

Some natural history of sense-making

an ape shows the way¹

A question of insight. For as long as he could hold a job Charles Sanders Peirce was a hardworking scientist, and he reflected on scientific method his entire life. From first-hand experience and from study of historical cases he concluded that “All the ideas of science come to it by the way of Abduction. Abduction consists in studying facts and devising a theory to explain them. Its only justification is that if we are to understand things at all, it must be in that way.”² Abduction “is the process of forming an explanatory hypothesis. It is the only logical operation which introduces any new idea.”³

The form of abductive inference, the operation of adopting an explanatory hypothesis, is this:

“The surprising fact, C, is observed;
But if A were true, C would be a matter of course,
Hence, there is reason to suspect that A is true.”⁴

Peirce adds,

“The abductive suggestion comes to us like a flash. It is an act of *insight*, although of extremely fallible insight. It is true that the different elements of the hypothesis were in our minds before; but it is the idea of putting together what we had never before dreamed of putting together which flashes the new suggestion before our contemplation.”⁵

So also Lonergan writes, “What we have to grasp is that insight (1) comes as a release to the tension of inquiry, (2) comes suddenly and unexpectedly, (3) is a function not of outer circumstances but of inner conditions, (4) pivots between the concrete and the abstract, and (5) passes into the habitual texture of one’s mind.”⁶

¹ After Nietzsche. “In former times people sought to show the feeling of man’s greatness [*Herrlichkeit*] by pointing to his divine descent [*seine göttliche Abkunft*]. This, however, has now become a forbidden path, for the ape stands at its entrance [*an seiner Thür steht der Affe*], and likewise other fearsome animals, showing their teeth in a knowing fashion, as if to say, No further this way!” *The Dawn of Day* [1887] (tr. John McFarland Kennedy 1911) Book I, § 49.

² *Collected Papers of Charles Sanders Peirce Vol. V: Pragmatism and Pragmaticism* (ed. Charles Hartshorne and Paul Weiss 1965) para. 145 [CP 5.145].

³ CP 5.171.

⁴ CP 5.189.

⁵ CP 5.181 (his emphasis).

⁶ *Collected Works of Bernard Lonergan Vol. III: Insight: A Study of Human Understanding* (ed. Frederick E. Crowe and Robert M. Doran 1992) 28.

Both Peirce and Lonergan remark the superabundance of insights. “Proposals for hypotheses inundate us in an overwhelming flood,” says Peirce.⁷ Lonergan: “insights are a dime a dozen.”⁸

Their enormous quantity is a surprising fact about insights. Another is their evidence of “an uncommonly good ability to find a signal even in total noise.”⁹

George Polya describes a conjecture which Euler made after considering only the cases $n = 1, 2, 3,$ and 4 of the expression of an infinite series. Polya comments,

“Euler’s conjecture appears extremely bold. I think that the courage and clearness with which he states his conjecture are admirable. Yet Euler’s admirable performance is understandable to a certain extent. Other experts perform similar feats in dealing with other subjects, and each of us performs something similar in everyday life. In fact, Euler *guessed the whole from a few scattered details*. . . . Euler guessed the whole story, the whole mathematical situation, from a few clearly recognized points.”¹⁰

Richard Feynman tells the class “For a particle moving freely in space with no forces, no disturbances, the correct law of physics is . . .” and puts an equation on the board. “Where did we get that from?” he asks. “Nowhere. It’s not possible to derive it from anything you know. It came out of the mind of Schrödinger, invented in his struggle to find an understanding of the experimental observations of the real world.”¹¹ With his hyperbolic “nowhere” Feynman says the same as Polya says of Euler – Schrödinger guessed the whole story, the whole quantum situation, from scattered details of experimental results and fragments of extant theory.¹²

“Insight,” Lonergan says, “is the apprehension of relations.”¹³ Freud claims that in order to get to the apparently simple in the normal “we must guess [*erraten müssen*] from the distortions and exaggerations of the pathological.”¹⁴ The phenomenon of swift and frequent apprehension of relations is starkest when there is no relation to apprehend, as in pathological cases.

⁷ CP 5.602.

⁸ Bernard J. F. Lonergan, *Method in Theology* (2nd ed. 1973) 13. He qualifies this a bit by remarking that “insight depends upon native endowment, and so with fair accuracy one can say that insight is the act that occurs frequently in the intelligent and rarely in the stupid.” *Insight* 29.

⁹ Baruch Fischhoff, “For those condemned to study the past: Heuristics and biases in hindsight” in *Judgment under uncertainty: Heuristics and Biases* (ed. Daniel Kahnemann, Paul Slovic, and Amos Tversky 1982) 347.

¹⁰ George Polya, *Mathematics and Plausible Reasoning Vol. II: Patterns of Plausible Inference* (2nd ed. 1968) 8 (his emphasis). At the conclusion of these two volumes Polya writes, “I address myself to teachers of mathematics of all grades and say: *Let us teach guessing!*” *Id.* 158.

¹¹ *The Feynman Lectures on Physics*; http://www.feynmanlectures.caltech.edu/III_16.html between eqs. 16.51 and 16.52.

¹² “In general we look for a new law by the following process. First we guess it.” Richard Feynman, *The Character of Physical Law* (1965) 156.

¹³ *Insight* 4.

¹⁴ *Zur Einführung des Narzissmus* (1914). *Wiederum werden wir das anscheinend Einfache des Normalen aus den Verzerrungen und Vergrößerungen des Pathologischen erraten müssen.*

Gazzaniga's work with split-brain persons led him to conclude that it is the left hemisphere which "engages in the human tendency to find order in chaos;" the left hemisphere "constructs theories to assimilate perceived information into a comprehensible whole." Yet it "persists in forming hypotheses about the sequence of events even in the face of evidence that no pattern exists." This "powerful mechanism," this interpretative capacity, "is driven to generate explanations and hypotheses regardless of circumstances. The left hemisphere of split-brain patients does not hesitate to offer explanations for behaviours which are generated by the right hemisphere."¹⁵

Kapur observes that many psychoses are a disorder of "aberrant salience;" in other words a false signal popping out from the white noise¹⁶ of ambient everydayness. For such patients endogenous (non-drug-induced) psychosis "evolves through a series of stages: a stage of heightened awareness and emotionality combined with a sense of anxiety and impasse, a drive to 'make sense' of the situation, and then usually relief and a 'new awareness' as the delusion crystallizes and hallucinations emerge."¹⁷

Mishara, reporting the work of Klaus Conrad, describes in detail this stage of heightened awareness, etc., which Conrad designated 'Trema':

"Attention is drawn toward irrelevant stimuli, thoughts, and associative connections, which are distressing and unpredictable: [quoting Conrad] 'The perceptual background acquires entirely new characteristics. **Everything that lies in the periphery to one's attention, what is behind, or not part of the current thematic focus' becomes a potential threat. The perceptual background, which remained unnoticed, now takes on a character of its own.** The sense of threat (or whatever the predominant quality of the delusion happens to be) spreads to the entire perceptual field. . . . The patient's changed internal motivational-emotional state, the delusional mood, imbues the entire field of experience with a transformed 'physiognomic' quality (ie, a sense of potential revelation/threat accompanied by affective tension due presumably to underlying neurobiological changes)."¹⁸

The release of this tension comes with so-called psychotic insight, which Conrad termed 'Apophany.' At Apophany the delusions "appear suddenly as an 'aha experience' ('Aha-Erlebnis' or 'revelation') concerning what had been perplexing during delusional mood and often bring relief." The alleviating delusions "involve a fundamental 'reorganization' of the patient's

¹⁵ Michael S. Gazzaniga, "Cerebral specialization and interhemispheric communication: Does the corpus callosum enable the human condition?" 123 *Brain* 1293; 1315-1319 (2000).

¹⁶ "Meaning is the barely heard white noise enveloping everything I meet, and the unnoticed gleam that lets everything shimmer with reality." Thomas Sheehan, *Making Sense of Heidegger: A Paradigm Shift* (2015) 113.

¹⁷ Shitij Kapur, "Psychosis as a State of Aberrant Salience: A Framework Linking Biology, Phenomenology, and Pharmacology in Schizophrenia," 160 *American Journal of Psychiatry* 13, 15 (2003).

¹⁸ Aaron L. Mishara, "Klaus Conrad (1905-1961): Delusional Mood, Psychosis, and Beginning Schizophrenia," 36 *Schizophrenia Bulletin* 9, 10 (2010) (my emphasis). <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2800156/>

experience to maintain behavioral interaction with the environment . . .”¹⁹ Kapur relates that “Once the patient arrives at such an explanation, it provides an ‘insight relief’ or a ‘psychotic insight’ and serves as a guiding cognitive scheme for further thoughts and actions. It drives the patient to find further confirmatory evidence—in the glances of strangers, in the headlines of newspapers, and in the lapel pins of newscasters.”²⁰ I.e., it passes into the habitual texture of the suffering mind.

Psychotic insight has the tenor of ‘solution’ no less than does mathematical invention. Once he regained lucidity after treatment for psychosis John Nash was asked why he had believed his delusions were true. He replied that because they came to him **the same way** as his mathematical ideas “I took them seriously.”²¹

So, two surprising C-facts about insights: their prodigious number and their obligate nature; their frequent sudden emergence regardless of circumstances – in the everyday task and in the throes of madness.²²

What then is A?

One clue may lie in the preconscious operation of insight, to which Peirce and Lonergan both attest; Lonergan stating that “an insight is neither a definition nor a postulate nor an argument but a preconceptual event.”²³ Peirce emphasizes that

“abductive inference shades into perceptual judgment without any sharp line of demarcation between them; or, in other words, our first premisses, the perceptual judgments, are to be regarded as an extreme case of abductive inferences, from which they differ in being absolutely beyond criticism. . . . On its side, the perceptive judgment is the result of a process, although of a process not sufficiently conscious to be controlled, or, to state it more truly, not controllable and therefore not fully conscious. . . . because it is subconscious and not amenable to logical criticism, [perceptual judgment] does not have to make separate acts of inference, but performs its act in one continuous process.”²⁴

Peirce then devotes a section of the lecture to perceptual judgment; dwelling in particular on spontaneously reversing figures.

So far as I’ve been able to learn, A, the insight explaining insight, has not yet like Pallas in full metal jacket leapt from anyone’s head. If that ever happens it seems likely that a substantial part of the hypothesis will have derived from Lynne Isbell’s Snake Detection theory. Snake Detection

¹⁹ *Id.* 10.

²⁰ Kapur, “Aberrant salience” 15-16.

²¹ <http://www.sylvianasar.com/a-beautiful-mind/>

²² “the ultimate *telos* of human life [is] sense-making. . . . I must be a sense-maker; things must hang together meaningfully.” Katherine Withy, *Heidegger on Being Uncanny* (2015) 67.

²³ *Insight* 82.

²⁴ *CP* 5.181.

theory “suggests that [predation by] snakes contributed to (1) the expansion of the visual systems and the fear module in mammals, (2) even greater expansion of the fear module along with greater connections to vision in primates, and (3) the pattern of variation in vision within the primates.”²⁵

Noticing an aspect ‘all of a sudden;’ the K pathway pop-out. Neil Shubin tells the story of his bumbling efforts as a novice fossil-hunter. It’s his first field expedition, and he’s in the Sonoran desert with some veteran paleontologists. They’re bringing home bags of fossils every evening and Shubin’s finding squat. He decides to tag along with the most expert member of the crew and maybe learn how to do it: “I wanted him to describe *exactly* how to find bones. Over and over, he told me to look for ‘something different,’ something that had the texture of bone not rock, something that glistened like teeth, something that looked like an arm bone, not a piece of sandstone.” No help; verbal prompts have no effect. From the account it does not appear that the expert ever simply *pointed* to a fossil so that Shubin could follow a vector to the target on the ground. Anyhow,

“Finally, one day, I saw my first piece of tooth glistening in the desert sun. It was sitting in some sandstone rubble, but there it was, as plain as day. The enamel had a sheen that no other rock had; it was like nothing I had seen before. Well, not exactly—I was looking at things like it every day. The difference was this time I finally saw it, saw the distinction between rock and bone. The tooth glistened, and when I saw it glisten I spotted its cusps. . . . All of a sudden, the desert floor exploded with bone; where once I had seen only rock, now I was seeing little bits and pieces of fossil everywhere, as if I were wearing a special new pair of glasses and a spotlight was shining on all the different pieces of bone.”²⁶

Shubin’s experience is a clear example of what Isbell designates by “camouflage-breaking,” the power of primate vision to discern pattern from clutter. We can infer that the superior colliculus of Shubin’s brain was then intact, because people with damage to the SC, Isbell explains, “are not able to detect stimuli that normally pop out from the background, such as targets embedded in distractors [for testing vision].” This and other pathologies “imply K [koniocellular neural] pathway and SC-pulvinar visual system involvement” in “preconscious visual pop out [which] occurs when salient stimuli are immediately detected despite being embedded in distractors.” The largest cortical visual area in mammals

“is important for conscious *awareness* of snakes, for example, but not for their preconscious *detection*. . . . By virtue of its strong connections to the SC and the pulvinar, the K pathway appears to be the visual pathway most strongly involved

²⁵ Lynne A. Isbell, *The Fruit, the Tree, and the Serpent: Why We See So Well* (2009) 136. Nutshell here: <https://aeon.co/ideas/how-seeing-snakes-in-the-grass-helped-primates-to-evolve>. “That which fears about is that fearing entity itself [*das sich fürchtende Seiende selbst*—Dasein. . . . Dasein as being-in-the-world is ‘fearful’ [*das Dasein als In-der-Welt-sein furchtsam ist*].” Martin Heidegger, *Being and Time* (tr. John Macquarrie and Edward Robinson 1962) 180, 182 (trans. slightly altered).

²⁶ Neil Shubin, *Your Inner Fish: A Journey into the 3.5-Billion-Year History of the Human Body* (2008) 64-65.

in the process of preconscious detection of predators and other dangers. That the K pathway has expanded in primates suggests that they were able to respond to selection for other more reliable or faster preconscious detection of dangerous objects than other mammals.”²⁷

Galton’s discovery of statistical regression is a good example of insight intermediate between Shubin’s “new pair of glasses” and Euler’s mathematical intuition:

“I had given much time and thought to Tables of Correlations, to display the frequency of cases in which the various deviations say in stature, of an adult person, measured along the top, were associated with the various deviations of stature in his mid-parent [a weighted average of the two parents], measured along the side. . . . But I could not see my way to express the results of the complete table [of numbers] in a single formula. At length, one morning, while waiting at a roadside station near Ramsgate for a train, and poring over the diagram in my notebook, it struck me that the lines of equal frequency ran in concentric ellipses. The cases were too few for certainty, but my eye, being accustomed to such things, satisfied me that I was approaching the solution. More careful drawing strongly corroborated the first impression.”²⁸

Concentric ellipses popped out at Galton from his visual experience of rows and columns of numbers. Stigler comments in a formula by now familiar that “What Galton had essentially done was to solve the whole problem by inspection (and minor adjustment of) this one table.”²⁹

Isbell suggests that “we can explain differences between primates and other mammals in visual (and therefore brain) expansion by differential responses to snakes.” “[A]n animal does not need to have a neocortex to visually detect and respond appropriately to threats. In fact, non-mammalian vertebrates do not have a neocortex.” But the keen sight of primates (“excellent central vision, fine visual acuity, and ability to see rich color”) does need the infrastructure of a larger, more complex neocortex. “Catarrhine primates, including humans, have the most highly developed visual systems in the mammalian world. . . . half of the primate neocortex is devoted to vision.”³⁰ As the empire of primate vision expanded over the brain it stamped its edgy character on cognition; the ancestral mode ensouls primate thinking. The guess is that along this path the norm of reaction extended enough and in such a direction so as to produce organisms whose minds manifest insight, noetic pop-out.

²⁷ *The Fruit, the Tree, and the Serpent* 88, 92, 91, 93. “In cats and humans pulvinar cells respond preferentially to moving or flickering plaid patterns, which are strikingly reminiscent of the tessellated image produced by scale patterns on moving snakes. . . . As part of their camouflage, snakes often have on their skins patterns of small spots of color set against a contrasted background.” *Id.* 80-81 (citations omitted).

²⁸ Francis Galton, *Memories of My Life* (1908) 302.

²⁹ Stephen M. Stigler, *The History of Statistics: The Measurement of Uncertainty before 1900* (1986) 288. At page 286 Stigler reproduces a published version the ‘diagram,’ an r by c table.

³⁰ *The Fruit, the Tree, and the Serpent* 106, 81, 50, 106.

Abyss or gradient? Heidegger writes, “With the existence of human beings there occurs an irruption [*Einbruch*] into the totality of beings, so that now the being in itself first becomes manifest, i.e., as being, in varying degrees, according to various levels of clarity, in various degrees of certainty.”³¹ Sheehan takes Heidegger for a phenomenologist – he’s all about meaning: “With the appearance of human being,” Sheehan writes, “meaning dawned in the universe, and nothing has been the same since. For the first time in the 13.7 billion years of the cosmos, things were no longer just ‘out there’ but instead became meaningfully present (*anwesend*). . . . Heidegger’s philosophical focus never strayed from *die Sache selbst*, the astonishing fact that with human existence sense irrupts into an otherwise meaningless universe.”³²

Wittgenstein thought such a notion ‘takes us in’:

“The evolution of the higher animals and of man, and the awakening of consciousness at a particular level. The picture [*das Bild*] is something like this: Though the ether is filled with vibrations the world is dark. But one day man opens his seeing eye, and there is light.

“What this language primarily describes is a picture. What is to be done with the picture, how it is to be used, is still obscure. Quite clearly, however, it must be explored [*erforscht*] if we want to understand the sense [*den Sinn Verstehen*] of what we are saying. But the picture seems to spare us this work: it already points to a particular use. This is how it takes us in [*Dadurch hat es uns zum Besten*].”³³

Let us take our direction from Wittgenstein and explore the picture. If C is the astonishing fact that with human existence sense irrupts, what is A? For Heidegger A goes by various names. Earliest is *das Da*, ‘the there.’ And then on to the clearing, *die Lichtung*, the open, *das Offene*, *Ereignis*, and so on to many others. But in turn this phenomenon – the there, the clearing, the open – is itself surprising. What is **it’s** A? Here the road of inquiry allegedly ends (at an abyss). Katherine Withy writes, for example, “the coming to be of openness involves no independent ground or origin, whether material or efficient. . . . The flaring up of the manifestness of the world is the end of the explanatory line. . . . it comes out of nowhere and nothing. . . . Openness opens itself; the world worlds.”³⁴ In Sheehan’s words,

“The mystery of the clearing-*qua*-abyss is what Heidegger calls ‘facticity’ in the proper sense of the term: the fact that we cannot question back behind this

³¹ Martin Heidegger, *Kant and the Problem of Metaphysics* (tr. Richard Taft, 5th ed. enlarged 1997) 160. *Mit der Existenz des Menschen geschieht ein Einbruch in das Ganze des Seienden dergestalt, daß jetzt erst das Seiende in je verschiedener Weite, nach verschiedenen Stufen der Klarheit, in verschiedenen Graden der Sicherheit, an ihm selbst, d.h. als Seiendes offenbar wird.*

³² Thomas Sheehan, “Astonishing! Things Make Sense!” 1 *Gatherings: The Heidegger Circle Annual* 1 (2011). “I try to make sense of Heidegger by showing that his work, both early and late, was not about ‘being’ as Western philosophy has understood that term for over twenty-five hundred years, but rather about sense itself: meaningfulness and its source.” *Making Sense of Heidegger* xi.

³³ Ludwig Wittgenstein, *Philosophical Investigations* (tr. G. E. M. Anscombe 3rd ed. 1958) II.vii, p. 184.

³⁴ *Heidegger on Being Uncanny* 92.

thrown-openness (which is ourselves) to find its ‘cause,’ without presupposing this very thrown-openness as what first makes such questioning possible.”³⁵

To question back beyond our thrown-openness is “a fool’s errand” Sheehan says. With cheerful thanks for that warning let us ignore it and press on. Wittgenstein recommends the use of intermediate cases: “A perspicuous [*übersichtliche*, ‘surveyable’] representation produces just that understanding [*das Verständnis*] which consists in ‘seeing connexions’ [*Zusammenhänge sehen*]. Hence the importance of finding and inventing *intermediate cases* [*des Findens und des Erfindens Zwischengliedern*].”³⁶

For Heidegger the core of understanding (*das Verstehen*) is the ‘as-structure’ (*die Als-Struktur*). “The ‘as’ is the basic structure whereby we understand and have access to anything;” “a structure of λόγος that first makes λόγος as such possible.” “The ‘as’ has the function of uncovering something in terms of something, of uncovering something *as*—i.e., as this or that. The ‘as’ is the structure of understanding.”³⁷

His lectures of winter semester 1929-30 are Heidegger’s most sustained discourse on non-human organisms. In those lectures he sharply distinguishes the animal’s behavior from the human being’s comportment. He raises the question of “whether the animal can apprehend something *as* something, something *as* a being, at all [*sondern ob das Tier überhaupt etwas als etwas, etwas als Seiendes vernehmen kann*]. If it cannot, then the animal is separated from man by an abyss [*Abgrund*].”³⁸

There Heidegger says that “The statement ‘a is b’ would not be possible with respect to what it means and the way in which it means what it does if it could not emerge from [*erwachsen aus*] an *underlying experiencing of ‘as as b’* [*zugrundeliegenden Erfahren des a als b*].” The issue then is one of “the *manifestness* of beings [*der Offenbarkeit des Seienden*] and the way in which this manifestness *occurs* [*die Art ihres Geschehens*].” Emphatically this “ ‘*as such*’, beings as such, something as something, ‘a as b’ . . . this quite elementary ‘as’ . . . is refused to the animal.”³⁹

But granted to human beings. “There belongs to man a being open for [*ein Offensein für*] . . . of *such a kind* that this being open for . . . has the character of *apprehending something as something* [*Vernehmens von etwas als etwas*]. This kind of relating to beings we call comportment [*Verhalten*], as distinct from the behavior [*Benehmen*] of the animal. Thus man is a ζῷον λόγον ἔχον, whereas the animal is ἄλογον.”⁴⁰

³⁵ *Making Sense of Heidegger* 76; see also 115, 159, 228.

³⁶ *Philosophical Investigations* I.122, p. 49.

³⁷ Martin Heidegger, *Logic: The Question of Truth* (tr. Thomas Sheehan 2010) 129, 120, 127.

³⁸ Martin Heidegger, *The Fundamental Concepts of Metaphysics: World, Finitude, Solitude* (tr. William McNeill and Nicholas Walker 1995) 264.

³⁹ *Id.* 301, 282, 287. *dieses ›als solches‹, das Seiende als solches, etwas als etwas, a als b. Dieses ganz elementare ›als‹ ist es – so können wir ganz einfach sagen –, was dem Tiere versagt ist.*

⁴⁰ *Id.* 306.

He concludes that

“In all its behaviourally driven activity, the animal is *taken* by whatever it is relating to in this behavior. That *to which* it stands in relation is thus never given to it in its what-being as such: it is not given as what it is and how it is, *not as a being*. The animal’s behaviour is never an apprehending of something as something.”⁴¹

Sheehan interprets:

“The sense organs [of an animal] ‘have no choice,’ as it were, about their corresponding objects. . . . the animal’s sense-openness is restricted to taking merely what the sensible appearances offer and dealing with it only within the limitations of instinct. The animal ‘behaves’ (*behmen*) rather than properly ‘relating itself to’ (*sich verhalten zu*) in the way a human being does. . . . This confinement to behavior is what Heidegger means by ‘captivation’ (*Benommenheit*). . . . The objects as such remain withdrawn from animal perception, unable to be apprehended as something intelligible. In that sense, ‘the animal is separated from man by an abyss.’”

In a footnote Sheehan comments on the purported abyss of separation: “This, of course, has to be read and corrected in the light of contemporary studies of animal intelligence.”⁴²

Indeed; yet although Heidegger discusses the work of Jakob von Uexküll and of Hans Driesch as “two essential steps in biology” he makes not even passing reference to the principal study of animal intelligence contemporary with his teaching – Wolfgang Köhler’s *Intelligenzprüfungen an Anthropoiden*, first edition 1917, second 1921 as *Intelligenzprüfungen an Menschenaffen* (‘Intelligence-testing on Hominids’).⁴³ The Index of Proper Names in *The Heidegger Concordance* contains no entry for Köhler. Heidegger’s non-mention of Köhler may be understandable as professional discretion after the spring of 1933, when in April Köhler criticized the Nazis in the German press and in May Heidegger joined the Party. But in 1929? In lectures specifically treating the difference between animal behavior and human comportment? What did Köhler find that Heidegger did not know of, or ignored, or suppressed?

First, chimpanzees **do have** an inchoate as-structure; they **can** take “something as something,” “a as b.” “All objects,” Köhler notes, “especially of a long or oval shape, such as appear to be movable, become ‘sticks’ in the purely functional sense of ‘grasping-tool’ in these circumstances [of problem-solving] and tend in Koko’s hands to wander to the critical spot.” In order to draw fruit outside the cage to within reach of his hand Koko had used – after the stick was removed by

⁴¹ *Id.* 311. *Das Tier ist in allem Umtrieb seines Behmens von dem, worauf es in diesem Behmen bezogen ist, hingenommen. Das, worauf es in Beziehung steht, ist ihm also nie in seinem Wassein als solches gegeben, nicht als das, was es ist und wie es ist, nicht als Seiendes. Das Behmen des Tieres ist nie ein Vernehmen von etwas als etwas.*

⁴² *Making Sense of Heidegger* 142-143; 143 fn. 58.

⁴³ Entitled *The Mentality of Apes* in Ella Winter’s 1925 translation of the second edition. In 1921 Springer published both Köhler’s second edition and von Uexküll’s *Umwelt und Innenwelt der Tiere*.

the observer – a blanket, a stone, a large piece of stiff cardboard, a rose-branch, the brim of an old straw hat, and a piece of wire.⁴⁴ Köhler reasons from this and many similar observations that

“if we assert that the stick has now acquired a certain *functional or instrumental value* in relation to the field of action under certain conditions, and that this value is extended to all other objects that resemble the stick, however remotely, in *outline* and *consistency*—whatever their other qualities may be—then we have formed the only assumption that will account for the observed and recorded behavior of these animals.”⁴⁵

In the problem situations Köhler set for it the chimpanzee’s empty hand itself becomes a function; taking as argument any movable object of a long or oval shape and returning the value ‘stick;’ ‘a as b.’⁴⁶

Köhler configured many of the tests so that solving the problem requires the animal to obtain a stick from available materials which are **not** sticks. The first step is for the animal to take something non-stick as stick. Often enough in its attempts the animal encounters ‘breakdown of the implement’ and copes by substitution or modification.

Köhler sets up one series of tests by placing fruit outside the bars of the cage and beyond the animal’s reach. In the back of the experiment room Köhler places a sawed-off castor bush, a kind of shrub whose branches break off easily. Sultan is let in the room and the observer draws his attention to the fruit. Sultan “approaches the bars, glances outside, the next moment turns round, goes straight to the tree, seizes a thin slender branch, breaks it off with a sharp jerk, runs back to the bars, and attains the objective.” Köhler comments: “that the breaking off a branch from a *whole tree* . . . is an achievement over and above the use of a stick is shown at once by animals less gifted than Sultan, even when they understand the use of sticks beforehand.”⁴⁷ Grande is tested the same day in the same way as Sultan. Although she chews the branches of the tree she never attempts to use it in any way as a stick and Köhler abandons the test.

Four months later Köhler tests Grande again with the same set-up. He notes that in the meantime she has become very much more accustomed to the use of sticks in problem-solving. This time Grande first tries to pull out from its metal rings an iron bar attached to a door. Unsuccessful at that she tries to whisk the fruit to her by using a strip of cloth, to no avail. She then takes a stone from the floor and tries to squeeze it through the bars but it won’t go. “After a further glance back, she at last marches toward the tree, leans with one hand on the wall, puts

⁴⁴ *The Mentality of Apes* 35.

⁴⁵ *Id.* 36.

⁴⁶ Cf. Heidegger: “The hand is a peculiar thing. In the common view, the hand is part of our bodily organism. But the hand’s essence can never be determined, or explained, by its being an organ which can grasp. Apes, too, have organs that can grasp, but they do not have hands. The hand is infinitely different from all grasping organs—paws, claws, or fangs—different by an abyss of essence [*einen Abgrund des Wesens verschieden*]. Only a being who can speak, that is, think, can have hands and can be handy in achieving works of handicraft.” *What is Called Thinking?* [1951-52] (tr. J. Glenn Gray 1968) 16.

⁴⁷ *Id.* 103.

the other one, and one foot, against the branch furthest from the front, with one jerk breaks it off, returns at once to the bars and attains her objective.” Köhler comments that the iron bar “stands out *visually* better from the wooden door, as a separate object . . . To ‘see’ a branch of the tree, so to speak as a stick, is much more difficult [*gewissermaßen als Stock „loszusehen“, ist schon schwerer*].”⁴⁸

Tschego is tested in the same conditions and to Köhler’s surprise invents an unsuspected solution. She first tries with her blanket, throwing it onto the fruit and trying to draw it toward her. Köhler takes the blanket away. Tschego seizes the castor tree and tries to stuff the whole thing through the bars but it’s too big. She takes a bundle of straw and “stretches out with it like a stick” toward the fruit. But the bundle is too flimsy to drag the fruit with it when pulled. So she “takes hold of the straw in the middle with her teeth, and at one end with her hand, and bends one half over the other, so that a bundle half as long, but incomparably firmer, a real sort of stick, is formed; this she uses at once, and, since it remains long enough, again and again, with complete success. . . . In this way a method of making implements has been invented that is different from the one expected; Tschego did not, at any time, show any indication of breaking off a branch of the tree, but she clearly showed that she ‘had present’ the *use of the stick* [*die Stockverwendung „präsent hatte“*] all through her experiment.”⁴⁹

Köhler’s fundamental discovery is that chimpanzees solve problems by insight – *Einsicht*; their actions are *einsichtig*, ‘intelligent.’ And we see in Köhler’s many tests of captive chimpanzees the very pattern of insight described by Peirce, Lonergan, and students of psychosis.

The ‘tension of inquiry’ manifests in the chimps’ frustration before the solution occurs to them. E.g.:

“A little stick is introduced into [Nueva’s] cage; she scrapes the ground with it, pushes the banana skins together into a heap, and then carelessly drops the stick at a distance of about three-quarters of a metre from the bars. Ten minutes later, fruit is placed outside the cage beyond her reach. She grasps at it, vainly of course, and then begins the characteristic complaint of the chimpanzee: she thrusts both lips—especially the lower—forward, for a couple of inches, gazes imploringly at the observer, utters whimpering sounds, and finally flings herself on to the ground on her back—a gesture most eloquent of despair, which may be observed on other occasions as well.”⁵⁰

Then the release occurs to Nueva at a stroke, unexpectedly:

⁴⁸ *Id.* 104-106.

⁴⁹ *Id.* 106.

⁵⁰ They can show their frustration as ferociously as a two-year-old child: “on the occasion of the next experiment, Koko used anything and everything he could lay hand on as a substitute for the familiar stick; and the box he merely stared at frequently in a peculiar manner. Suddenly he flew at it and began a violent attack: he was beside himself with rage, and flung the box to and fro and kicked it. . . . Again and again as he turned from the objective, his eyes sought the box; he glared, and then fell upon it.” *Id.* 44.

“Thus, between lamentations and entreaties, some time passes, until—about seven minutes after the fruit has been exhibited to her—she suddenly casts a look at the stick, ceases her moaning, seizes the stick, stretches it out of the cage, and succeeds, though somewhat clumsily, in drawing the bananas within arm’s length.”⁵¹

And this insight passed into the habitual texture of Nueva’s mind:

“Moreover, Nueva at once puts the end of her stick behind and beyond the objective, holding it in this test, as in later experiments, in her left hand by preference. The test is repeated after an hour’s interval; on this second occasion, the animal has recourse to the stick much sooner, and uses it with more skill; and, at a third repetition, the stick is used immediately, as on all subsequent occasions. Nueva’s skill in using it was fully developed after very few repetitions.”⁵²

Certainly there are limits on the chimpanzee’s capacity to retain an insight. The basic constraint is ‘out of sight out of mind.’ It is evident, Köhler says, “how immensely delayed the solution may become when the adequate implement can be introduced only through the action of memory. . . . The best tool easily loses its situational value [*Situationswert*] if it is not visible simultaneously or quasi-simultaneously with the region of the objective.”⁵³

Köhler says in effect that the temporal horizon of chimpanzees is restricted to an extent not yet explored; and that apart from language it is principally this difference in temporal range that distinguishes human from chimpanzee. He writes,

“In the method adopted so far we have not been able to tell how far back and forward stretches the time ‘in which the chimpanzee lives’; for we know that, though one can prove some effects of recognition and reproduction after considerable lapses of time . . . this is not the same as ‘life for a longer space of time’. A great many years spent with chimpanzees lead me to venture that, besides the lack of speech, it is in the extremely narrow limits in *this* direction that the chief difference is to be found between anthropoids and even the most primitive human beings.”⁵⁴

In Köhler’s method “everything depends upon the situation being surveyable by the subject from the outset [*daß die Situation dem Prüfling offen gegebene ist*].” Thus his experimental tests of

⁵¹ “If the experiment has not been made often, there is the additional fact that the moment in which a true solution is struck [*eine echte Lösung einsetzt*] is generally sharply marked in the behavior of the animal (or the child) by a kind of jerk [*eine Art Ruck*]: the dog stops, then suddenly [*plötzlich*] turns completely round (180°), etc., the child looks about, suddenly its face lights up, and so forth. Thus the characteristic smoothness of the true solution [*Stetigkeit des echten Lösungsverlaufes*] is made more striking by a discontinuity [*eine Unstetigkeit*] at its beginning.” *Id.* 17.

⁵² *Id.* 32-33.

⁵³ *Id.* 53.

⁵⁴ *Id.* 266-267.

the animals “brought them into situations in which all essential conditions were actually visible, and the solution could be achieved immediately.”⁵⁵

Even then the chimpanzees could find themselves stuck, ‘benumbed’ in Heidegger’s word, by the structure of the situation. When the key to the solution is the removal of an obstacle, e.g. moving a box placed against the bars inside the cage – something which appears to us to be extremely simple – the chimpanzee “has special difficulty in solving such problems; he often draws into a situation the strangest and most distant tools, and adopts the most peculiar methods, rather than remove a simple obstacle which could be displaced with perfect ease.”⁵⁶

The insight of the chimpanzee “shows itself to be principally determined by the optical apprehension of the situation [*dem optischen Aufbau der Situationem orientiert*].” *Das Bild* holds it captive: “*solutions showing insight [einsichtigen Lösungen]* necessarily are of the same nature as the structure of the situations [*dem Artcharakter der (optischen gegebenen) Feldstruktur*], in so far as they arise in dynamic processes *co-ordinated with* the situation.”⁵⁷

Köhler suspends the fruit high above and covers the ground beneath with a heap of stones “on which a box can hardly be placed firmly.” A box lies nearby. Sultan, “the most intelligent of the animals,”

“immediately pulls the box to the stone-heap, but does not succeed in making it stand up; he drags a big cage from a distance, tips it onto the stones, sets the first [box] on top of it, and reaches the objective after fifteen minutes of very hard labour, though on a construction that stands crookedly up in the air. The stones are [next] heaped up into a pointed pyramid. But this time Sultan, by a series of lucky accidents, fixes his box onto the heap in a certain way in a few minutes, and again reaches the objective. At the third repetition—the pyramid having been heaped up again—he is not successful, and soon gives up his efforts. He did not make the least attempt, during the experiments, to move the stones and clear a level foundation.”⁵⁸

The same with cylindrical tin cans placed on their side on the ground beneath the objective. Sultan “immediately seizes the box and attempts to put it on the tins, whereat the box rolls off to the side over and over again. . . . Nothing in his behavior indicates any endeavor to remove the rolling tins, although he could do it in a few seconds without the least trouble.”⁵⁹

The pixilated primate. For Sultan and his less gifted fellows the fact that a box obstructs access to the fruit, or that the ground is encumbered with stones or tins, is ‘how it is.’ They cannot see that there is anything to be done about it. The situation takes them in, holds them captive. Only

⁵⁵ *Id.* 11, 13, 11, 18, 266.

⁵⁶ *Id.* 65.

⁵⁷ *Id.* 267-268.

⁵⁸ *Id.* 154-155.

⁵⁹ *Id.* 155.

within a certain range of the spectrum do they, as Heidegger says of human beings, “look into the light of the possible.” As Köhler puts it, the chimpanzees “are chiefly hindered by the limits of their ‘visual insight’ [*eine Schranke ihrer „optischen Einsicht“ prinzipiell behindert werden*].”⁶⁰ Sultan will remove stones from a box he needs that make it too heavy to move, but won’t move stones that are in the way of setting a box. He removes obstacles only “which he understands to be such [*Hindernisse, die es als solche versteht*].”⁶¹ He can take stones as to-be-moved in some situations but not in others.

Yet Köhler insists their problem-solving behavior is not – in Sheehan’s characterization – “restricted to taking merely what the sensible appearances offer and dealing with it only within the limitations of instinct.”

“I have been asked by otherwise intelligent spectators of these [box-towers built by the apes], ‘whether this is not instinct?’ Therefore I feel obliged to emphasize the following particularly: the spider and similar artists [ants and bees, birds and beavers] achieve true wonders, but the main *special conditions for this particular work alone* are within them, long before the incentive to use them occurs. The chimpanzee is not simply provided for life with any special disposition which will help him to attain objects placed high up, by heaping up any building material, and yet he can accomplish this much by his own efforts, when circumstances require it, and when the material is available [*und Baumaterial vorhanden ist*].”⁶²

In contrast to chimpanzees **everything** can show up to us as *Baumaterial*; every ‘a’ as potential ‘b.’⁶³ Our field of view, so to speak, is very much more densely populated than theirs. And that same field of view of ours extends backward and forward in time. Whence this human difference?

Heidegger is adamantly ‘essentialist’ on this point. Whatever it was or is – *Einbruch, Ereignis*, or whatnot – every natural process of differentiation is excluded; in addressing the human difference naturalism is the error of biologism:

“Ek-sistence [*Ek-sistenz*] can be said only of the essence of the human being [*vom Wesen des Menschen*], that is, only of the human way ‘to be’ [*der menschlichen Weise zu »sein«*]. For as far as our experience shows, only the human being is admitted to the destiny [*Geschick*] of ek-sistence. Therefore ek-sistence can also

⁶⁰ *Id.* 153.

⁶¹ *Id.* 156

⁶² *Id.* 140.

⁶³ Such that in the limit ‘humanism is a fascism’: “Save men we do not know any particular thing in nature in whose mind we may rejoice or which we may join to us in bonds of friendship or any other kind of association: therefore the consideration of our own advantage does not demand that we preserve whatever exists in nature besides men. Instead, it teaches us that we should preserve or destroy it according to its usefulness, or adapt it to our use in any manner we please [*pro eius vario usu conservare, destruere, vel quocumque modo ad nostrum usum adaptare*].” Spinoza, *Ethics* (tr. Andrew Boyle rev. G. H. R. Parkinson 1989) Book IV, Appendix para. 26. A way of being which adversely impacts, e.g., chimpanzees: <https://www.sciencemag.org/news/2019/03/humans-are-wiping-out-chimpanzee-cultures> .

never be thought of as a specific kind of living creature among others - granted that the human being is destined to think the essence of his being [*geschickt ist, das Wesen seines Seins zu denken*] and not merely to give accounts of the nature and history of his constitution and activities. Thus even what we attribute to the human being as *animalitas* on the basis of the comparison with 'beasts' is itself grounded in the essence of ek-sistence [*im Wesen der Ek-sistenz*]. The human body is something essentially other than [*etwas wesentlich anderes als*] an animal organism. . . . The fact that physiology and physiological chemistry can scientifically investigate the human being as an organism is no proof that in this 'organic' thing, that is, in the body scientifically explained, the essence of the human being consists [*das Wesen des Menschen beruht*]."

In the same work he repeats yet again that living creatures are "separated from our ek-sistent essence by an abyss;" that they are as they are "without standing outside their being as such and within the truth of being, preserving in such standing the essential nature of their being."⁶⁴

A bedazzling picture.⁶⁵ The evidence reviewed above, however, suggests that "if the genealogist refuses to extend his faith in metaphysics [*ajouter foi à la métaphysique*], if he listens to history, he finds that there is 'something altogether different' behind things: not a timeless and essential secret, but the secret that they have no essence [*sans essence*] or that their essence was fabricated in a piecemeal fashion from alien forms [*fut construite pièce à pièce à partir de figures qui lui étaient étrangères*]."⁶⁶

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⁶⁴ Martin Heidegger, "Letter on Humanism" in *Pathmarks* (ed. William McNeill 1998) 247, 248.

⁶⁵ Not least by its flattering intimation that "the essence of divinity [*das Wesen des Göttlichen*] is closer to us than what is so alien in other living creatures." *Id.* 248.

⁶⁶ Michel Foucault, "Nietzsche, Genealogy, History" (tr. Donald F. Bouchard and Sherry Simon) in *The Foucault Reader* (ed. Paul Rabinow 1984) 78.