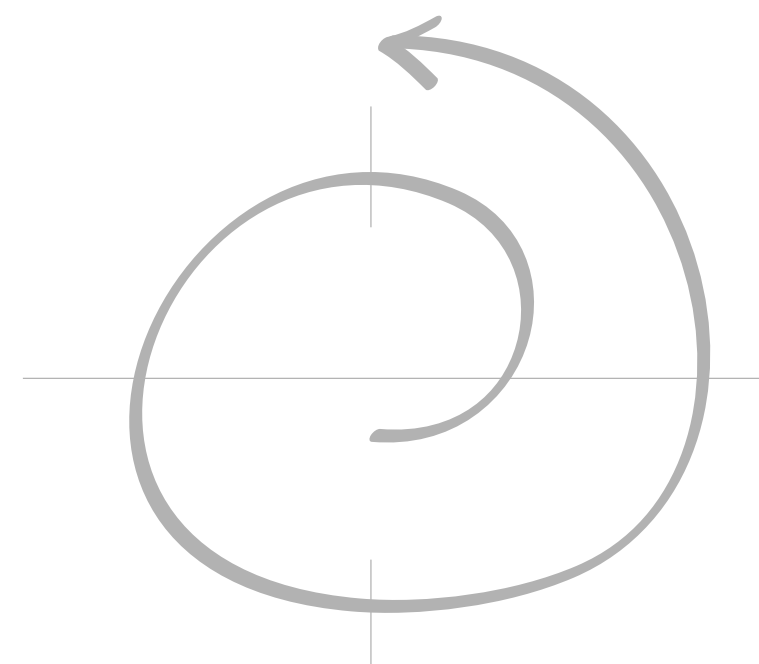
symbols are indispensable for identification.

economy   politics

qualitative identity   numerous identity
presupposes   presupposes
distinction   qualitative distinction
according to   into kinds
numerosity

realism

if statements are to be *true* or *false*, we must assume that *the states they account for* are governed.

Realist philosophy is theorizing such governance – notions of identity, mastership, bondage, rights, legitimacy are crucial for any realist philosophy.

nominalism

if statements are to be *true* or *false,* we must assume that discourse is "governed".

but to speak of *governance* makes no straight forward sense because such theory has *no real (direct) effects*. Indirectly, however, because knowledge orientates *de facto* politics and economics, *the governance of discourse becomes effective in reality* – in a way that is not to be questioned (this, it has in common with religious doctrines)

Presupposes a *Summing to Unity!*

governance

A subject *is being predicated.* The predication is *legitimized* by a principle.

Principles *orientate* what is happening. They are *challenged by objects* that manifest the claim that the principles are inadequate.

Latin *principium* (plural *principia*) "a beginning, first part," from *princeps* (see *prince*). Meaning "origin, source".

Latin *princeps* (genitive *principis*) "first, chief, prince," literally "that takes first" (adj.), from *primus* "first" (see *prime* (adj.)) + root of *capere* "to take" (see *capable*).

A predicated subject is *addressed its "just" place* within *universal order.*

a subject is given *rights* that naturally belong to it / that it naturally deserves.

the *universal order* is organized by the *categories*, a list of criteria for distinguishing individuals according to their kinship relations into *species* and *genera.*

order (n.), "body of persons living under a religious discipline," from Old French *ordre* "position, estate; rule, regulation; religious order" (11c.), from earlier *ordene*, from Latin *ordinem* (nom. *ordo*) "row, rank, series, arrangement," originally "a row of threads in a loom,"

can there by objective governance?

the **object** is something which is "thrown before you", an "accusation".

It challenges principles into a struggle, about the dominant way of giving **orientation**.

object (n.)
late 14c., "tangible thing, something perceived or presented to the senses," from Medieval Latin *objectum* "thing put before" (the mind or sight), noun use of neuter of Latin *obiectus* "lying before, opposite" (as a noun in classical Latin, "charges, accusations"), pp. of *obicere* "to present, oppose, cast in the way of," from *ob* "against" (see *ob*) + *iacere* "to throw" (see *jet* (v.)). Sense of "thing aimed at" is late 14c. *No object* "not a thing regarded as important" is from 1782. As an adjective, "presented to the senses," from late 14c. *Object lesson* "instruction conveyed by examination of a material object" is from 1831.

object (v.)
c.1400, "to bring forward in opposition," from Old French *objecter* and directly from Latin *obiectus*, pp. of *obiectare* "to cite as grounds for disapproval, set against, oppose," literally "to put or throw before or against," frequentative of *obicere* (see *object* (n.)). Related: *Objected*; *objecting*.

objection (n.)
late 14c., from Old French *objeccion* "reply, retort" (12c.) and directly from Late Latin *obiectionem* (nom. *obiectio*), "a throwing or putting before," noun of action from pp. stem of Latin *obicere* "to oppose" (see *object* (n.)).

Orient (n.),
Latin *orientem* (nom. *oriens*) "the rising sun, the east, part of the sky where the sun rises," originally "rising" (adj.), prp. of *oriri* "to rise" (see orchestra).

to orientate
originally "to arrange facing east," from French *s'orienter* "to take one's bearings," literally "to face the east" (also the source of German orientierung), from Old French *orient* "east," from Latin *orientum*

orchestra
"area in an ancient theater for the chorus," from Latin *orchestra*, from Greek *orkhestra*, semicircular space where the chorus of dancers performed, with suffix *-tra* denoting place + *orkheisthai* "to dance," intensive of *erkhesthai* "to go, come," from PIE *ergh- "to set in motion, stir up, raise". (cf. Sanskrit *rghayati* "trembles, rages, raves," *rnoti* "rises, moves," *arnah* "welling stream;" Old Persian *rasatiy* "he comes;" Greek *ornynai* "to rouse, start;" Latin *oriri* "to rise," *origo* "a beginning;" Gothic *rinnan*, Old English *irnan* "to flow, run"). In ancient Rome, it referred to the place in the theater reserved for senators and other dignitaries. Meaning "group of musicians performing at a concert, opera, etc." first recorded 1720; "part of theater in front of the stage" is from 1768.

chorus
Latin *chorus* "a dance in a circle, the persons singing and dancing, the chorus of a tragedy," from Greek *khoros* "band of dancers or singers, dance, dancing ground," perhaps from PIE *gher- "to grasp, enclose," if the original sense of the Greek word is "enclosed dancing floor." Extension from dance to voice is because Attic drama arose from tales inserted in the intervals of the dance. In Attic tragedy, the *khoros* (of 15 or 24 persons) gave expression, between the acts, to the moral and religious sentiments evoked by the actions of the play.

knowledge, lordship and bondage I

predicament,
late 14c., "that which is asserted" (a term in logic), from Medieval Latin *predicamentum*, from Late Latin *praedicamentum* "quality, category, something predicted," from Latin *praedicatus*, pp. of *praedicare* (see predicate), a loan-translation of Greek *kategoria*, Aristotle's word. The meaning "unpleasant situation" is first recorded 1580s.

category, Late Latin *categoria*, from Greek *kategoria* "accusation, prediction, category," verbal noun from *kategorein* "to speak against; to accuse, assert, predicate," from *kata* "down to" (or perhaps "against;" see cata-) + *agoreuein* "to harangue, to declaim (in the assembly)," from *agora* "public assembly" (see agora). Original sense of "accuse" weakened to "assert, name" by the time Aristotle applied *kategoria* to his 10 classes of things that can be named.

object, "tangible thing, something perceived or presented to the senses," from Medieval Latin *objectum* "thing put before" (the mind or sight), noun use of neuter of Latin *obiectus* "lying before, opposite" (as a noun in classical Latin, "charges, accusations"), pp. of *obicere* "to present, oppose, cast in the way of," from *ob* "against" (see ob-) + *iacere* "to throw" (see jet (v.)). Sense of "thing aimed at" is late 14c. No object "not a thing regarded as important" is from 1782.

to accuse, "charge (with an offense, etc.), impugn, blame," from Old French acuser "to accuse, indict, reproach, blame" (13c.), earlier "announce, report, disclose" (12c.), or directly from Latin accusare "to call to account," from ad- "against" (see ad-) + causari "give as a cause or motive," from causa "reason" (see cause (n.)).

accusative, grammatical case whose primary function is to express destination or goal of motion, mid-15c., from Anglo-French accusatif, Old French acusatif, or directly from Latin (casus) accusativus "(case) of accusing," from accusatus, pp. of accusare (see accuse).

Translating Greek ptosis aitiatike "case of that which is caused," on similarity of Greek aitiasthai "accuse." Greek aitia is the root of both, and means both "cause" and "accusation," hence the confusion of the Romans. A more correct translation would have been casus causativus

dative, Latin *dativus* "pertaining to giving," from datus "given" (see date (n.1)), In law, "that may be disposed of at pleasure,"

nominative, Latin nominativus "pertaining to naming," from nominatus, pp. of nominare (see nominate).

to nominate, "to call by name," back-formation from nomination or else from Latin nominatus, pp. of nominare "to name, call by name, give a name to," also "name for office,"" from nomen "name" (see name (n.)).

case, "what befalls one; state of affairs," from Old French *cas* "an event, happening, situation, quarrel, trial," from Latin *casus* "a chance, occasion, opportunity; accident, mishap," literally "a falling," from *cas-*, pp. stem of *cadere* "to fall, sink, settle down, decline, perish" (used widely: of the setting of heavenly bodies, the fall of Troy, suicides). The notion being "that which falls" as "that which happens" (cf. befall).
Meaning "instance, example" is from c.1300. Meaning "actual state of affairs" is from c. 1400. Given widespread extended and transferred senses in English in law (16c.), medicine (18c.), etc.

case, "receptacle," early 14c., from Anglo-French and Old North French casse (Old French *chasse* "case, reliquary), from Latin *capsa* "box, repository" (especially for books), from *capere* "to take, hold" (see *capable*).

knowledge, lordship and bondage II

predicament, late 14c., "that which is asserted" (a term in logic), from Medieval Latin *predicamentum*, from Late Latin *praedicamentum* "quality, category, something predicted," from Latin *praedicatus*, pp. of *praedicare* (see predicate), a loan-translation of Greek *kategoria*, Aristotle's word. The meaning "unpleasant situation" is first recorded 1580s.

proposition, "a setting forth as a topic for discussion," from French *proposition* (12c.), from Latin *propositionem* "a setting forth, statement," noun of action from *proponere* (see propound). Meaning "action of proposing something to be done" is from late 14c.

thesis, Latin *thesis* "unaccented syllable in poetry," later "stressed part of a metrical foot," from Greek *thesis* "a proposition," also "downbeat" (in music), originally "a setting down or placing," from root of *tithenai* "to place, put, set," from PIE root *dhe- "to put, to do" (see factitious). Sense in logic of "a proposition, statement to be proved" is first recorded 1570s.

premise, in logic "a previous proposition from which another follows," from Old French *premisse*, from Medieval Latin *premissa* (propositio) "(the proposition) set before," fem. pp. of Latin praemittere "send or put before," from *prae* "before" (see pre-) + *mittere* "to send" (see mission). In legal documents it meant "matter previously stated" (early 15c.), which in deeds or wills often was a house or building, hence extended meaning of "house or building, with grounds" (1730). The verb meaning "to state before something else" is from 1520s.

theorem, Late Latin *theorema*, from Greek *theorema* "spectacle, speculation," in Euclid "proposition to be proved," from *theorein* "to consider" (see theory).

to predicate, a term in logic, from Latin *praedicatum* "that which is said of the subject," properly neuter pp. of *praedicare* "assert, proclaim, declare publicly," from *prae-* "forth, before" (see pre-) + *dicare* "proclaim," from stem of *dicere* "to speak, to say"

subject, "that which lies beneath", or "person under control or dominion of another," from Old French *suget*, *subget* "a subject person or thing" (12c.), from Latin *subiectus*, noun use of pp. of *subicere* "to place under," from *sub* "under" (see sub-) + combining form of *iacere* "to throw" (see jet (v.)). Meaning "person or thing that may be acted upon" is recorded from 1590s. Meaning "subject matter of an art or science" is attested from 1540s.

theory, "conception, mental scheme," from Late Latin *theoria* (Jerome), from Greek *theoria* "contemplation, speculation, a looking at, things looked at," from *theorein* "to consider, speculate, look at," from theoros "spectator," from thea "a view" + horan "to see" (see warrant). Sense of "principles or methods of a science or art (rather than its practice)" is first recorded 1610s. That of "an explanation based on observation and reasoning" is from 1630s.

hypothesis, Late Latin hypothesis, from Greek *hypothesis* "base, basis of an argument, supposition," literally "a placing under," from *hypo-* "under" (see sub-) + *thesis* "a placing, proposition" (see thesis)

argument, "statements and reasoning in support of a proposition," from Old French *arguement* "reasoning, opinion; accusation, charge" (13c.), from Latin *argumentum* "evidence, ground, support, proof; a logical argument," from *arguere* "to argue" (see argue). Sense passed through "subject of contention" to "a quarrel," a sense formerly attached to argumentation.

to argue, "to make reasoned statements to prove or refute a proposition,"

theme, Latin *thema* "a subject, thesis," from Greek *thema* "a proposition, subject, deposit," literally "something set down," from root of *tithenai* "put down, place," from PIE root *dhe- "to put, to do" (see factitious)

not *factitious reality,* not *discourse,* *logodrama* !

Greek *drama* (genitive *dramatos*) "play, action, deed," from *dran* "to do, act, perform" (especially some great deed, whether good or bad), from PIE **dere-* "to work."

logo- is a Greek word-forming element meaning "speech, word," from Greek *logos* "word".

discourse, from Latin *discursus* "a running about," in Late Latin "conversation," from pp. stem of *discurrere* "run about," from *dis-* "apart" (see <u>dis-</u>) + *currere* "to run" (see <u>current</u>).

artifacts are articulated statements,
statements are articulated artifacts.

the virtually generic structure of language games*:

* the notion comes from Wittgenstein, he conceived of *game* in the purely operative, syntactical sense, i.e. as following sets of rules, operative, not reflectional. *Game* turns into *play* once the Wittgenstein'ian notion looses the immediacy he ascribed to it and which he named "life form".

subjects are mastered – *by principles. We are not only subjects, but also individual beings (with the dignity of belonging to the universal). If we master a subject manner, we are identifying with a principle.*

objects accuse, they claim universal rights for subjects that are not treated just – *the oppose inadequate addressing and speak in the name of universality*

the universal is the property of all things – *knowledge articulates the universal. It is a property of all things – but it needs appropriation, mastering, learning.*

is this not *obscurantism*?

obscurantism, "opposition to enlightenment," "dark," figuratively "morally unenlightened; gloomy," from Old French *obscur, oscur* "dark, clouded, gloomy; dim, not clear" (12c.) and directly from Latin *obscurus* "dark, dusky, shady," figuratively "unknown; unintelligible; hard to discern; from insignificant ancestors."
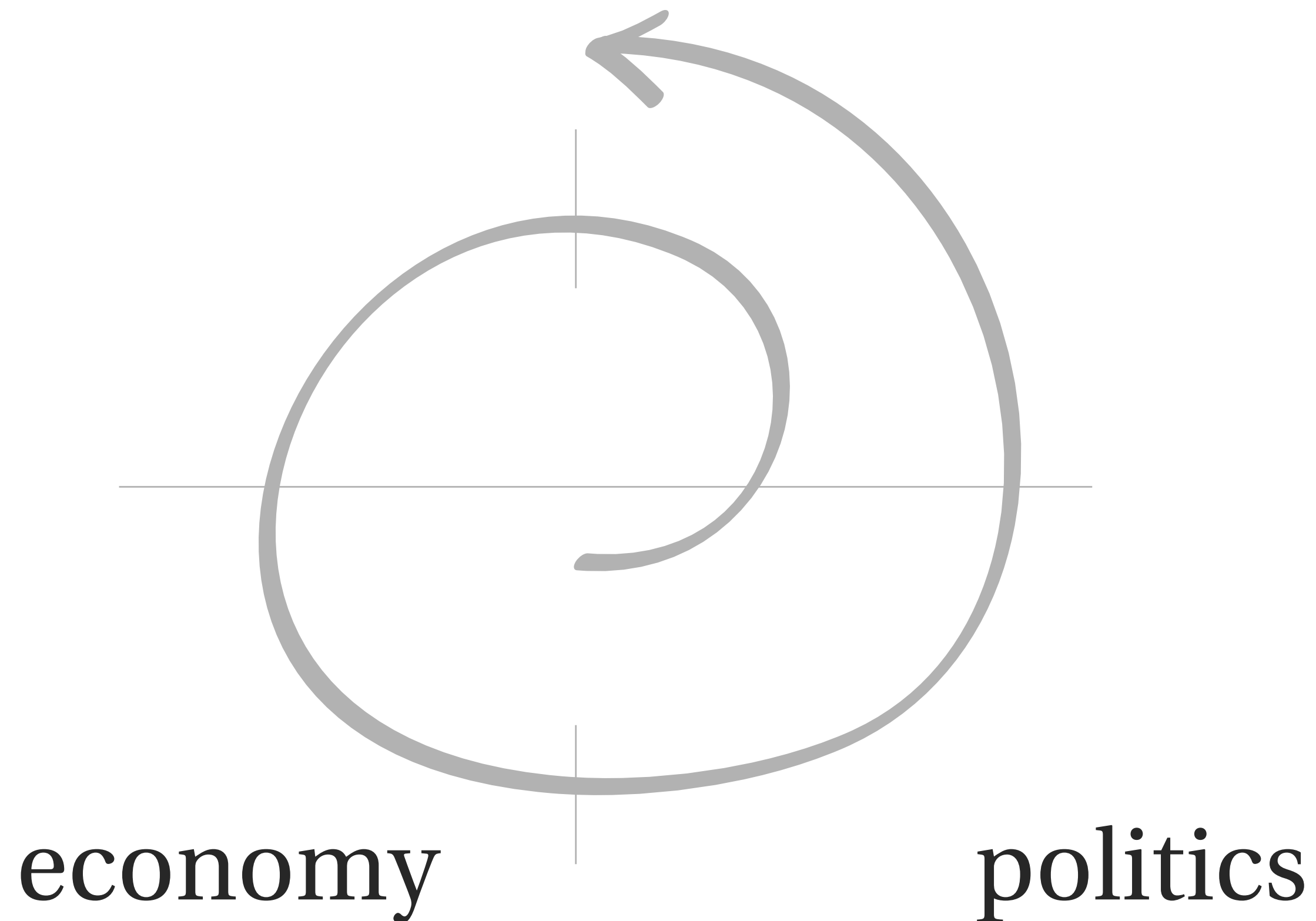
logolatry, rather than revealing something about reality as the logodramatic ?

3

notions of abstraction and universality are never "innocent" or "harmless" ...

self-reference

economy

politics

probability as virtually apparent possibilities
*regarding Systems-in-Act as model:*

ascribing a certain probability value to a system attributes a real disposition or propensity to that system. These dispositions are grounded in the (first-order potentiality proper to a system). laboratory situation of the observer/object distinction is intact.

probability as virtually real possibilities
regarding Systems-in-Act as nature:

ascribing a potentiality according to certain probability amplitudes is very different. It is a description attempted in the act of exploring the system. It does not ascribe a) a actual property or magnitude (predication); b) the disposition for a certain property or magnitude (probability); but c) a purely virtual disposition or propensity to having a property.

„... every thing has a double meaning: a *real* one and a *bureaucratic* one, just like knowledge is double, real and bureaucratic, so is also the will. Bureaucracy, this spiritual essence of society, owns (besitzt) the state apparatus. It is its private property. The general intellect of bureaucracy is the secret, the mystery, conserved within itself, in the closed corporation of its hierarchy, towards the outside. An openly revealed spirit of the State Apparatus appears to bureaucracy like a betrayal to its mystery. Authority is, therefore, the principle of its knowledge, and the deification of its authority is its ethos (Gesinnung). Within itself (bureaucracy), this spiritualism turns into a crude materialism, a materialism of passive obedience, of devote subjection to authority, the mechanism of rapid formal action, fixed foundations (principles), traditions and intuitions (Anschauungen).“

(my own translation, Karl Marx on Hegel's *Philosophy of Rights*).

proletariat / the universal class
self-reference

economy
capitalists

politics
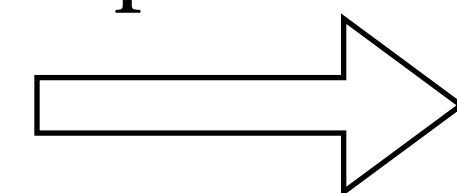*bureaucracy*
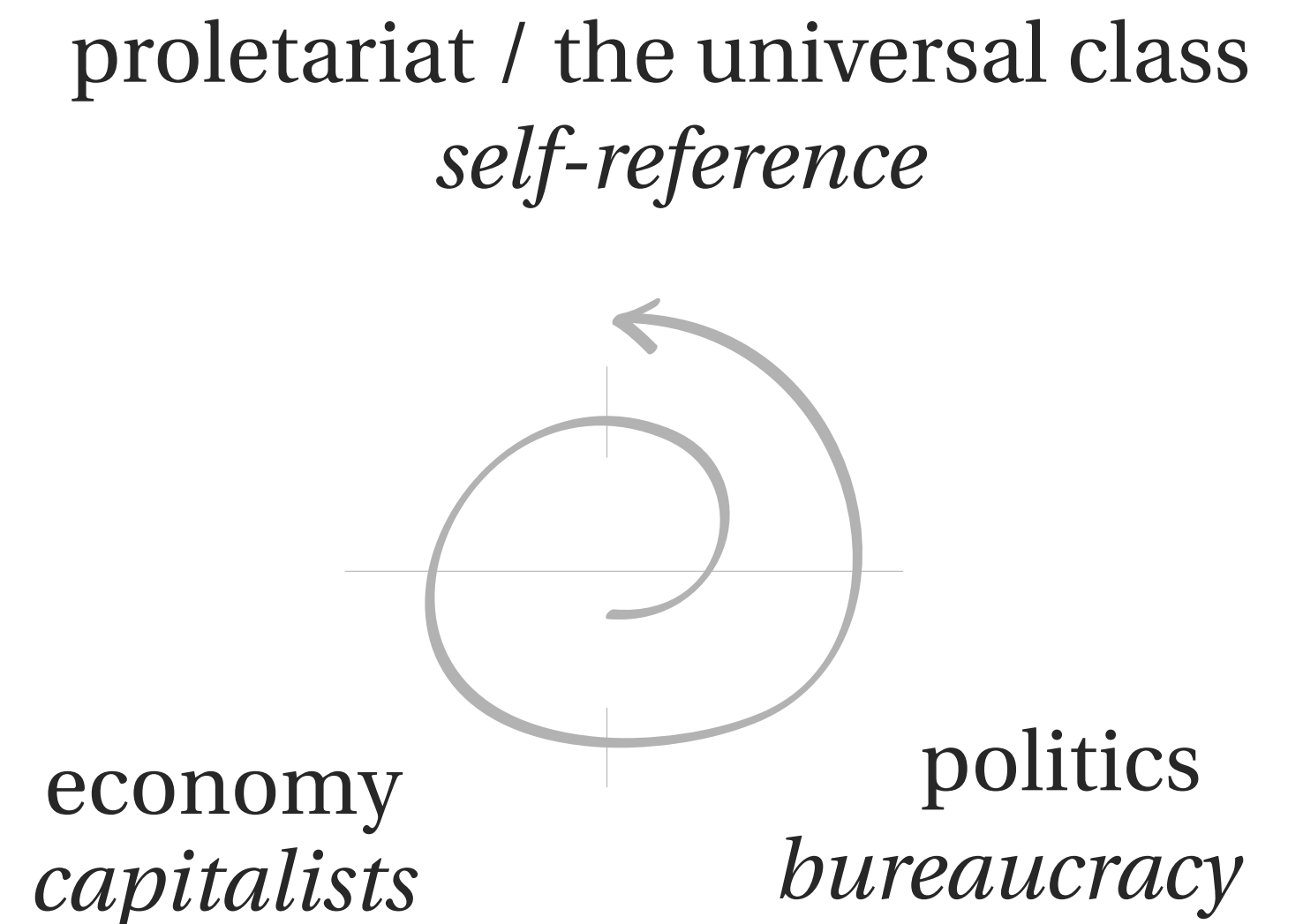
The *First Program of a System of German Idealism*, Hegel says:

machines are not an "object of freedom" and states are not either.

from an inverse perspective they are exactly that !

"monarch" & bureaucracy

~~state~~
self-reference

civil society
economy

civil service
politics

"just as there is no idea of a machine, so there is no idea of the state; for the state is something mechanical. Only that which is an object of freedom may be called an idea. We must therefore transcend the state! For every state is bound to treat men as cogs in a machine. And this is precisely what ought not to be; hence, the state must cease to be."

How can we reconcile in a non-schizoid manner this radical anarchistic statement of the young Hegel with his later views on the subject of *the state as the universal spirit incarnated*?
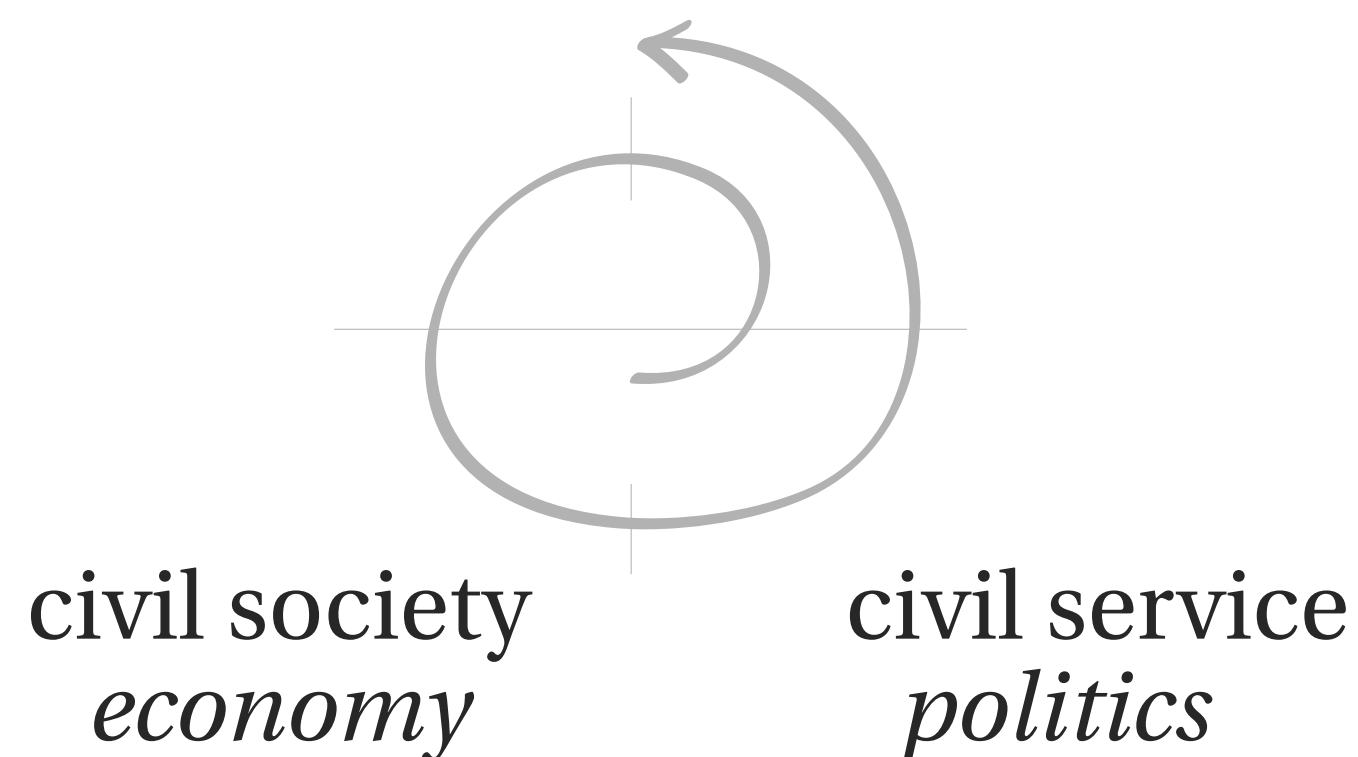
Since *philosophy is its own time apprehended in thoughts*, it is quite natural that a reconfiguration of the objective context leads to a reconfiguration of its apprehension in philosophy. Hence, according to this view, the Prussian state in 1796 was pretty much like a machine who treated men accordingly, that is, like cogs in a machine. While thirty years later, the Prussian state appeared completely changed, not anymore as an *impossible idea of a machine*, but rather as a *machine of an idea*, that is, as the concrete manifestation and structuring of the objective spirit.

⟹ **1781 James Watt patents the Steam Engine**

Bureaucracy as the universal class

In Hegel's *Philosophy of Rights*, *bureaucracy* comprehend the civil servants as the universal class.

It is a constitutive trait of bureaucracy that in this universal class, there is an identity between spiritualism and formalism.

excerpt from a highly recommendable text (available online as pdf) by
Alexandru Cistelecan:
The Discrete Charm of Bureaucracy. A Lacanian Theory of the Bureaucratic Mechanism

from the *dynamical point* of view: the total state. *The state as a steam-engine driven by its perpetual inner conflicts.*
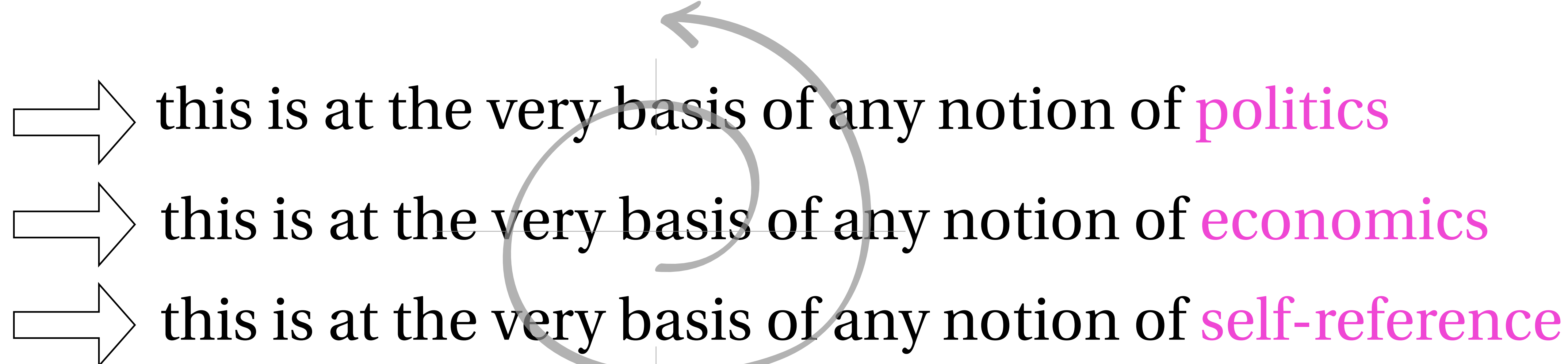
"firstly, the growing importance and centrality that the civil service comes to acquire in Hegel mark the passage from a social structure organized on the model of the master's discourse to one organized on the model of the university discourse. Just like in Lacan's theory, the master's discourse, in order to endure and reproduce itself, has to become invisible and to be suppressed and conserved in the discourse of the university. But this also means that the social contradictions that this structure generates (and which are revealed in the second moment of this dialectical move) prove to be, in the third and final moment, not the stumbling block of this social structure (as they were for the master"s discourse) but its very moving principle. Thus, the civil service, as the objective and universal knowledge ruling over the civil society and as the core of the rational state, manages to succeed in both (or, rather, over both) of its designated *checks* and *balances*: it saves the face of the monarch, which it reduces to a mere signature, and it sees that the *contradictions at the level of civil society* are positively invested and peacefully reproduced, since generated only by the fair principles of *abstract right*. This dynamic is, as it were, reproduced in a nutshell in Marx"s labor theory of value."

more generally:

deliberation

there is a realm in reality that cannot be subsumed under any definition of identity

necessity and contingency

⇒ this is at the very basis of any notion of politics

⇒ this is at the very basis of any notion of economics

⇒ this is at the very basis of any notion of self-reference

Towards enlightenment
– from the MASTER ARGUMENT to

The Social Contract, Or Principles of Political Right

(1762) by *Jean-Jacques Rousseau*

theorized about the best way in which to set up a political community in the face of the problems of commercial society.

www.wikipedia.org

The Social Contract argued against the idea that monarchs were divinely empowered to legislate; as Rousseau asserts, only the people, in the form of the sovereign, have that all-powerful right.

The heart of the idea of the social contract may be stated simply: Each of us places his person and authority under the supreme direction of the *general will,* and the group receives each individual as an indivisible part of the whole...

Man is born free, and everywhere he is in chains.[1]

The Sovereign, having no force other than the legislative power, acts only by means of the laws; and the laws being solely the authentic acts of the general will, the Sovereign cannot act save when the people is assembled.[2]

Every law the people have not ratified in person is null and void — is, in fact, not a law.[3]

The legislative power belongs to the people, and can belong to it alone.[4]

The Social Contract helped inspire political reforms or revolutions in Europe, especially in France.

cf the lecture by Prof. Niggli at the 2nd Metalithikum Klausur (online)

the *abstract* as *a general universal (generic) x*
is *indeterminate*, in other words:

so Roussau's *General Will* is *indeterminate !!*

this castrated "will" is proper
to the universal class, the bureaucracy

it *lacks* its opposite.

This is the so-called problem of *real abstraction*

there are *necessary abstractions* (those
of a logical reality or ontology), and
they produce the crucial notion of

*Those abstractions which are not necessary,
they are accused (made the object of public
discourse) and stigmatized of collapsing and
impovering the "concreteness" of the world.*

it also relates to a poststructuralist
critique on *methodical dualism* and
dichotomy:
e.g.
men is defined as male, hence female is
limited to being *the Other* of male. Yet:
genuine femininity if it is *genuine* is not
prefigured in maleness.

abstract *rights*

In Hegel's theory of the State it is this
notion alone which is capable of
"pacifying" conflicts in the civil society.

abstract *subject*
abstract *object*
abstract *property*

> science of logics !

*usually, logics is constitutive for what can be considered
science ... with this, logic is deprived its capacity to
integrate the new ... the ideal is: total state.*

HEGEL

-> as we will see in a moment with Vuillemin's notion of a
dichotomous contrivance which is crucial for the algebraic /
quantum theory point of view.

the *natural contract*

sovereignity
not to the *monarchs,*
not to the *people,*
but to the *universal*

as a contract to be worked out continuously between Earth and its inhabitants. Michel Serres, *The Natural Contract (1990).*

building on the Master Argument in order to obtain *propositional* terms how we can declare the nature of nature *such that it can to be governed:*

the world as the *universal object*
humanity as the *universal subject*
information as the *universal property*

the *method of characterizing* this individuating universality is *abstraction.*
It aims at working out the constitutional *bill or rights,* the *articles* and *amendments* of the natural contract

dialectical discourse, by *stating* reality perpetually, in *propositional terms*

fights abstraction – insists on legitimized application of general forms (science of logic) and postulates, as a method, opposition, struggle, accusation, claim. The conflicts can be settled only by instituting abstract rights (which, in turn, depends on the conflicts for its dynamic persistence).

seeks to *determine* (state) the universal

static or dynamic view on reality, *subsumption / injunction* as onto*logical* framework

logodrama
playing language games as performances, by articulating identity in *polynomial terms*

quantum view on reality, *saturation*, *doping* and *injection* as onto*dramatic* framework of a virtualized dialectic

seeks to *characterize* and *popularize* the universal in its individuating forms (to dramatize it)

popularizes abstraction as method of unifying what cannot be totalized – to relax conflicts which arise from schematism (the application of general forms)

in both views, *this realm which cannot be subsumed* *by any definition is referred to as the realm of social conflict*

once as a *battlefield*
once as a *stage*

once as an primary void or lack of what can be appropriated universally.

once as a primary abundance of what can be appropriated universally.

Universability – what is appropriated through learning is *not a taking away but a providing of more – more of what can be taught*. It is increasing the stocks of what can belong to all – hence, be actually universal.

how to *resolve* this conflict ?

battlefield dialectics it cannot ever be resolved, finally. the attempts to resolve it are *the course of history.*

virtualized dialectics we can learn to articulate its resolutions. We can cultivate it and open up ever more *solution spaces* from it.

4

RECAP of our number theory discussions and outlook to theory within a generalized topicality

Polynomials name terms that comprehend *ever so much* as the term is capable of bounding *within a constellation of terms* as incorporated by a formulaic system. The determinability of this *so much* is added separately, by the decision regarding which numerical domain is being put at the basis of the solution space.

„Bombelli [(1526-1572)] had given meaning to the "meaningless" by thinking the "unthinkable," namely that square roots of negative numbers could be manipulated in a meaningful way to yield significant results. This was a very bold move on his part. As he put it: '*it was a wild thought in the judgment of many; and I too was for a long time of the same opinion. The whole matter seemed to rest on sophistry rather than on truth. Yet I sought so long until I actually proved this to be the case.*' Bombelli developed a "calculus" for complex numbers, stating such rules as $(+\sqrt{-1})(+\sqrt{-1}) = -1$ and $(+\sqrt{-1})(-\sqrt{-1}) = 1$, and defined addition and multiplication of specific complex numbers. This was the birth of complex numbers. But birth did not entail legitimacy."

Israel Kleiner, *A History of Abstract Algebra*, p. 8

group

collection of permutations or substitutions in the solution space of polynomial equations

field of algebraic integers (Zahlenkörper)

a partial domain of complex numbers acting a "Determinants" in the identifiability of roots for the coefficients.

algebraic integers (ideal numbers)

concept of symbolical integers, relative to a respective field.
The algebraic integers turn the field (partial domain of complex numbers) into a rational domain (closed u.a.o.).

module

a field used as the foundation for a numerical Ideality (a certain class of algebraic integer which D. calls Ideals)

field of algebraic functions (Funktionskörper)

allows to build analytically controllable systems of partial equations.

-> cf. for a discussion about real and complex analysis Detlef Laugwitz:
B.Riemann, *Turning Points in the Conception of Mathematics*, Ch.1 (complex analysis) and Ch.2 (real analysis) *(will be on the server soon)*

The algebraic and quantum theory point of view

"Let us replace the image of *two mutually exclusive possibles*, one of which is but a shadow of reality, by a *dichotomous contrivance* that will force nature to recognize a degree of possibility for them both."

(Vuillemin, p. 257)

Latin *dialectica*, from Greek *dialektike* (techne) "(art of) philosophical discussion or discourse," fem. of *dialektikos* "of conversation, discourse," from *dialektos* "discourse, conversation" (see dialect). Originally synonymous with logic; in modern philosophy refined by Kant, then by Hegel, who made it mean "process of resolving or merging contradictions in character."

dialectics is the art/science/philosophy that deals with real problems and the provision of their solutions

virtualizing dialectics
by treating *identity* in *polynomial terms*

OR: *summing to unity* what *cannot be defined* in its totality, by articulating the "bills of rights", "articles" and "amendments" *that are to constitute* a problem in its probabilistic formulation.
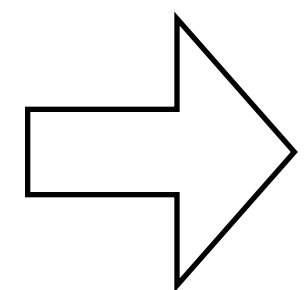
⇨ implies taking *the Inverse* of *a State* as the "imaginary solidity" – as the *speculative grounds*, for doing science and politics!

algebraic ideality

conserves invariances!

ideality is not the *universe of forms and templates* for objective thought.

ideality is the *totality of everything* that *can be* the object of rigorous thought in formal terms.

> this is *an open totality*, a totality which does not absolutize its sum !

regarding the *symbolic constitution of a formula* as providing the means for constructing a *dichotomous contrivance* (the inverse of a state)

It conserves the *affirmed* (explicit), *infinitesimalized*, and *inverted negative (opposite)* of what can be termed analytically – with no need of making it explicit (this would mute "the conserved" by subjecting it to another principle, in the *infinite play of differentiality** which is characteristic for the post-structuralist critique on predication (making existence-statements).

invariances (ideals)

testify that there are *sums which do not totalize their parts.*

two ways to look at them:

the "platonic" view of Kummer

ideals are considered as categorically „indeterminate". He treats them like the transcendental numbers pi and e, which he refused to use in proof and demonstration because their symbols stand for *sums (forms) which do not totalize their parts.*

the "inverted platonic" view of Dedekind

Dedekind wanted to know under what conditions the „indeterminates"can be constructed, i.e. he asks about the categories by which we can name, address, and determine them.

The virtualization of dialectics and the notion of *Critique*

measuring
(German: Vermessen)

measuring *possibility spaces*
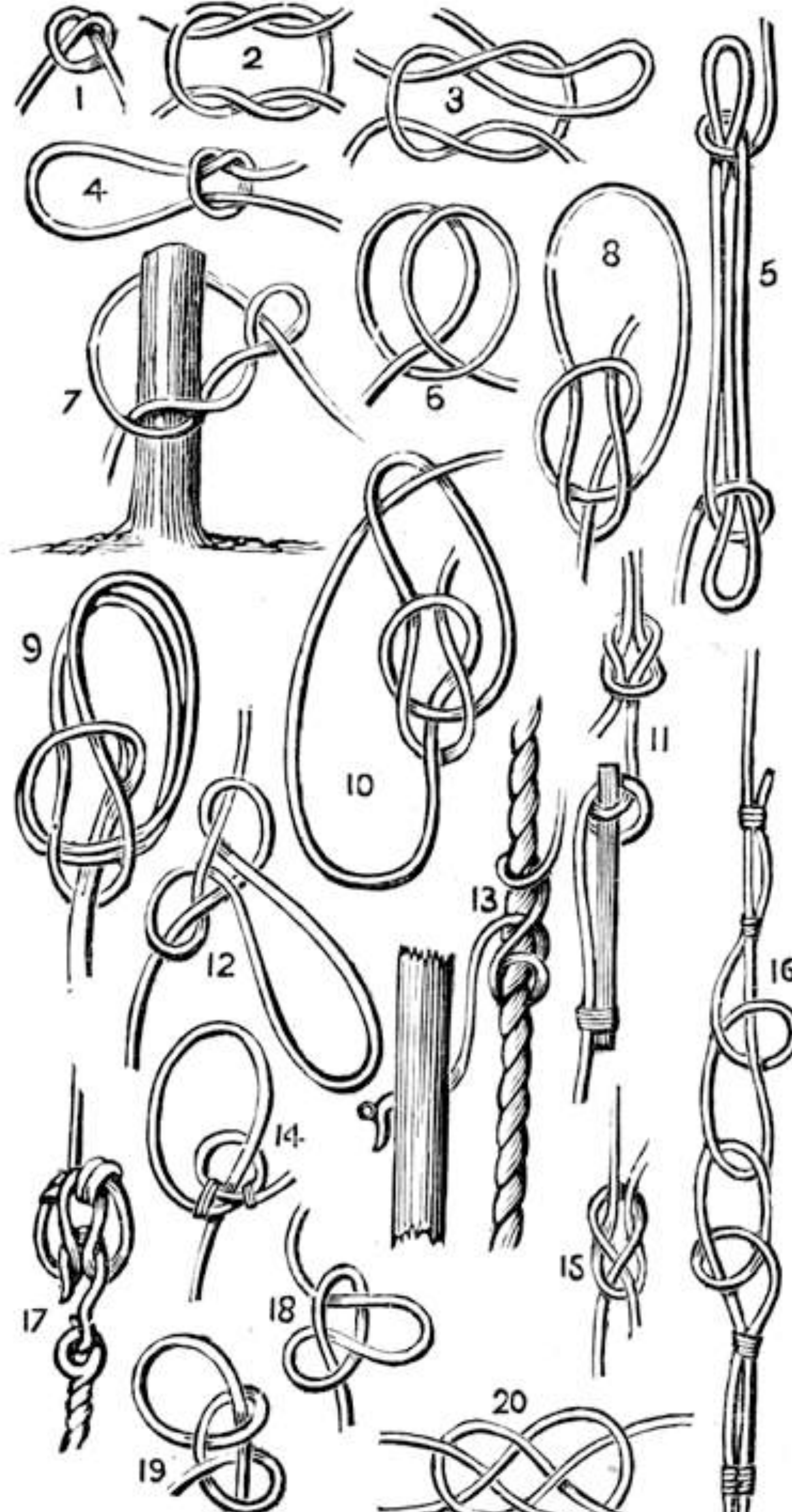(KANT: asking for the conditions of possibility)

dynamical view – balancing and transformability

rendering discernible
(German: Ermessen)

rendering *solution spaces discernible*, and hence *capable of being measured* as a possibility space

(VUILLEMIN: philosophie de l'algèbre)

quantum view – doping and articulation

How to *compute* with concepts ?

a problem is a *knot*

topology can be understood as the means for posing solution spaces for knotted subject matters.
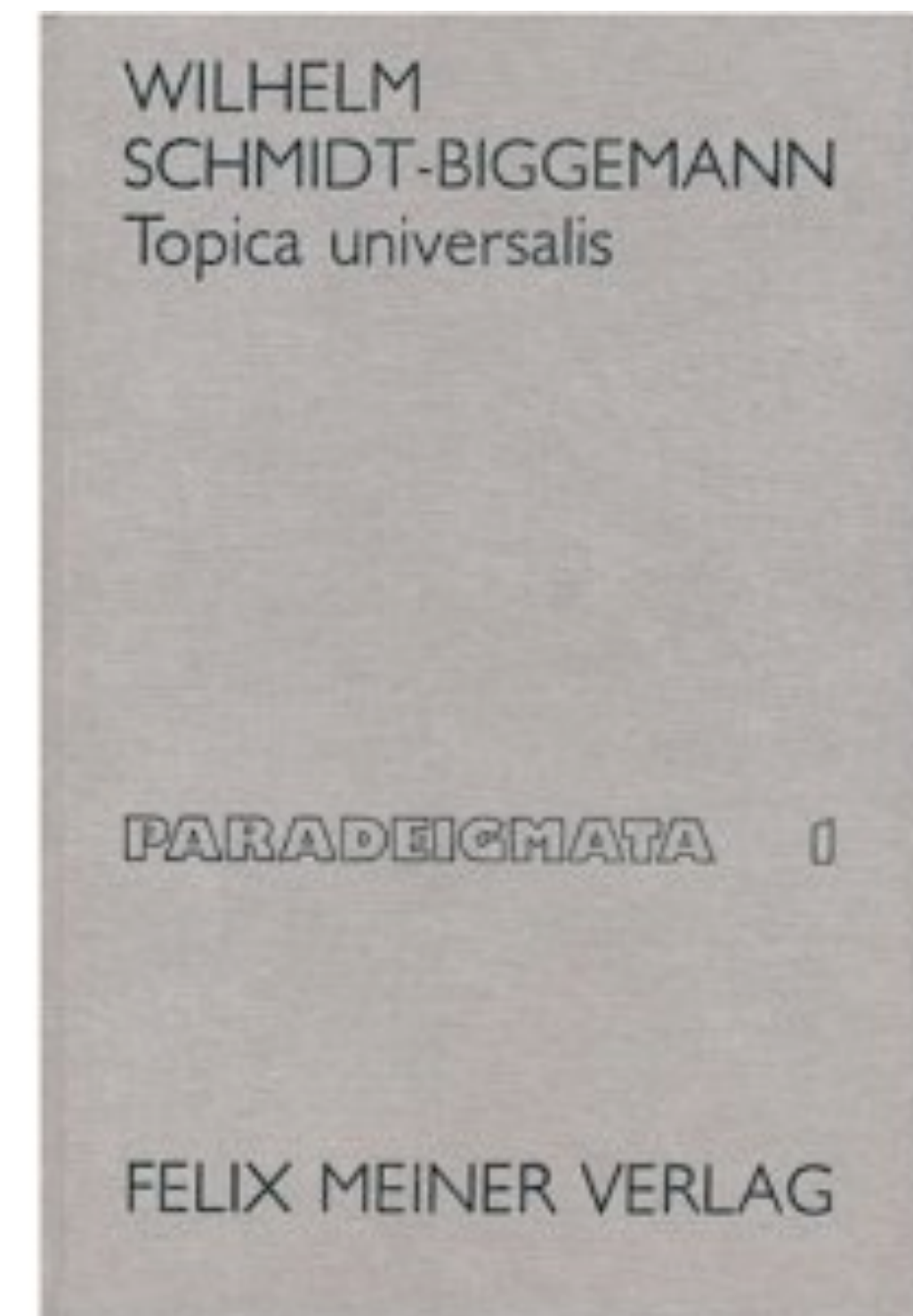
> generalizing *Topicality* ?

Topics was that part of analytics which dealt, in pre-modern logics, with *probable* knowledge. It complemented grammatical and metaphysical aspects in dealing with terminology and arguments.

WILHELM SCHMIDT-BIGGEMANN
Topica universalis

PARADEIGMATA 1

FELIX MEINER VERLAG

polynomials integrate
segments of series (discrete,
not continuous like lines)
into finite and complex order
– they allow to arrange and
analyze (rigorously) lines in
*discontinuous manne*r

polynomials
incarnate
complex and
heterogenous
terms that allow
resolution into
ideal spaces of
symbolic
numerosity – to render solution spaces
discernable

algebraic grammaticality

an experiment in thought !

natures of the
members of
series

members of
series *captured*
in structured
orders (by code)

members
of series
balanced in the
generic by our
intellection

WORLD
now. **domain of the essential** - governed by the *principle of identity*
there. **domain of the existential** - governed by the *principle of sufficient reason*
here. **domain of the insistential** - governed by the *principles of conservation* (oppositions
conserve an invariance, Emmy Noether).

ALPHABETS
domain of the continous - - governed by the *principle of contradiction*
domain of the discrete - - governed by the *principle of bypass narratives*
domain of the performable - - governed by the *principle of dramatization*
domain of the condensable - - governed by the *principle of poetry*
domain of the affirmable - governed by the *principle of tragedy*
domain of the negatable - governed by the *principle of comedy*
domain of the infinitesimizable - governed by the *principle of approximation*
domain of the invertable - governed by the *principle of verse* (from turning, bending, plowing)
domain of the continuable - governed by the *principle of belief*
domain of the repeatable - governed by the *principle of esteem*
domain of the integrateable - governed by the *principle of constitution*
domain of what can be factored out - governed by the *principle of analogy*
domain of what can be canceled down - governed by the *principle of hygiene*
domain of the remainder - governed by the *principle of compromise*
domain the addable - governed by the *principle of desire*
domain of the providable - governed by the *principle of care*
domain of the subsumable - governed by the *principle of generosity*
domain of the public - governed by the *principle of service*
domain of the linear - governed by the *principle of prose*
domain of the animated -- governed by the *principle of lithurgy*

NATURE / NATALITY
domain of the true - governed by the *principle of inarticulate elegance*
domain of the false - governed by the *principle of coercion*
domain of the stupid - governed by the *principle of approval* (as the enemy of *impertinence*)
domain of the healthy - governed by the *principle of gloriosity*
domain of disease - governed by the *principle of rights*

members of series *captured* in a state

COMPOSITION
domain of the repleated – governed by the *principle of economy*
domain of the fenced (palisade) – governed by the *principle of politics*
domain of the integrated – governed by the *principle of logics*
domain of the established – governed by the *principle of grammar*
domain of the differentiated – governed by the *principle of analysis*
domain of the complying – governed by the *principle of synthesis*
domain of the colluding – governed by the *principle of mechanics*
domain of the secured - (Arc, Stoa, Column) – governed by the *principle of architecture*
domain of the absolved – governed by the *principle of institutions*
domain of the legitimate – governed by the *principle of rights*
domain of the claimed – governed by the *principle of duty*

members of series *proportioned* in the pre-specific

TEMPERAMENT
domain what anticipates – governed by the *principle of exuberance*
domain of the reliable– governed by the *principle of precision*
domain of the ambitious – governed by the *principle of hesitation*
domain of the aspectual– governed by the *principle of critique*
domain of what conserves – governed by the *principle of drive*
domain the interesting – governed by the *principle of boredom*
domain of the entertaining – governed by the *principle of amusement*
domain of the affectionate – governed by the *principle of wholeness*
domain of the subtil – governed by the *principle of captiousness*
domain of the cruel – governed by the *principle of rawness*

members of series *modularized* into manners of addressing

CATEGORIALITY
domain of the conceptual – governed by the *principle of terminability*
domain of the proposable – governed by the *principle of variability*
domain of the disclosable – governed by the *principle of demonstrability*
domain of the intuitable – governed by the *principle of familiarity*
domain of the graspable– governed by the *principle of symbolizability*
domain of the dissolvable – governed by the *principle of countability*
domain of the considerable – governed by the *principle of assessability*
domain of the imaginable – governed by the *principle of addressability*
domain of the blankable – governed by the *principle of estimatability*
domain of the tabooable – governed by the *principle of sanctification*
domain of the omittable – governed by the *principle of laudation*

an experiment in thought !

etc.   etc.

counting comes from *computing* and means *ruling*

to count comes from the Latin *computare* "to count, sum up, reckon together," from *com-* "with" (see com) + *putare* "to reckon"

to rule, "to control, guide, direct," from Old French *riuler*, from Latin *regulare* (see regulate).

to regulate, from Late Latin *regulatus*, pp. of regulare "to control by rule, direct" (5c.), from Latin *regula* "rule"

to govern, Latin *gubernare* "to direct, rule, guide, govern", originally "to steer," a nautical borrowing from Greek *kybernan* "to steer or pilot a ship, direct" (the root of cybernetics).

to master, "to get the better of," from *master* (n.) late Old English *mægester* "one having control or authority," from Latin *magister* (n.) "chief, head, director, teacher", contrastive adjective ("he who is greater") from *magis* (adv.) "more," from PIE *mag-yos-, comparative of root *meg- "great."

to multiply, "to cause to become many,"" from Latin *multiplicare* "to increase," from *multiplex* (genitive *multiplicis*) "having many folds, many times as great in number," from comb. form of *multus* (see *multi*) + -*plex* "-fold," from PIE *plek- "to plait" (see complex (adj.))

complex, "composed of parts," from French *complexe* "complicated, complex, intricate" (17c.), from Latin *complexus* "surrounding, encompassing," pp. of *complecti* "to encircle, embrace," in transferred use, "to hold fast, master, comprehend," from *com-* "with" (see com-) + *plectere* "to weave, braid, twine, entwine"

simplex, "characterized by a single part," 1590s, from Latin *simplex* "single, simple," from PIE root *sem- "one, together" (cf. Latin *semper* "always," literally "once for all

multiplicity, Late Latin *multiplicitas* "manifoldness, multiplicity,"

to add, "to join or unite (something to something else)," from Latin *addere* "add to, join, attach, place upon," from *ad-* "to" (see ad-) + -*dere* comb. form meaning "to put, place," from *dare* "to give"

The sum, from Latin *summa* "total number, whole, essence, gist"

The summary, from Medieval Latin *summarius* "of or pertaining to the sum or substance,"

a product, "mathematical quantity obtained by multiplication," from Medieval Latin productum, from Latin "something produced," noun use of neuter pp. of producere "bring forth"

total, from Medieval Latin *totalis* "entire, total" (as in *summa totalis* "sum total"), from Latin *totus* "all, whole, entire," of unknown origin.

absolute, "unrestricted; complete, perfect;" also "not relative to something else", from Middle French *absolut*, from Latin *absolutus*, pp. of *absolvere* "to set free, make separate"

author, c.1300, *autor* "father," from Old French *auctor, acteor* "author, originator, creator, instigator (12c., Modern French auteur), from Latin *auctorem* (nom. *auctor*) "enlarger, founder, master, leader," literally "one who causes to grow," agent noun from *auctus*, pp. of *augere* "to increase" (see augment). Meaning "one who sets forth written statements" is from late 14c.

authority, from Latin *auctoritatem* (nom. auctoritas) "invention, advice, opinion, influence, command," from *auctor* "master, leader, author".

prince, Latin *princeps* (genitive principis) "first, chief, prince," literally "that takes first" (adj.), from *primus* "first" (see prime (adj.)) + root of *capere* "to take."

principle, "fundamental truth or proposition," from Anglo-French *principle*, Old French *principe*, from Latin *principium* (plural *principia*) "a beginning, first part," from *princeps* (see prince). Meaning "origin, source" is attested from early 15c. Sense of "general rule of conduct" is from 1530s.
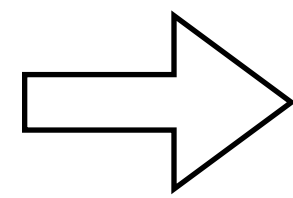
spiritualism and formalism ⟹ it's all in the words – we can "extract roots" to ground assumed invariances for these modern developments, algebraically, if we treat the concepts as polynomials

office (n.)

Old French *office* "place or function; divine service" (12c. in Old French) or directly from Latin *officium* "service, kindness, favor; official duty, function, business; ceremonial observance," (in Ecclesiastical Latin, "church service"), literally "work-doing," from *ops* (genitive opis) "power, might, abundance, means" (related to opus "work;" see *opus*) + stem of *facere* "do, perform" (see *factitious*). Meaning "place for conducting business" first recorded 1560s. Office hours attested from 1841.

opus,

Latin *opus* "a work, labor, exertion" (source of Italian opera, French oeuvre, Spanish obra), from PIE root **op-* (Germanic **ob-*) "to work, produce in abundance," originally of agriculture later extended to religious acts (cf. Sanskrit *apas-* "work, religious act;" *Avestan hvapah-* "good deed;" Old High German *uoben* "to start work, to practice, to honor;" German *üben* "to exercise, practice"

to work,

from Proto-Germanic **werkan* (cf. Old Saxon, Old Frisian, Dutch *werk*, Old Norse verk, Middle Dutch *warc*, Old High German *werah*, German Werk, Gothic *gawaurki*), from PIE root **werg-* "to work" (see *urge* (v.)).

to urge,

from Latin *urgere* "to press hard, push, drive, compel," from PIE root **werg-* "to work" (cf. Avestan vareza "work, activity;" Greek *ergon* "work," *orgia* "religious performances," organon "tool;

urgent,

"pressing, impelling" (14c.), from Latin *urgentem* (nom. urgens), prp. of *urgere* "to press hard, urge"

bureacracy,
1818, from French *bureaucratie*, coined by French economist Jean Claude Marie Vincent de Gournay (1712-1759) on model of *democratie, aristocratie,* from *bureau* "office," literally "desk" (see *bureau*) + Greek suffix -*kratia* denoting "power of" (see -cracy).

bureau,
"desk with drawers, writing desk," from French *bureau* "office; desk, writing table,"

desk,
Medieval Latin *desca* "table to write on" (mid-13c.), from Latin *discus* "quoit, platter, dish," from Greek *diskos*. *> seems to replace the notion of the* substrate, *as a support/ carrier where writing leaves no marks.*

service,
"celebration of public worship," from Old French *servise*, from Latin *servitium* "slavery, servitude," from servus "slave"

liturgy,
Latin *liturgia* "public service, public worship," from Greek *leitourgia* "a liturgy; public duty, ministration, ministry," from *leitourgos* "one who performs a public ceremony or service, public servant," from *leito-* "public" (from laos "people;" cf. *leiton* "public hall," *leite* "priestess;" see lay (adj.)) + -*ergos* "that works," from ergon "work" (see *urge* (v.)). Meaning "collective formulas for the conduct of divine service in Christian churches" is from 1590s.

to serve,
"to render habitual obedience to," from Old French *servir* "to serve," from Latin *servire* "to serve," originally "be a slave," related to *servus* "slave," perhaps from an Etruscan word (cf. Etruscan proper names Servi, Serve). Meaning "to attend to (a customer)" is first recorded mid-14c.; that of "to set food on (a table)" is from late 14c. Sporting sense, in tennis, badminton, etc., first recorded 1580s; the noun in this sense is from 1680s. To serve (someone) right "to treat as he deserves" is recorded from 1580s. To serve the time "shape one's views to what is in favor" is from 1550s, translating Latin tempori servire; time-server first recorded 1580s.

the accusation of *logolatry* and *obscurantism* is a serious one, and a *method that deserves its name* is still owed ...

so for now, these indexical "concept-biographies" are just for inspiration ...