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Niels Engelsted

Catching Up With Aristotle

A Journey in Quest of General Psychology

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With Commentary from Jens Mammen and Aaro Toomela

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Series Editor's Preface

Advancing General Psychology: From Aristotle to New Dialectics

The aim of this new SpringerBriefs Series—Theoretical Advances in Psychology—is to give the international and interdisciplinary readership direct access to specifically theoretical innovations that can be found in the field. This is not an easy task—theoretical innovations in contemporary psychology are usually hidden behind the socially proliferated label of 'empirical research.'

Nothing can be more confusing than such assertions. Every time I hear that expression I am surprised—such statements seem to be empty calls for something that is already solidly in place. All sciences have their empirical sides—so, why is it important to single out the 'empirical' for an extra emphasis? From the vantage point of serious advancement of knowledge all empirical enterprises in science depend on the nonempirical (theoretical and meta-theoretical) intellectual frames all through the research process—from the beginning of asking the research questions to the end of gaining new knowledge. Thus, if the label 'empirical' were to denote "research free of theory"—it cannot be scientific, other than by social convention or administrative declaration. All science is theoretical in its generalizing role—gaining new knowledge—while it keeps involving specific theory-defined arenas for empirical inquiry.

Why, then, is the label 'empirical science' used? Why emphasize the obvious? The key here may be in the macrosocial context for science—talking of 'empirical science' is an ideological commitment. It is a 'loyalty oath' to a specific, socially prescribed, mode of operation for scientists. It calls for accepting the primacy of inductive generalization at the expense of its abductive and deductive counterparts. Yet purely inductive generalization has never provided good solutions for any science. Induction works in tandem with deduction and abduction.

A counterargument could be made at this junction—'empirical science' is 'evidence based,' driven by 'the data' and free of 'speculations' beyond 'the data.' I smile. There is no panacea in 'the data.' When I hear my colleagues urging to "let the data speak for themselves" I am ready to ask—"which language do the data

speak, and how did they learn to speak it?" Psychology needs theories that allow us to generalize our understanding through the data—but not confined by the sweet rhetoric of 'the data.' Our SpringerBriefs series is devoted to that task.

Our new series starts well—trying to catch up with the intellectual productivity of Aristotle is a good start for psychology in the twenty-first century. Niels Engelsted reminds us about the dire need to reestablish the theoretical focus upon general psychology in the otherwise theories phobic contemporary enterprise of psychological research. General psychology—a core theoretical frame for the discipline up to mid-twentieth century—has become an appendix for most psychology curriculae around the world. It is even cut out of some study courses as an unnecessary remnant of the past. On the background of such historical change, Engelsted's message needs to be carefully considered—trying to catch up with Aristotle is needed more than ever in our twenty-first century, where we force the theoretical voices from the past to fit into a 'history and systems' classification in a university course taken not very often and not too seriously.

Aristotle had of course much to say in many fields of knowledge at his time. So does Engelsted in ours—bringing together relevant ideas from various fields, and synthesizing these not only into a theoretical whole but into a pleasing one. His cheeky humor is a rare additional treat to contemporary psychologists who are usually confronted with research reports of no elegance, and (often) even less knowledge. This book—differently from many written in psychology—is a masterful exposure of basic ideas that has lingered on for two millennia. The reader can have the pleasure to think together with the author. It is a rare treat of honest intellectual sharing.

Perhaps the first fundamental distinction the reader finds in this book is the two ways of making distinction, one which separates and excludes the other, the other which separates and—by the very act of separating—unites with the other. In Engelsted's own terms, there are two setups, "dash- psychology (S—O), where a dash connects subject to object, and slash- psychology (S/O), where a slash keeps them apart. In the first, the subject and object are connected and separated by an interspace, in the latter by an interface. The interface connection is causal and physical and based on local motion; the interspace connection is intentional and non-physical, and based on locomotion."

The difference between interspace and interface has been the crucial meta-theoretical issue through all of psychology's history as *Wissenschaft*. Most of the empirical efforts of our contemporary psychology are focusing on constructing various versions of interfaces by invented notions that are of technical kind (e.g. "significant difference or relation between A and B"). Such constructed interfaces are inserted into the interspaces—and thus replace the connecting 'dashes' with separating 'slashes.' Asserting a difference between something (A) and something else (B) leads us to conceptual "cutting" of possible ties between A and B. If we conclude that "men are different from women" we guide ourselves toward losing the focus on how men and women are interdependent with one another.

The implications of such "slashing" are profound. Usually such replacement is the final result of an inquiry. It should not be. Where the interface is put into place, the study of the interspaces needs to begin—but it rarely does. The inserted 'slash' is like a parasite that consumes the richness of the interspace, explaining it with simplified but plausible causal attributions, thus keeping it from being further studied. The "empirical science of psychology" is filled with many constructed causal entities that are treated as explanations.

It is here the traditions, which were started—but not developed—by the *Naturphilosophie* of the Continental European kind, can be brought back to attention. Among these the main underutilized theoretical system of thought is that of dialectics—introduced by Solomon Maimon (1753–1800), Johann Gottlieb Fichte (1762–1814) and Georg Hegel (1770–1831), dismissed by the avalanche of the *Naturwissenschaften* in late nineteenth century, resuscitated for ideological reasons in Soviet Union in the 1920s, and forgotten again by the end of the twentieth century. Only Klaus Riegel (1925–1977) expressed hopes for developing a dialectical version of psychology in the 1970s American context, while Klaus Holzkamp (1927–1995) systematically advanced dialectical ideas within his version of Critical Psychology. Steinar Kvale (1938–2008) and Svend Brinkmann in Denmark have been linking dialectical ideas with concrete qualitative methodology. Yet these ideas need to be utilized also at the theoretical level.

Dialectical thought introduced a conceptual revolution to Naturphilosophie at the turn of the nineteenth century. A core invention of that tradition, the focus on transformation between quantity and quality, remains foreign to our contemporary psychology two centuries after its introduction. The reason is axiomatic, psychological phenomena are assumed to be reducible to variation in their quantity. The quantity, exemplified by the operation of quantification to turn phenomena into data, represents a given or assumed quality. Yet the quality is expected to remain ontologically stable, no transformations are assumed.

This renders the discipline blind to qualitative transformations that are rampant in human lives. In contrast, the dialectical philosophy emphasizes the phenomena of 'qualitative leaps' in nature, psyche, and society. These are central in nature, but enormously difficult to handle by the classical logical mindset of the history of Occidental philosophies and psychologies. The focus on "measurement" that prevails in psychology has stopped further inquiries into such leaps since the late nineteenth century. Even that part of psychology that would encounter such leaps most frequently—developmental psychology—has rarely attempted to develop theoretical models of such transitions in quality.

It is here that the centrally relevant new elaboration that Engelsted introduces in his book needs special attention. In Chap. 11, he describes and develops the mechanism used in dialectical thinking to explain such 'leaps'—that of second negation. To play it out in a very usual theme in psychology:

> FIRST NEGATION: "Men and women are not similar." In empirical terms this is expressed as in "we found statistically significant gender differences."

> SECOND NEGATION: "The statement men and women are not similar is irrelevant—as even if they differ in some ways, they are interdependent as inevitable joint creators of the next generation."

This statement does not bring our decision back to "men and women are similar," but to "men and women are similar while being not similar." This is not a confusion of opposites, but their counterpositioning, and a focus on a higher level systemic unity that renders the local differences irrelevant. Such meta-level contradiction opens the possibility for a new look that goes beyond the previous ones. In other words, something else than difference or non-difference matters, something that unites the separated phenomena ('men' versus 'women') in ways that renders the first negation mute. The relation between the two—'men' relating with 'women'—implies something else than mere difference or non-difference. The second negation leads to the study of interspaces, while the first negation results in a 'slash' in Engelsted's terms.

It is at the moment of second negation that novel forms emerge—negation of the first negation constitutes no return to the opposite that was posited first, but to the forward move to search for a different way to understand the difference. What matters is something else than the difference. In the case of gender this could be new forms of coordinating the lives of men and women, (marriage types, emotional relations within the family, etc.), all of which are complex social forms that constitute the interface between human beings embedded in bigger social networks.

Refocusing on the second negation is important. It is de facto utilized already in physical chemistry over the last half century; Ilya Prigogine's discovery of the restructuring of chemical substances under far from equilibrium contexts is a material example of this basic notion. Psychology is of course better positioned to find evidence for the ways in which the second negation works. For human psychology it is basic. Any generalization involving a move beyond the here and now action context involves some version of the second negation. A visitor to the Musée d'Orsay in Paris who is confronted with Gustave Courbet's masterpiece *The Origin of the World* would quickly move beyond the possibility that what is being depicted is a part of a nude body to the generalization of the beauty of the human life-giving powers. Art requires psychological distancing—which involves move to second negation, beyond the first. The processes of dialectical synthesis would allow psychology to consider phenomena of consciousness and self-consciousness in their own terms. This is the pathway that Niels Engelsted's contribution to science makes possible.

Aalborg
October 2016

Jaan Valsiner

Preface

When 50 years ago in Copenhagen I started in university, one of our professors told us new students that it was up to each of us to make his own map of psychology. The book presented here is the map I've made, and an account of the travels that went into making it. A Zeigarnick effect put to rest, so to speak, a mission accomplished.

You are not supposed to make your own maps; the whole point of education is that you should be shown the way by people in the know and not be on your own. Henry David Thoreau jibed that education makes straight-cut ditches of free, meandering brooks. Yes, it is meant to; education is the very channel of civilization, and the passage must be unceasingly maintained. Unspoiled nature may be fine, and it may not always be true that self-taught people have bad teachers and even worse students, but beginners are not experts, and amateurs like brooks tend to flow all over the place when they shouldn't.

Nevertheless, in every other generation or so, students have been left to find their own bearings when the tides of historical change have disrupted the channel, thrown open the institutional locks and settled paradigms, and left the old attendants without ability and will to form and regiment. To make a virtue of necessity, such occasions have been hailed as windows of freedom and opportunity. Imploring man's "inability to make use of his understanding without direction from another," Immanuel Kant went overboard, declaring Enlightenment to be "man's release from his self-incurred tutelage," and its motto to be 'Dare to know!'[1] No one would want to impugn Kant and Enlightenment; and, of course, there is an upside to these outbreaks as well. Which goes to show that both brooks and ditches have a place in science and education, if not necessarily in equal measure.

Ditch or brook is today a temperamental choice, only in our case there was no choice. Finding ourselves in the precarious window of opportunity, even those born to be ditches had to be brooks scouring the landscape for courses to run. For better or worse, it was this that made my generation—the class of 68—special.

[1]Kant (1784).

With everybody left to their own devices, what were mine? Like schoolboys of old, I had become a natural history buff, avidly collecting insects and fossils, and with my class mate Lasse first to embrace dinosaurs in primary school.[2] Years later we joined together with Kurt Malling from primary school in an attempt to reproduce at home James McConnell's memory transfer experiments with planarians; it failed miserably, but I made another try at university, and the many, many hours spent in company with that endearing little invertebrate made its indelible mark. Later I upgraded to rats and mice, and since a chance encounter with Robert Ardrey's *African Genesis* when in high school in California had already made me conversant with our hominid ancestors, I'd come the full evolutionary circle. It was this biological grounding—in combination with invaluable insider knowledge gained from an episode of depressive illness—that led me to the theory of mind presented in the book.

Of equal significance were the two great intellectual achievements that until the window closed again informed my generation: Marxism and Feminism. For introduction to the latter I greatly owe the tutelage of Bette, now long my life partner. Though not so easily aligned, enforced with the proper biological scaffolding, the insights of Marxism and Feminism almost effortlessly led to the understanding of the human being proposed in the book. In keeping with the belief of my generation that science and education should not be sequestered from the great issues of our time, this understanding is also a plea for a better future.

Mentioned should also be patriotism, some might say chauvinism. Having been handed the keys to the shop, some of us did not willingly wish to surrender them again and became true patriots of psychology when the integrity of the field was threatened by foreign forces and fifth columns. This ethos should be evident throughout the book. The account of intentionality, for instance, is basically a declaration of independence, psychology's claim for autonomy as domain and science; similarly, the call for a general psychology is basically a warning for psychology to stand united.

Whether students need teachers or not, teachers need students. No sooner had we been left effectively teacherless, when we ourselves were called to be the teachers for the next batch of students. It is a well-known secret that the best way to learn a subject is to teach it, and for that you need students. This is one reason the numerous students I have taught through the years have a great share in the book; I owe them all a deep debt for educating me. For their never flagging backing, I particularly wish to thank my three early students Annette Aboulafia, Magnus Dahl, and Torben Kjeldsen, who themselves went on to become teachers of psychology at universities in Denmark and abroad.

The route traveled was never a crowded one, but so much more exclusive the company. For their friendship and intellectual companionship I am particularly

[2]As natural history presenter for Danish Broadcasting Corporation, Lasse—*aka* Jens Olesen—went on to become a Danish David Attenborough.

indebted to Jens Mammen and Ole Elstrup, through many years my fellow travelers and co-combatants in the struggle for a sensible psychology.

Finally, a warm thanks to Jaan Valsiner, my editor, for offering this brook a passage way out of the wilderness; and if—through no fault of his—it has overflown, hopefully it has watered some far afield pastures in the process. You decide.

Copenhagen, Denmark Niels Engelsted

About the Author

Niels Engelsted retired from teaching in 2012. Prior to his retirement, he served as the head of the Department of Psychology at the University of Copenhagen. Dr. Engelsted received his doctorate from the University of Copenhagen and his postdoctorate from the University of Aarhus. He is the author of many publications, including *Evolution, Sleep, and Depression* from Copenhagen Academic Press. He has also published articles in many journals, including the *Bulletin of Anthropological Psychology, Journal of Anthropological Psychology, Current Science,* and *Mind, Culture, and Activity*.

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Part I
Within Circles of History

Chapter 1
Introduction

Abstract This chapter explains why the once famous 'Crisis of psychology' has not gone away and why a general psychology is needed. General psychology is understood as the theoretical field that outlines what psychology is the science of and maps the architecture of the psychological domain within the larger compass of nature and framework of science. Explained is also how a student rebellion in Copenhagen against the Copenhagen School of Phenomenology launched the author on that project.

The Tasks Ahead

Psychology is the quintessential life science for at least four reasons.

Life itself can be called the practical science of *agency* coming to terms with *causality* while adapting to *fortuity*. Exactly this is what psychology is about, as a *domain* as well as a *field*. The domain is what a special science is about; the field is how it goes about it. The domain is the special part of the universe the order of which a special science studies. In psychology, it is precisely the intersection between agency and causality. The field is the people and institutions, methods, and theories a special science employs. In psychology, the field has historically been a match between partisans of precisely agency and causality. The contour of the domain—*general psychology*—is our concern in this essay, but in order to delineate the edifice, we shall need to sketch the field history as well; they hold the key to each other.

Life itself is the never-ending story of new beginnings. So the field of psychology has been, nearly each generation insisting it was starting afresh. Referring to the latest new beginning, Wilhelm Wundt's renowned founding of psychology as science 30 years previously, Hermann Ebbinghaus—of nonsense syllable fame—expressed it like this: "Psychology has a long past, but only a short history."[1]

[1]Ebbinghaus (1908, p. 3).

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A psychologist would suspect a sign of insecurity and crisis in the implied distancing from the past, and not be far off. Neglect of the past is uncommon in well-founded sciences; they understand themselves as the front in an ongoing accumulative quest for knowledge, and usually take great pride in teaching the story of their ascent. Not so psychology. Considering how narratives and life stories were embraced as the latest fashion, psychology itself is surprisingly without. Boldly declaring that psychology 20 years past was not worth considering, a professor in my student days even made *this* a cause for pride. Forced juvenescence does not hold the answers to psychology's troubles, however; only the life history does. We shall make a reading here.

Life itself is primeval. The field of psychology is remarkably ancient too. If the archaeological evidence bears out that Neanderthals grave-laid their dead with flowers, the first folk science of psychology would be at least 28.000 years old, but probably much older. The ancient record is rich in information for those who wish to fathom the depths of psychology; sampling it, we shall find a clue even in the distant din of the Maenads' outrage on Mount Pangaion. In fact, to pick up the secret of the human being we shall venture all the way back to the legend of Adam and Eve.

Life itself is a meeting between the individual subject and the collective past, the organism, and the genetic heritage. So it is in psychology where at some point in the career of every psychologist their personal journey merges with the historical journey of psychology itself. In revolutionary and tumultuous times, they may even come to know. The following is my story.

The Crisis of Psychology and General Psychology

My personal journey dovetailed with the long history of psychology in 1968 when, in my sophomore year, the student body at the Department of Psychology at the University of Copenhagen rose in rebellion, demanding democracy, and open doors.

For two generations, The Copenhagen School of Phenomenology, founded by Niels Bohr's younger cousin, Edgar Rubin, ruled Danish psychology with an iron fist.[2] Possibly inspired by Bohr's subjectivist Copenhagen Interpretation of quantum physics, the school embraced a subjective and solipsistic philosophy. And while the inmates could longingly watch the field of psychology flower on the other side of the bars, the wardens insisted that psychology could not venture out into the real world until a very narrow and rigid phenomenological methodology was mastered in the future. Obviously, it had to go. The students won, and after the prison fare, they now threw themselves at the rich buffet table of international psychology, but what to choose? There were plates for every taste; various

[2]Engelsted and Køppe (1994).

collations of Personality psychology; Functional psychology of the easy American kind, or the indigestible German kind; a rich variety of Analytical psychologies; Pavlovian reflexology and different brands of Behaviorism; rewarmed Gestalt psychology and the new taste, Cognitive psychology; Social psychology, spicy from Frankfurt, or mild from London; Cultural psychologies with pineapple or coconut; Humanistic psychology of the Maslowian or the Existential flavors; and gamy dishes like Animal psychology and Ethology.

Alas, in want of a common table to hold the feast, the cornucopia almost immediately turned into a cacophony, the party into food fights. With everybody going for their particular favorites and turning on each other, students and faculty were soon divided into warring factions. Copenhagen, hitherto insular and protected, had jumped from the pan into the fire of the famous Crisis of psychology.

The Crisis of psychology is the brand name for the state of theoretical incoherence that came to characterize the science in the early twentieth century, a state of incomprehension and war, mercilessly pitting school against school, and dashing the high hopes held after psychology's founding as science in the 1870s. At the centennial little had changed. Sigmund Koch and David Leary, assigned by APA to make a comprehensive report on the state of psychology after its first hundred years, felt forced to conclude that "after a hundred years of ebullient growth, psychology has achieved a condition at once so fractionated and so ramified as to preclude any two persons agreeing as to its 'architecture.'"[3] Informed observers agreed. "An intellectual zoo," said George Miller.[4] "Ambiguous at best and chaotic at worst", said Amadeo Giorgi.[5] "When Zeno Pylyshyn stuck in the knife, declaring that 'the reason psychology is hard is that we have no good idea of what psychology is science of,'"[6] Koch and Leary gave the knife a twist, calling psychology "a jumbled 'hidden-figure' puzzle that contains no figure."[7]

Obviously, a scientific field has a problem if it does not know what its domain is, or even if it has one. At the common sense level, the domain of psychology is straightforward, of course. Psychology is about the way we sense, feel, think, and act, as expressed in the ordinary language vocabulary and reflected in the usual standard definition of psychology as the science of mind and behavior. If we ask further, things get more difficult, however. We are not helped much by such definitions, "if one cannot, in turn, say what behavior and experience are," Amadeo Giorgi wryly remarks.[8] How the defining constituents of psychology—items such as intentionality, consciousness, mind, and meaning—are themselves constituted has been the problem to stump psychology and leave the pieces of the puzzle in

[3]Koch and Leary (1992, p. 2).
[4]Miller (1992, p. 40).
[5]Giorgi (1992, p. 46).
[6]Pylyshyn (1987, p. 97).
[7]Koch and Leary (1992, p. 2).
[8]Giorgi (1992, p. 50).

disarray. And if it is not talked much about these days, *that* is the true crisis of psychology.

In his 1927 book *Crisis of Psychology*, Karl Bühler had pointed to the only solution.[9] Even if factional strife beats sex, you should resist being lured into taking sides. Like the Indian fable's wise, blind men who met an elephant in the forest,[10] every warring faction clearly had a valid point, and if the animal was to be grasped, all the points were surely needed. Buhler's advice was therefore to provide a frame for the puzzle that kept all the pieces together in a coherent whole, and allowed each piece to contribute and shine in its own rightful way. What was needed, in other words, was a *General psychology*, the theoretical field that explicates what psychology is the science of, and, in general outline, maps the architecture of its domain and its place within the larger compass of nature and greater framework of science. Only one had not been around for ages, so what would it even look like?

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[9]Karl Bühler (1927): *Die Krise der Psychologie*, Verlag von Gustav Fischer:Jena.

[10]A popularized version from my lectures can be seen here: http://engelsted.net/PPEnglish/GeneralPsychology/GP-files/BlindMenAndElephant.exe.

Chapter 2
The Heritage

Abstract This chapter first gives a respectful bow to the folk psychological concept of soul; then tells the story of philosophy and psychology from Aristotle to Franz Brentano as a continued attempt to place the psychological in the natural world and—after Galileo—within the bounds of physics. Beginning with the Athenian Golden Age, the history is laid out as a cascade of Enlightenment events, driven by growth in commercial wealth and class aspirations. The major fault line in this history is the Aristotle–Galileo rupture, and it is argued that for psychology to be whole, general psychology must bridge this fissure, giving Aristotle and Galileo each their rightful due.

Soul

Now it so happened that history a long time ago had provided a conclusive answer to that question. "The first truly complete systematic psychology comes from Aristotle," wrote Oswald Külpe,[1] and George Kantor later elaborated: "What makes Aristotle's psychology so remarkable is that it is a fairly comprehensive psychological corpus thoroughly grounded on naturalistic foundations."[2]

The recognized founder of a host of our present sciences, Aristotle has been credited with founding psychology too. It is only partly true. Psychology was evidence-based folk science long before Aristotle went to work in the Iron Ages. Like later Ptolemy's geocentric astronomy, it was based on incontestable observation and robust and reasonable deduction. The key observation for Ptolemy was the Sun's daily half circle pass across the sky; for the Paleolithic psychologists, it was that people stop breathing when they die. From this was deduced that breath—*psyche* in Greek—is the life-giving force, an airy, invisible substance, able to move in and out of the body. This explained the mystery of nocturnal dreams; during sleep, the psyche or soul takes leave of the body and departs for strange and different worlds. The non-identity of soul and body also explained another common

[1]Misiak and Sexton (1966, p. 6).
[2]Kantor (1963, p. 149).

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but puzzling experience, that of self-identity, that we basically remain the same despite our ever-changing bodies.

As long as they keep to the data from which they are built, evidence-based theories, like curve-fitting, cannot be easily faulted; on the contrary, as they provide coherent maps of the status quo, you can steer by them. It was for this reason Ptolemy's tables were indispensable to navigators for more than a millennium and a half. The Theory of Soul has been indispensable for much longer. Built from observation and common sense, with our experience of being unitary striving agents with consciousness, and linked with the first-person pronoun of language, the concept of soul simply became essential to the way we understand ourselves and communicate with each other. It is difficult to see how we could have done without it, and justified that Ebbinghaus pays it this tribute in his 1902 textbook: "Carrier and foundation of all mental life is a particular, unitary, simple, and independent essence, the Soul."[3]

As Ptolemy's theory proved when elaborated with more and more epicycles, you can, however, have too much of a good thing. The first epicycles added to the Theory of Soul seemed helpful and credible enough. For instance, that as breath is vapor, and vapors rise, so do souls, and therefore presumably have their final resting place in the Heavens.[4] But as more and more apps were added, for instance, as Socrates argued, that souls have learnt mathematics from the gods during their heavenly stay, the theory became increasingly spurious and top heavy. And as humankind ascended from the animistic world (*anima* is breath in Latin) of the hunter with his brother bear and sister elk, to the early days when the fertility god at harvest time gave up his body in sacrifice to the farmer, and further on to the new regime when elves and forest spirits were superseded by a royal family of capricious super-hero gods, the folk psychology of soul inevitably morphed into religion, which, of course, was contrary to what Ebbinghaus was talking about. Neither did it help that the theory soon was co-opted and turned into the ideological bulwark of ruling elites, a known graveyard of many a field of science. In western culture, this was most famously done by the aristocrat and philosopher Plato whose doctrine of *Idealism* came to bolster the hegemony of the landed aristocracy for a thousand years, only contested by Democritus' doctrine of *Materialism,* kept alive and fielded on occasion by the urban commercial classes in their perpetual struggle for emancipation from feudal rule.

Master Model

This epic conflict, crucial in the history of psychology, is where Aristotle enters the picture. Plato, for 20 years his principal in the Academy, held that only ideal and spiritual forms are real, matter is false and to be ignored. Democritus held that only

[3] *"Träger und Grundlagen alles psychischen Lebens sind besondere einheitliche, einfache und selbständige Wesen, die Seele."* Ebbinghaus (1902/1911, p. 12).

[4] As vapors also linger at water surfaces, an alternative abode for souls would be in lakes, which allegedly is the etymological origin of the German 'Seele' from which the English 'soul' is derived.

tiny material particles (*atomos* in Greek) are real, while forms are mere illusions. Aristotle held that both were wrong when denying the other. There can be no matter without form, and no form without matter, he insisted. Form and matter can be analytically distinguished, but not separated from each other. It is the task of science to study the forms, but it can only be done by studying their material embodiments. Declaring psyche to be form, Aristotle hereby reined in the fickly soul and made it an expression of and inseparable from the material body. *This was how psychology was first founded as a naturalist science.*

That truth to be true and objective must be immutable and not vacillating was the axiom of Greek philosophy. Plato had managed by making his ideas analogous to the change-resistant geometric formula; Democritus had managed by making his atoms indivisible analogous to the points on a geometric line. Aristotle, however, did not take his model from the abstract world of mathematics and ideal contemplation. The son of a Macedon court physician and trained in medicine, he had learned the hard way that you snub bedside observation and ignore bodily change at your peril. Instead, he took his paradigm from the material and highly active forms of the living being. But where would he find the unchangeable aspect in the ever-changing activity of living beings?

Aristotle found it in the natural tasks the living beings have to perform to fulfill their nature, *i.e*., to remain living beings of their kind, feeding being the first paradigmatic case. The ongoing performance is ever changing, true, but the task and its goal (*telos*) remain invariably the same. Everything is on the move from *potentiality* to *actuality,* aiming for a future goal, a *final cause*; and the *locomotion* from here to there has *a beginning, an end, and something in between*, which was how Aristotle defined an *epic* in *Poetics*, his famous work on the art of drama. And like all good plays, the natural tasks are re-enacted again and again. When the fox has fed, it has to feed again; the grass greens and withers with the seasons, over and over; when the acorns produce oaks, the oaks in turn produce acorns, and the circle is repeated. Life is repetition, circles within circles. It is not the still life circles of geometry, but the circles of real concrete life are world-constituting forms as good as the mathematician's timeless formulae and Plato's eternal ideas; you only have to follow them to their completion and closure to see their true nature.

A marine biologist by vocation (one legend tells he died during a dive), Aristotle did not make a distinction between the defining forms of biology and psychology, but named them all *psyches*. Thus, by identifying the defining form of life as the active striving towards a pre-given goal, ideally described in the vocabulary and subject–object grammar of ordinary language (S → O), *Aristotle had also identified the defining unit of psychology.*

The *psyches* he ordered into a taxonomic hierarchy like the major groups of living beings. Aristotle had no notion of evolution, but today we recognize his classificatory sequence as evolutionary. At the most fundamental level were the basic life functions shared by all living beings: Food intake and reproduction. Next followed functions shared by all animals: The ability to move about and to sense. Then followed functions particular to higher animals: The ability to imagine and have dreams during sleep. Finally at the top were functions specific and defining for

the human being: The ability to think and speak, and the ability—and need—to live in a society. As his battling peers had at least agreed that society was secondary to reason, Aristotle emphasized the distinction by calling us an animal with reason and language (*zoon logon echon*) and a societal animal (*zoon politikon*), respectively.

In scope and intention, *Aristotle's taxonomy is a general psychology*, laying out the architecture of the psychological domain from the simplest animal functions to the unique human traits. Since a general psychology is what we are presently missing, Kantor was certainly right when he said that our psychology had "*not yet fully caught up with Aristotle*."[5]

If to Aristotle's architecture of general psychology we add his identification of the essential psychological unit (S → O), and his insistence that we need soul and body, both and together, the answer to Koch's hidden-figure-puzzle should be within reach. The solution to the crisis of psychology should be as simple as could possibly be: *We just have to catch up with Aristotle!*

If it was that simple, of course, there would have been no crisis in the first place. But, as Aristotle underlined in *Poetics*, still used as textbook by Hollywood screenwriters dreaming of producing blockbusters, a crisis is essential in any good drama.[6] The crisis in the epic drama of psychology came with the downfall of Aristotle. As in the best Greek plays, he brought it upon himself.

Enlightenment

How Aristotle around 300 BC could found so many sciences is best explained by an analogy. Like the great French *Encyclopédie, ou dictionnaire raisonné des sciences, des arts et des métiers* was the accumulated product of the *French Enlightenment*, its clone, the *Encyclopædia Britannica*, the product of the *Scottish Enlightenment,* Aristotle's remarkable scientific corpus was the product of the *Greek Enlightenment*. Aristotle, and his school, was standing upon the shoulders of previous generations of scholars, as he himself acknowledged: "Let us remember that we should not disregard the experience of ages; in the multitude of years these things, if they were good, would certainly not have been unknown; for almost everything has been found out, although sometimes they are not put together; in other cases men do not use the knowledge which they have."[7]

Enlightenment is the call for knowledge and emancipation, and the belief that the first will bring the second; "daring to know," is how Immanuel Kant defined it.[8] It is

[5]Kantor (1963, p. 149).

[6]Tierno (2002).

[7]Aristotle, *Politics*, Book 2, part 5.

[8]Kant (1784).

the claim that you can take fate into your own hands and by your own efforts become what you truly are, as iconically expressed in Pico della Mirandola's *Oration to Man*, called the *Manifesto of the Renaissance*, which renders it as God's promise to Adam: "The nature of all other beings is limited and constrained within laws prescribed by Us. Thou, constrained by no limits, in accordance with thy own free will, in whose hand We have placed thee, shalt ordain for thyself the limit of thy nature."[9] Or, as Erasmus of Rotterdam expressed it 50 years later: "Now it is the possession of Reason which constitutes a Man. If trees and wild beasts grow, men, believe me, are fashioned." Education and learning are how we make ourselves. "If it be contrived earnestly and wisely, you have, I had almost said, what prove a being not far from God."[10]

Conventionally the term has been reserved for the period from 1690 to 1789, but the Italian Renaissance and the Dutch Humanism were also Enlightenment events, and similar surges in science, culture, and calls for social reform and democracy have occurred throughout history whenever trading wealth made urban mercantile classes strong enough to challenge and overthrow their feudal overlords. After the revolution—whether the new rulers remained in control, the old rulers made a comeback, or a combination—the Enlightenment event as a rule came to pass.

The first outbreak took place in ancient Greece, when Athens rose to become the center of a commercial empire, and a market for learning and intellectual skills developed. On the Athenian silver coin was an impression of Athena's wide-eyed owl, the symbol of wisdom and learning, and scholars and teachers all over Greece took the hint. In search of fame and silver owls, they flocked to the metropolis to offer their ideas and services, among them Democritus and his student Protagoras, a young mathematical prodigy Democritus had discovered and taken in from the street in Abdera. Good teachers beget good students, and good students veer, so when Democritus declared that "only atoms exist, the rest is opinion,"[11] Protagoras said, 'Fine, you take care of the atoms, Master, then I'll deal with opinion.' Setting up shop in Athens, he did. With the individual as his atom and calling *Man the measure of all things*, Protagoras became the leader of the Sophists—lovers of wisdom—and a founder of the cultural-historical sciences and the humanities. And when Plato, anti-materialist and anti-democrat, using Socrates as his literary mouthpiece, set out to demolish the two arms of Enlightenment, the Atomists and the Sophists, Aristotle, another wayward student, drew his own conclusions.

In Aristotle's day Greek democracy faltered and its Enlightenment event came to an end, but not least through the efforts of the Muslim scholar and fellow physician Averröes his work was saved and became a pillar in the next Enlightenment event, the cultural and scientific surge called the Islamic Golden

[9]Pico (1486).

[10]Erasmus (1529).

[11]Diogenes Laërtius, *Life of Democritus*, XII.

Age.[12] From here, at the predawn of the Italian Renaissance, thanks to the commentaries of Averröes, Thomas Aquinas in 1200 made Aristotle chief philosopher in the Catholic Church, demoting Plato who had previously held that position. This, by the way, explains why Plato, Aristotle, and a turban clad Averröes, pagans all, came to figure in a central wall painting in the most holy temple of the Christian Church.[13]

Plato had ruled 800 years when unseated, Aristotle only 400. Contrary to Plato, who had denounced the material world as false and a no-go, Aristotle encouraged empirical studies of nature, and with this license science began to prosper, culminating with Galileo's scientific revolution in 1600, which axed Aristotle!

Salto Mortale

The (S → O) form of the living being defines the living being, surely; but contrary to what Aristotle believed, it does not define everything else as well. Orbiting planets and falling stones are not like animals aiming to reach future goals and fulfill natural tasks; the physical objects are reacting to the field of forces presently surrounding them, as Galileo could demonstrate. Animals have *locomotion* reaching out in time and space, but physical objects are determined by *local motion,* causal forces affecting their boundary and bound to the immediacy of the here and now.

Aristotle had over-generalized and made everything biological. Now Galileo over-generalized and made everything physical. Everything is physical, of course, but in addition, the living world is animated, and it is this *active* quality of life that Aristotle's concepts capture, and Galileo's *reactive* causality does not. For future reference, let us call it *Activity Theory* and *Reactivity Theory*.

Galileo's revolution has rightfully been called the decisive turning point in science as it opened up for the huge and still ongoing advances in the physical sciences. But it was also a turning point that sent psychology on a Diaspora from which it has yet to return.

Both paradigms—shown in Fig. 2.1 and to be further explained—are valid and necessary. To give to each his own, the physical to Galileo, the animate to Aristotle, would have seemed the sensible thing; in retrospect, however, the outcome was

[12]As 101 Economy will tell you, the establishment of a common market, subject to common rules, and under the directorship and policing of a common authority, will greatly favor the expansion of trade and accumulation of wealth. Starting with an altercation between the merchant towns of Mecca and Medina in the 7th century, a new religious doctrine—*Islam*—accomplished precisely this, which led to an Enlightenment event that from a distance lent a shine to Europe's Dark Ages.

[13]Raphael's painting *The School in Athens* in the Apostolic Palace in the Vatican. Like a pictorial lexicon it depicts the major Greek philosophers. The lexicon is opened in my PowerPoint presentation, The School in Athens http://engelsted.net/PPEnglish/TheSchoolinAthens/TheSchoolinAthens.htm.

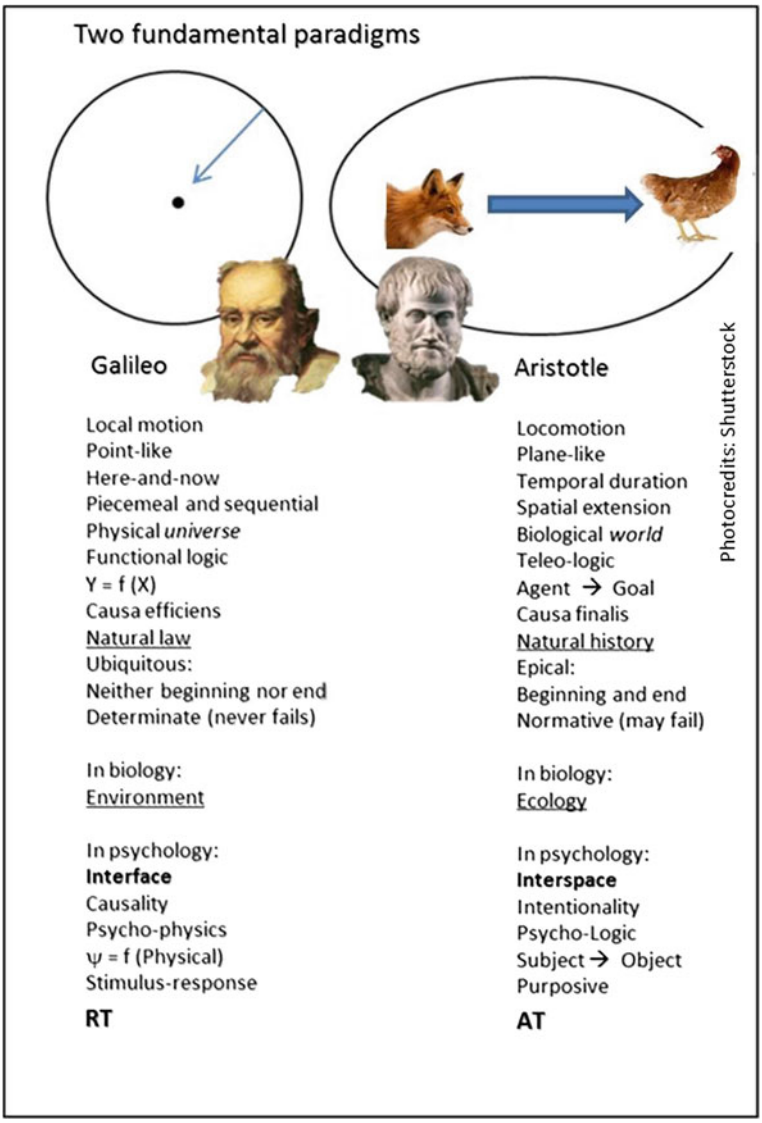

Fig. 2.1 Two fundamental paradigms

inevitable. It is in the nature of paradigmatic swings that winner takes all, as Thomas Kuhn would say. Besides, many wanted Aristotle out. Latin school boys—like Francis Bacon and John Locke of later Enlightenment fame—wanted to be freed of the boring and demanding Aristotelian syllabus; their bourgeois fathers wanted to get rid of the philosophical support Aristotle's *Scala naturae* gave the feudal order. When given the chance, fathers and sons, therefore, opted for the

old-time Atomism now reincarnated in Galileo. The dazzling success of mechanical physics—sheer brilliance after Newton—made the choice easy, mandatory even. Anyway, Aristotle's and Galileo's seemed worlds too far apart to bridge. They even spoke different languages.

As an epic event with a beginning, an end, and something in between (Aristotle's definition in Poetics), locomotion is ideally described in the vocabulary and subject–object grammar of ordinary language (S → O) evolved through time for precisely this purpose. Local motion requires a completely different language. Galileo: "It is written in the language of mathematics, and its characters are triangles, circles, and other geometric figures, without which it is humanly impossible to understand a single word of it; without these, one is wandering about in a dark labyrinth."[14] What would capture local motion was not meaningful words, but the causal function, $y = f(x)$, as Galileo showed with his fall law. And while law is law and brooks no exception, epic events have so many ways to go wrong between the beginning and the end that they can be only norms.

You would not be a self-respecting intellectual if you did not prefer mathematical clarity over word play and the precision of law over the elusiveness of norm; so long before Kurt Lewin made this call, young bright heads were demanding a psychology to follow the Galilean precepts. Not so young also, as for instance Thomas Hobbes of English Enlightenment fame.

Hobbes had visited Galileo in Pisa and become a passionate fan. On his return, he squashed Aristotle—the most ridiculous he had ever read[15]—and founded psychology anew based on Galileo's mechanical principles, for which he has been called "the father of modern empirical psychology."[16]

According to our official history, psychology as science was founded by Wilhelm Wundt in 1879. It is not wrong, but fails to mention that it was only the third time in history psychology was founded; that there were three different psychologies simultaneously founded in the 1870s; and that Wundt himself had to found two distinctively different psychologies. It seems like chaos, but there is order in the madness. What we see are the after quakes following the shock of the Aristotle–Galileo rupture, which marks a Ground Zero in the history of psychology, in the history of Western thought as well. The story is quickly told.

The Classical Philosophical Cascade

With Hobbes' second founding, humans were now to be understood as machines with input and output, usually called stimulus and response ($s \rightarrow r$). First, we were compared to mechanical precision clocks; then, as the program progressed, with the

[14]Galileo (1623, p. 4).

[15]Hobbes (1651, p. 672).

[16]Brandt (1928, p. 151).

top machines of the subsequent industrial revolutions; with the first industrial revolution we became like steam engines, with the second like telephone exchanges, with the third like computers, and with the fourth currently under way like the Internet.

There were objections right away. The naturalist John Ray, called the Aristotle of England, protested that "[t]hese Mechanick Philosophers" cannot explain animals "from the necessary Motion of Matter, unguided by Mind for End,"[17] but he was put down with ridicule by his Royal Society colleague Robert Boyle. An Atomist insisting that reality should be stripped down to those "grand and most catholick principles of bodies, matter and motion,"[18] Boyle cruelly compared Ray to the ignorant Chinese savages who had believed that mechanical clocks were European animals with souls. Boyle was adamant, as was Hobbes, that no ghosts should be allowed in the machine, and that applied to René Descartes as well. The Frenchman had his doubts too, and to appease them had turned humans into machines with souls, but when scrutinized, his solution of psycho-physical interaction proved unintelligible, and rejected were also the even weirder solutions of psycho-physical parallelism that followed in the desperate attempts to both keep the psychological (Ψ) and square it with the physical (P).

There were, however, problems the Mechanick Philosophers could not so easily dismiss. Already Democritus recognized that sensory experience has features with no equivalent in the physicist's universe of bodies in motion. Galileo put it succinctly: "I think that tastes, odors, colors, and so on are no more than mere names so far as the object in which we locate them are concerned, and that they reside in consciousness. Hence if the living creature were removed, all these qualities would be wiped away and annihilated."[19]

Hobbes agreed and called these subjective qualities "the great deception of sense."[20] That the mind creates such sensory qualities on its own is secondary, said now John Locke; the primary is that mind is also informing us about the objective world of bodies, matter, and motion, which physics deals in. As the two works Locke brought home from exile at the conclusion of the English Glorious Revolution, one on government and one on psychology, had made him *Mr. Enlightenment* to the European intelligentsia,[21] people felt suitably calmed by this neat distinction between *primary* and *secondary* sense qualities.

Not so fast, retorted Anglo-Irish George Berkeley; in a brilliant pioneering study in the psychology of perception, he demonstrated that Locke's primary qualities were just as much subjective fabrications as the secondary. In other words, from the

[17]Ray (1701).

[18]Robert Boyle/Le Van Baumer (1978, p. 312).

[19]Galileo (1623, p. 23).

[20]Hobbes (1640).

[21]"*Perhaps no man ever had a more judicious or more methodical genius,*" the French savant Voltaire wrote of Locke in his *English Letters* no XIII, himself an icon of the (official) *Enlightenment Era*, which is customarily dated from the publication of Locke's books in 1690 to the French Revolution in 1789.

sensory interface we cannot know the outer world of objects moving in time and space, and yet we do unquestionably know it. Using this remarkable conclusion to create an ingenious proof of the existence of God—Berkeley belonged to the counter revolution, which has followed most revolutions and as a rule turns off again the lights of Enlightenment—he was rewarded with a bishopric.

Dismissing the part about God, David Hume of the illustrious Scottish Enlightenment accepted as valid the conclusion that by the senses and induction, we cannot know with certainty what we do know. Ironical and shocking, the empiricism of the physicists could not vouch for the ontology of the physicists.

Reading Hume shook Immanuel Kant out of his "dogmatic slumber," as he admitted.[22] Hume had thrown up his hands; Kant, a teacher of the new physics and a devotee of Newton, did not. A radical solution had to be found, and he found it: "Hitherto it has been assumed that all our knowledge must conform to objects, [let us instead] suppose that objects must conform to our knowledge."[23] The ontology could be made safe and certain if we just moved it from the outer to the inner world. The matrix of space, time, and moving bodies is simply the mind's own a priori format of intuition, the form the sensory input has to take when entering the mind, just like a liquid takes the form of the bottle it is poured into. As it reversed everything, Kant called the solution his Copernican revolution. With Kant, classical philosophy is brought to its conclusion.[24] Philosophy after Kant ceases to be a frontrunner of science to become its self-appointed—and not always appreciated—overseer. Having said that, post-Kantian philosophy still had a gift or two to give psychology.

The Third Founding of Psychology and Its Different Faces

The first casualty of Kant's revolution was psychology. The task of a scientific psychology is to find a place for mind in the structure of the world; if the world structure itself is in the mind that obviously becomes impossible. Besides, said Kant, to be scientific, psychology must be renderable in mathematical equations, which it is not. As Kant was the leading light of the German Enlightenment, everybody listened, and psychology was stomped. But only for 50 years, then a mad German physicist, G.T. Fechner, did produce a psycho-physical equation, and the game was on again.

It is a most curious story and proves that counter revolution can be revolutionary too, counter-Enlightenment enlightening. When the French Revolution turned into counter revolution and the promises of Napoleon were dashed, dashed were also the

[22]Kant (1783).

[23]Kant (1781/1787).

[24]For a short Power Point presentation see Classical Philosophy Ultrashort Version www.engelsted.net/E-philosophy.htm.

hopes of the German intellectuals and liberal bourgeoisie. As they resigned themselves to continued aristocratic rule, the general mood shifted. Turning away from worldly politics and hard science, which, in the words of Madame de Staël, "can only examine by division, [and] applies like a dissecting knife to dead nature, but … is a bad instrument to teach us to understand what is living,"[25] people turned to their inner life and embraced a New Age palette of art and poetry, spiritualism, vitalism, and pantheism. *German Romanticism*, it is called.

Today its stance would be called anti-scientific, but German Romanticism did in fact make an important contribution to scientific progress, as its cavalierly largesse with spiritual phenomena proved a boon to scientific fields cramped by the strictures of the hegemonic mechanical physics. It licensed Luigi Galvani's discovery of '*animal*' electricity, for instance; and when H.C. Oersted discovered electromagnetism, he later referred to it as *The Spirit in Nature*.

Psychology was released too in a couple of steps. The notion of special spiritual energies—a specific nerve energy for each sensory modality—had informed the experimental laboratory work that earned the Berlin professor Johannes Müller the title of founder of modern physiology. When four of his best students, led by towering Ludwig von Helmholtz, in 1845 took down the spiritual scaffold again and—swearing an oath never to accept any other forces in the organism than the common physical chemical[26]—restored a rigid natural science outlook, the building stood solidly on its own. The four oath-swearing students—Helmholtz, du Bois-Reymond, Carl Ludwig, and Ernst Brücke—read like the blue book of physiology, but also the pedigree of psychology. It was the students taught by Müller's students, who became the founding fathers of scientific psychology.

Fechner was the last leg of the Romanticist movement, and probably mad as a hatter. He believed in a pan-psychic unity of spirit and matter, and was desperate to find a formula to open peoples' eyes to this true reality. Having hurt his own eyes studying the sun, and moving along a path from a depressive stupor to religious euphoria, he discovered the formula that was to make him famous, in his bed October 22, 1850. It was first laid out in the book *Zend-Avesta or Concerning Matters of Heaven and the Hereafter* published under a pseudonym in 1851, but after a lot of experimental work, and in a more academic guise, it was republished in 1860 as *Elements of Psycho-Physics* and immediately set off a revolution.

Fechner's formula demonstrated that the experienced magnitude of sensation is a logarithmic function of the magnitude of the physical stimulus: $\Psi = k \log s$.[27] As this broke Kant's ban by proving that functional mathematical relationships between the *psychological* and the *physical*, $\Psi = f(P)$, could be found, the German sensory physiologists and physicists went to work in psycho-physical laboratories to find them. Next their students, using the same formula, founded psychology for the third time in their own psycho-physical laboratories.

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[25]Madame de Staël (1814) and Le Van Baumer (1978, p. 475).

[26]Boring (1950, p. 708).

[27]In German $S = k \log R$.

First out of the box was the Russian Ivan Sechenov, but Wilhelm Wundt, his roommate during their studies with Hermann von Helmholtz, was close on his heels. Wundt was subsequently awarded the laurels, but only because Germany by now was the leader in industry and science and imitated by everybody.

Perhaps this was unfortunate because Sechenov's psychology was the more advanced. By this time, Russia was warming up to its first bourgeois revolution, and an Enlightenment event was finally in the pipeline. While first movers end up struggling with antiquated models, late comers have access to the state of the art, and that was to Sechenov's advantage. True to the revolutionary spirit, he opted for a no-nonsense objective psychology based on stimulus-response; "the initial cause of any action always lies in external sensory stimulation," he insisted.[28] It was pure Hobbes, but Hobbes upgraded with the newest science, not least brain physiology to which Sechenov himself greatly contributed. He laid the ground for the succeeding Reflexologies of Ivan Pavlov and Vladimir Bekhterev, and, through these, also the American Behaviorism of J.B. Watson.

If Sechenov was Hobbes upgraded, Wundt was Locke put in Teutonic order. Wundt wanted to do for the mind what Mendeleev had just done for chemistry, identify and order the elements of subjective experience using the psycho-physical methodology and introspection. It was a psychology of limited scope; the visiting American William James said it could only have been invented in a country where people were incapable of being bored.[29] Wundt, however, recognized that and became—in one very German body—his own Democritus and Protagoras both. Having given the 'atoms' their due, he went to work on the 'opinions' and founded *Völkerpsychologie*, the cultural-historical psychology that studied higher mental processes as expressed in religion, social customs, myths, history, language, arts, and law. Wundt's two psychologies correspond to the much advertised partition between natural science, which explains, and humanist science, which understands. Launched and reinforced by the German William Dilthey, it led to C.P. Snow's 'two cultures'—never shall they meet—and is, of course, disastrous for the prospects of psychology, which needs both these realities in the same picture (Fig. 2.2).

There was a third founder as well at this time, and he nearly got it right. As a former Catholic priest with a scholastic education, Franz Brentano had written his dissertation on Aristotle, and with reference to the Greek sage, he now made intentionality defining of psychology: "Every mental phenomenon is characterized by what the Scholastics of the Middle Ages called the intentional (or mental) inexistence of an object, and what we might call […] reference to a content, direction towards an object (which is not to be understood here as meaning a thing), or immanent objectivity […]. No physical phenomenon exhibits anything like it."[30]

[28]Sechenov (1863/1965, pp. 88–89).

[29]James (1890, p. 192).

[30]Brentano (1874, pp. 115–116).

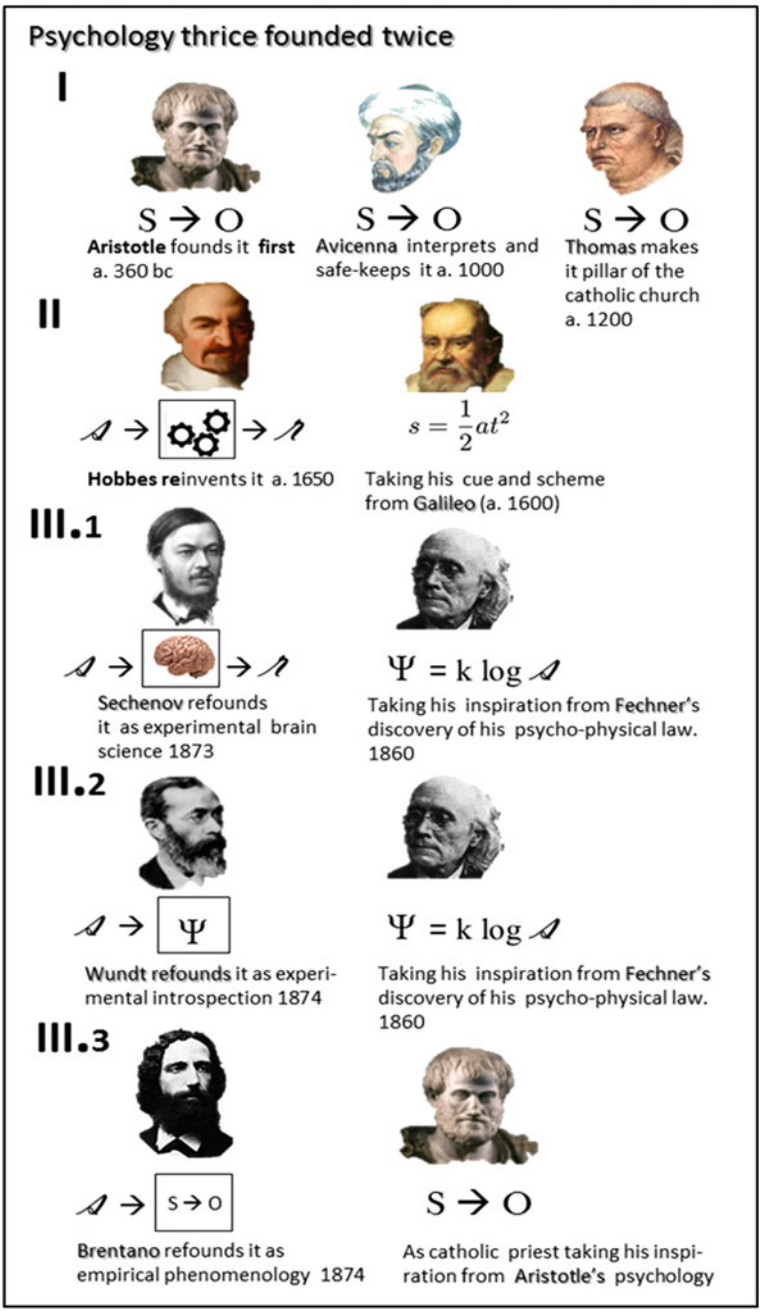

Fig. 2.2 Psychology thrice founded twice

Immanent objectivity was Kant's solution too, only using other words; but whereas his was an a priori format of reception, ($s \rightarrow r$), Brentano's was an outreaching towards an object (S → O). The title of Brentano's major work made clear, however, that this intentionality should still be seen as experience, "from an empirical standpoint." In other words, (S → O) should proceed from ($s \rightarrow r$), Galileo remains the law of the land, and empiricism reign with its concomitant subjectivity.

So exasperating close Brentano was, and even closer his student Alexei Meinong with his very perceptive theory of objects, but also Edmund Husserl with his Phenomenology, and his student Martin Heidegger with his Being and Time. Notwithstanding the keen insights of the Phenomenologists, however, psychology gets nowhere if it remains locked up inside the cocoon of subjectivity. Unless it touches base outside the mental it all too easily reduces to subjectivist philosophy in one of its many bottlings; cosmogenesis alone demands that psychology stands on physics as this came first in time. For these reasons, it was entirely understandable that the psychology mainstream followed the Galilean highway into behaviorism, cognitivism, and brain science.

Sine Qua Non

Only it was the wrong direction, some of us thought. Dedicated materialists and biologists as we were, the phenomenological incarceration had not been in vain. However, barren the Copenhagen approach, you could not dump phenomenology. Psychology must be materialistic and tie into the physical world, and it must be biological and tie into the living world, but if about anything, psychology is about *the subject* and *the subject's being in the world*. Psychology is the special science of *epistemics*; that is, the ways the world can be known to beings to which the world can be known; knowing understood in the widest sense, including the cognitive, but also the conative and emotive. Inseparable from the material and living world, psychology must be *real* phenomenology, epistemology *naturalized*. Aristotle got that right; the Copenhagen school did not, and was reduced to vapid philosophy. It should be fixable, though, if only a serviceable bridge back to Aristotle could be found.

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Chapter 3
Marxism and General Psychology

Abstract This chapter narrates how in the wake of a resurgence of Marxist Enlightenment in European universities in the 1970s, the Danish general psychology project was greatly facilitated by the discovery of Lev S. Vygotsky and his Cultural-historical activity theory school. In particular, how Alexei N. Leontiev's psycho-phylogenetic activity model as a virtual mirror image of Aristotle's bio-psychological taxonomy became a key? The author's suggested model of general psychology is a combination of Aristotle's and Leontiev's models and presented in the end.

Resurgence

In this hour of need, out of the blue, such a bridge did appear. In the wake of the Vietnam War, and the student rebellions in Berkeley, Paris, Berlin, and Copenhagen, a resurgence of Marxist Enlightenment reached European universities, and, as Lev Vygotsky wrote in 1927 in his book about the *Crisis of Psychology*, *the creation of a general psychology would be the only justifiable application of Marxism to psychology.*[1]

Marxism is a product of the 1848 revolutions, which were among the last of the bourgeois revolutions in Europe, only the Russians were tardy and still had their revolution coming. In 1845, Marx wrote in the *Theses on Feuerbach*: "The materialist doctrine that men are products of circumstances and upbringing, and that, therefore, changed men are products of changed circumstances and changed upbringing, forgets that it is men who change circumstances and that the educator must himself be educated."[2] The revolutionary Enlightenment ethos could hardly be clearer; Erasmus of Rotterdam would have nodded.

You will probably object that Marx called for a socialist revolution, not for a bourgeois one, which is true. With the *Industrial Revolution,* a new class, the working class, had arrived on the scene. Having won their emancipation, the

[1]Vygotsky (1927, 1997, p. 330).
[2]Marx (1845, 3).

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bourgeois naturally believed—like recently American Francis Fukuyama[3]—that history had come to its natural end. The workers did not; they wanted emancipation too, to which end an appropriately revised manifesto was needed. Karl Marx and Friedrich Engels wrote one in 1848, which recognized that "the modern bourgeois society that has sprouted from the ruins of feudal society has not done away with class antagonisms. It has but established new classes, new conditions of oppression, new forms of struggle in place of the old ones."[4] With the bourgeois class and the working class locking horns, beginning in 1848, the Enlightenment cascade increasingly turned red, and the call for a socialist revolution was heard more and more often. Until the 1917 revolution in Russia, every attempt was soon rebuffed, however; only Soviet Russia held out for 70 years before it folded and Russia returned to the capitalist path.

In the 1970s this demise was still future history, and with the Marxist resurgence, and with Klaus Holzkamp's Critical Psychology school at the Free University in West Berlin as main conduit, translations of so-called Soviet psychology soon reached Copenhagen. In particular, Vygotsky and his team made an impact.

Vygotsky and His Project

A more romantic figure than Lev Vygotsky could hardly be imagined. A prodigy, writing treatises on Hamlet and art when still an adolescent, but also a discriminated Jew from the Pale in need of luck to get into higher education, Vygotsky became a teacher of the debilitated and developed educational ideas so progressive that he was headhunted to the Psychological Institute in Moscow. Here with Alexander Luria as co-worker and Alexei Leontiev as assistant, he devised a program to bring back order to a psychology in deep and never-ending crisis.

Vygotsky, the Marxist, recommended that Marx's example was followed. He writes: "The whole of Capital is written according to the following method: Marx analyzes a single living 'cell' of capitalist society—for example, the nature of value. Within this cell, he discovers the structure of the entire system and all of its economic institutions." Then he adds "Anyone who could discover what a 'psychological' cell is—the mechanism producing even a single response—would thereby find the key to psychology as a whole."[5]

Beginning with Robert Hooke's discovery of the cell in 1665, the importance of such "cells" has been proven again and again in the history of science; just think of how the discovery of the covalent bond revolutionized chemistry. With such a hub in place, you could move; without, you were struggling, might even come to fear, like Koch and Leary, that your field did not contain any such central figure.

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[3]Fukuyama (1992).

[4]Marx and Engels (1848).

[5]Vygotsky (1978, p. 8).

So what did Vygotsky suggests the matrix of psychology should be? With reference to Wolfgang Goethe's *Faust*, in which the Bible's *In the beginning was the word* was daringly replaced with the—Faustian—*In the beginning was the deed*, Leontiev smartly sums up Vygotsky's view with this line: *"In the beginning was the act (practical activity), which became mediated by the word."*[6] In other words, Vygotsky's cell was a double-cell, *activity* and *word*. This combination, Pico's and Erasmus' freedom of action enlightened by learning, had been the template of every Enlightenment event in history, and Vygotsky could have picked it up from either the Humanists or from Marx, who shared it.

Vygotsky had made great strides in the rehabilitation of the debilitated using this template, but as it could equally well be applied as a general model for every kind of *psycho-genesis*, development of mind, an extensive program was facing Vygotsky and his group. Following Vygotsky's lead and spurred on by his revolutionary fervor and feverish urgency (Vygotsky was succumbing to tuberculosis), his team went to work. Luria traveled to Uzbekistan to study the cultural-historical psycho-genesis at work as literacy campaigns and collectivization transformed the traditional mind-sets of nomads and peasants[7]; and later he applied the template in famous studies in neuropsychology.[8] Leontiev took up *psycho-phylogenesis*, the study of the development of mind in evolution, and that is our ticket here.

Divergent Paths

That the word—logos, language, reason—is the attribute that makes the human being exceptional, the Enlightenment thinkers never tired of emphasizing. Karl Marx agreed, as did Vygotsky, who saw "the second signal system" as the defining difference between Pavlov's dogs and us. He wrote "The behavior of humans is unique because they create artificial signal stimuli—above all, the grandiose signalistics of speech."[9] In other words, where animals have only natural *signals* to guide them, humans have culturally originated *signs*.

Leontiev did not disagree, but the illustrious *word* was, of course, only the last and final episode in the evolutionary story of mind. For most of the long evolutionary stretch there were no humans, only wordless animals, and Leontiev had only the *activity* part of the template to work with. So when his team mates produced *cultural-historical* studies, Leontiev could only make *activity theory* (AT). This side tracking, if that it was, was to have consequences.

The alleged fall out between Leontiev and Vygotsky toward the end of Vygotsky's life—Vygotsky being charged with over-emphasizing the semiotic—is

[6]Leontiev (1997, p. 25).
[7]Luria (1976).
[8]Luria (1966).
[9]In Wertsch (1985, p. 90).

disputed[10] and may be just a misinterpretation. There was a crack in the building, nevertheless. When in the 1970s—not least thanks to the untiring efforts of American UCSD professor Michael Cole and his Finnish helper Yrjo Engeström—the *Cultural-historical Activity theory* school (CHAT) evolved into a broad international movement with extensive networking, national chapters in the Americas and Europe, and international congresses, it slowly became apparent that the cultural-historical approach (CH) and AT were diverging propositions.

It may not have happened everywhere, but in Denmark, this branching led to radically opposed positions and traumatic debates. As fashionable Marxist psychology had been in the 1970s, as unfashionable it became after the implosion of the Soviet Union in the 1990s. But it now proved that CH was better preadapted to the new historical winds than AT. With its emphasis on the word's decisive social influence, many found the slide to Ludwig Wittgenstein's language games easy, and from here there was only a small step to Social Constructionism, which claims that all knowledge is socially constructed, subjective, and relative. It is, of course, everything a person does is done from a position and a perspective. Implied in Social Constructionism is, however, that if knowledge is subjective, *it cannot be objective;* that is, matter-of-factly, about the world, as it is on its own.

Subjective and objective are opposing terms, but that they are also mutually exclusive is a fallacy belonging to the class room and easily refuted in science as well as everyday life; like Hooke's eye in the microscope did not void the reality of the cell, he was first to see, the mother's caring touch does not void the reality of the baby's fever. The fallacy is particular dangerous to the science of psychology since obviously you cannot have a special science of psychology if *everything* is psychological and *only* psychological; if it is to be *explanandum* and not merely *explanans*,[11] psychology must have roots and causes in a non-psychological world.

Kant, in fact, drew exactly this conclusion; when he decided that we cannot access the world as it is on its own, it was bye, bye to psychology as science. Others drew that conclusion too. When co-chairing with Jens Mammen—a leader of the 1968 student rebellion—a session titled "Problems in Defining the Units of Analysis in Psychology" at The Fourth International Congress on Research on AT in 1998, we were much taken aback when a vociferous group in the audience insisted that there was no such thing as psychology, that the world had moved on from that illusion.

The culture-crowd was not alone in this verdict, unfortunately. It was shared by many natural scientists, their opposite number in the antagonistic two-cultures world famously described by Snow. Psychology, embodying meaning and cause both, must span both these worlds, the world of culture and the world of natural science, but though natural enemies, the culture people and the natural science people could gleefully agree to demolish that bridge. Same year as we were bowled over by the psychology deniers, the famous neuroscientist, Michael Gazzaniga

[10]Leontiev and Leontiev (2003).

[11]That which is *to be explained* and not merely that which *explains*.

boldly declared "Psychology itself is dead." Then smugly added "The odd thing is that everyone but its practitioners knows about the death of psychology."[12] Caught in the vise between Social Constructivism and Brain Science, it seemed that the Crisis of psychology had become terminal.

Words can create what they name, but "the death of psychology" was off the chart. The domain cannot be talked away, not because of gullible practitioners, but because of the realities on the ground. Still the mighty twin waves of Social Constructionism and Brain Science had nearly overwhelmed the field and confirmed the Medieval Frisian Spade-land Law: "He who will not dike must take a hike." A general psychology was seriously needed. In Denmark, it became a project.

The General Psychology Project

In a state of transition after 1968, Danish university psychology had been ready to embrace CHAT, and in the following decades—as recently told by Jens Mammen[13]—the Danish chapter not only managed to hold reasonably together but also to produce a number of very productive research lines in developmental and educational psychology, in social and cultural psychology, in so-called critical psychology, and—a novelty which was to have an international impact—in HCI, human–computer interaction. It also had a line in general psychology, which had taken its cue from Leontiev. The key text was Leontiev's *Outline of the Evolution of the Psyche*, part of his doctoral dissertation in 1940, and published in English in 1981 together with other selected papers in *Problems in the development of mind.*[14] Electing as his 'cell' the subject's practical *activity* toward its object (S → O), and introducing the concept of *operation*—the equivalent to Marx's cherished *tool*—for the choice of approach to the activity goal, Leontiev uses this unit as a building block to systematically and very elegantly outline an evolutionary series of activity formations with their associated forms of cognition, thus linking activity and epistemics (Fig. 3.1).

First, in simple animals, *simple activity* with no choice of operation, to which corresponds the ability to sense: *Sentience*. Second, in terrestrial animals, *operational activity*, with the choice of parallel courses toward the goal, and the overview required to choose: *Perception.* Third, in higher animals (*i.e.,* Wolfgang Köhler's clever chimps), *intellectual activity*, in which two different operations are combined in a series, the first preparing the way for the second, and the ability to hold this together: *Insight.* Finally, in human beings, the *specific human activity* in which

[12]Gazzaniga (1998, pp. xi–xii).

[13]Mammen and Mironenko (2015).

[14]Leontiev (1981).

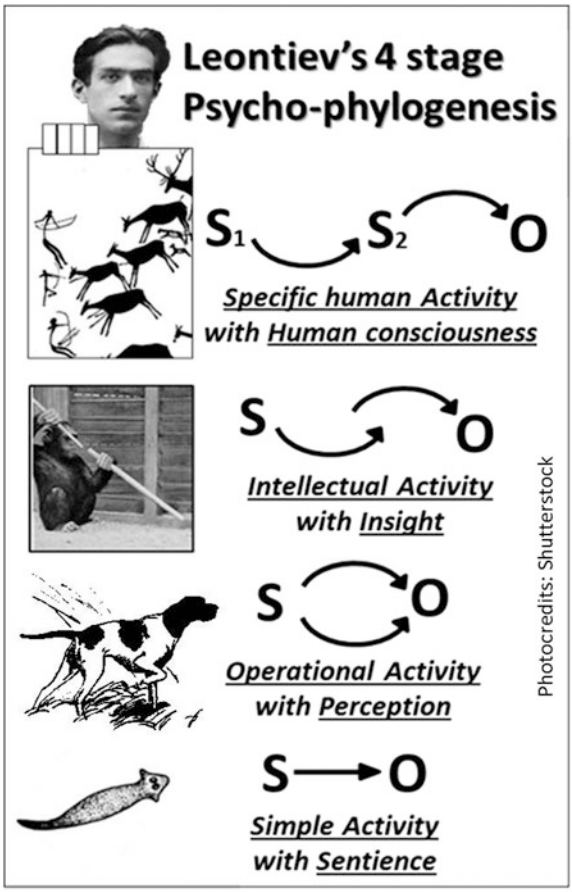

Fig. 3.1 Leontiev's 4 stage psycho-phylogenesis

intellectual activity is socialized and turned into cooperative work with a division of labor, and the ability of the participants to understand their role in the whole: *Human consciousness.* In other words, following progressively more complex types of activity in evolution were progressively more complex types of cognition: Sentience, Perception, Insight, and Human consciousness.

Spanning the whole psychological range from the simplest animal life of the behaviorists to the highest human achievements of the humanists, Leontiev's Outline is obviously a general psychology. Was Leontiev catching up with Aristotle? If you compare his four-stage model with Aristotle's four-level taxonomy in Fig. 3.2, it certainly seemed so.

First, and most importantly, both anchor their general psychology in an evolutionary sequence. Aristotle did not have evolution in mind, of course, evolution was first put forward as a scientific theory by Jean Baptiste Lamarck in 1809, but today

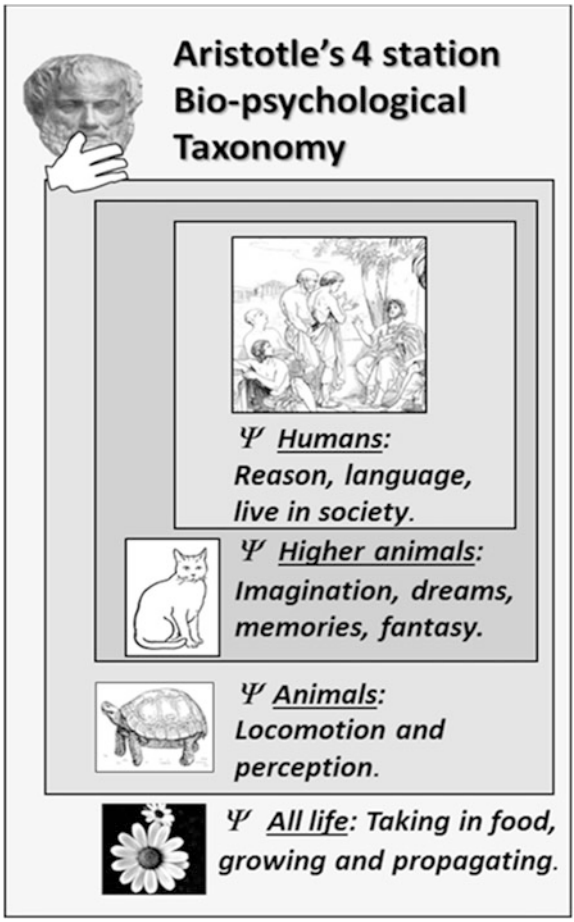

Fig. 3.2 Aristotle's 4 station bio-psychological taxonomy

his taxonomy is immediately recognizable as an evolutionary sequence. Herbert Spencer, who in his *Psychology* from 1855 was first to link a systematic general psychology with evolution and psycho-genesis, famously stated "Mind can be understood only by showing how mind is evolved."[15] It should be considered statutory for general psychology.

General psychology is all about outline and frame; it is not meant to fill in for the specific fields of psychology. Its task is not to lay the whole jigsaw puzzle but only to get the four corners right, which, as every aficionado knows, is the key to solving

[15]Spencer (1870, p. 291).

the puzzle. Aristotle's and Leontiev's four stations serve to do exactly that. Furthermore, they are in much agreement.

Their fourth stations are identical; Aristotle defining the human being as a language-using animal with reason (*zoon logon echon*) living in society (*zoon politikon*); Leontiev defining the human being as a cooperative social being with language and a specific human consciousness. Their third stations are much alike, Leontiev pointing to the faculty of insight, Aristotle to that of imagination. Their second stations are also nearly the same, only the first stations differ markedly. Aristotle did not distinguish between biology and psychology and identified his 'psyches' with basic life functions, ends as much as means. For Leontiev, on the contrary, psychology was dedicated to the epistemic functions, his 'operations' being basically tools to navigate the world, means rather than ends.

It was when studying—and teaching—Leontiev's work, I came to appreciate the inherent value of Aristotle's taxonomy, which, highlighted by Leontiev's work, seemed much clearer and evident.[16] In turn, Aristotle's imposing bio-psychology corroborated the virtues of Leontiev's psycho-genesis. Like the can opener explains the can, and the can the can opener, the two models validated each other. So alike, and still different, the two views begged to be fused into a composite that combined Leontiev's sharp and systematic epistemics with Aristotle's biological substantiality. This became my project,[17] and eventually resulted in the general psychology that it is this book's aim to present.

The general psychology (Fig. 3.3) defines four epistemic subdomains, which together constitute the domain of psychology: *Sentience*, *intentionality, mind*, and *human consciousness*. The subdomains represent a psycho-genetic sequence, and, except for the first, are nearly identical to Aristotle's levels and Leontiev's stages, only more elaborate, and (hopefully) better explained.

The key to the explanation of *human consciousness* comes from Leontiev, who hardly could have gotten any closer without actually getting it right, but the explanation also fully answers to Aristotle's identification of the human being as a 'zoon logon echon' and a 'zoon politikon.' Aristotle's 'dream and imagination' reach deeper than Leontiev's 'insight' and are the key to the explanation of *mind.* The explanation of *intentionality* is as Aristotelian as it could possibly be, and even if *sentience* is not placed with the living being by Aristotle, his definition of the living being is precise and lays the naturalist foundation for the whole

[16]I am not an Aristotle scholar. The ideas Aristotle's work evoked, rather than what he precisely said and meant, have been my guide. This, of course, is the usual way great works have been received and made the base of progress when built upon by subsequent generations, they fall victim to interpretation, construal, and free associations.

[17]Engelsted (1980).

Fig. 3.3 The 4 subdomains of general psychology

psychological edifice. All in all, the resulting general psychology was nearer Aristotle, but it could not have been arrived at without the can opener.

The four subdomains constitute the four corners of the puzzle of psychology, which we shall attempt to construe in the following.

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Part II
General Psychology—The Four Corners of the Puzzle

Chapter 4
Sentience

Abstract This chapter describes sentience, or sensory awareness, as the first subdomain of psychology. Its unique features—secondary sense qualities, raw feel, and the brief temporality of presence among them—lead to speculations that sentience is primordial and a property of living cells long before the evolution of nervous systems. With reference to the early evolution of life forms, it is argued that nervous systems do not produce sentience, but merely process it. It is also argued that the final explanation of sentience is probably to be found in the world of quantum mechanics, which leads to the admission that it is an understatement when philosophers have called sentience the hard problem.

The Hard Problem

Sentience is the ability to sense and have sensuous awareness. Sensuous awareness is an *awareness of presence* and must not be confused with *awareness of an object* as in *intentionality*, or *awareness of an event* as in *mind*, or *self-awareness* as in *human consciousness*. Omnipresent and weird, sentience is better captured in Madame de Staël's romantic poetry than in the language of science. To this day, in fact, it has made a mockery of science; it is an understatement when philosophers have called its strange subjective feel and its 'qualia'—Locke's secondary qualities, Galileo's "tastes, odours, colours," Hobbes' "great deception"—for 'the hard problem.' While intentionality, mind, and human consciousness are solvable cases, sentience is an intractable mystery. Consider, therefore, the following take a speculative and loose-handed attempt to place and ring in the phenomenon.

In a famous essay, the philosopher Thomas Nagel said that it must be like something to be a bat.[1] Indeed it must; anything else would be unreasonable. Having spent many hundred hours doing experimental work training planarians, the first animal with nerves, to me it seems equally evident that it must be like something to be this little invertebrate. From long acquaintance, Herbert Spencer

[1]Nagel (1974).

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Jennings, the pioneering American invertebrate zoologist, willingly extended the same courtesy to the amoeba and the paramecium, which can sense and follow a stimulus trace, as well as can a dog, so-called taxis.[2] If you continue down from the protozoa to bacteria, the first life form, *E. coli* has taxis too, and you are given a choice. Either to call the whole exercise a *reductio ad absurdum* and look for a cutting off point somewhere before or after the bat, or to accept sentience as an inherent property of all living cells. I choose the latter for the following reason.

To sense is to sense movement and change while it is actually happening, which means that sentience comes with a measure of duration. The individual sensory experience lingers for a short time,[3] leaving us in the phenomenological bubble called *the present moment* or *now,* and then passes to be replaced by new experiences in what William James called the stream of consciousness. With this—as much a mystery as qualia—the land of Parmenides and Zeno meets the nether world of atomic physics. Until Leibniz and Newton in the seventeenth century invented calculus, mathematicians did not know how to represent movement. Confined to a theoretical world of stills, the Greek philosophers reasoned that movement implies being at two different places at the same time, which they declared contradictory and therefore impossible. In other words, the senses are lying and best not listened to; an advice generations of Greek philosophers subsequently followed.

Our ability to turn stills into continuous movement is well known from the flow of the separate frames in movie watching. Apparent motion it is called, and it was the 'discovery' and study of apparent motion, which in 1912 launched the Berliner *Gestalt psychology*. A fancy name being more important than anything, the three publicity savvy founders—Max Wertheimer, Wolfgang Köhler, and Kurt Koffka—called it *the phi-phenomenon*. But how was it created? Not by summing up the parts to form wholes, they insisted, because the whole—the Gestalt—is more than the sum of its parts. Having studied under the physicist Max Planck at Humboldt University in Berlin, Köhler speculated that the created wholes were linked to physical *fields* in the brain, and though contemporary experimentation was unable to confirm this, the idea was inspired, so is the calling in of Planck, the father of quantum physics.

The surprising and very eerie discovery of quantum physics is that reality at the bottom of things is simultaneously discrete and continuous, particular and wavelike, and that things can be at different places at the same time. Thus refuted by physical reality, the ancient Greek thinkers could be excused, though, for that reality, is truly bizarre. You could "safely say that nobody understands quantum mechanics,"[4] the Nobel Laureate physicist Richard Feynman admitted, to which his equally richly awarded fellow physicist Roger Penrose added "that it makes

[2]"The writer is thoroughly convinced, after long study of the behavior of this organism, that if Amoeba were a large animal, so as to come within the everyday experience of human beings, its behavior would at once call forth the attribution to it of states of pleasure and pain, of hunger, desire, and the like, on precisely the same basis as we attribute these things to the dog." (Jennings 1906, p. 336).

[3]About 500 ms in our case.

[4]Feynman (1965).

absolutely no sense."[5] But maybe it does make sense, literally! Sensory awareness is a weird conundrum; quantum mechanics is too, so perhaps the latter holds the key to the first? The idea is irresistible, and Penrose jumped at it. Arguing that consciousness is fundamentally non-algorithmic and cannot therefore be the result of mental calculation, he suggested it is produced by quantum wave reduction at the smallest biological level. He also was given a seat for this quantum wizardry when next the anaesthesiologist Stuart Hameroff proposed microtubules as the 'valves' of consciousness and unconsciousness.[6] As microtubules are tiny tubular polymers found in eukaryotic cells and some bacteria, the Penrose–Hameroff theory[7] reinforces our notion that sentience is an inherent property of all living cells. Whether it holds up or not, I personally have no doubt that their theory is pointing in the right direction.

Sounding a bit too strange to many, their first choice would be rather to start sentience at the time in evolution when *sense organs* evolved. A.N. Leontiev pursued this course and tried to demonstrate how a process similar to classical conditioning would coax skin cells into becoming stimulus-sensitive and qualia-producing spots.[8] If you read his lengthy account, you will admire the brave attempt, only it had two flaws. First, classical conditioning, like natural selection, can only advantageously shape or combine what is already there, not create *ex novo*. Second, sensation does not require the existence of special sensory cells; it is a fact of biology that free-living unicellular organisms have a sensory capacity. The story of the sense organs must be a different one.

Life's Deep Beginning

Our planet was formed 4.6 billion years ago, and the first life evolved not more than half a billion years after; still it took another 3.4 billion years for large and complex multicellular organisms to evolve, jellies, sponges, and sea anemones, for instance. The challenges must have been great and many, among them how to make a multitude of cells perform as one organism, especially if each cell came with a mind of its own. Like in any other historical society, the final solution proved to be a division of labour and centralized control. Thus at the upper end of evolution, we find animals with their cells organized to do special jobs. At the top, a command

[5]Penrose (1986).

[6]The term *consciousness* invites confusion, when it refers to both *the opposite of unconsciousness* and *the specific human awareness*. Commonly it has led to the false belief that nonhuman animals are unconscious. To avoid that mistake, we here call the first *sentience* and the second *human consciousness*.

[7]Hameroff and Penrose (2014). http://www.ncbi.nlm.nih.gov/pubmed/24070914.

[8]Leontiev (1981, pp. 1–114).

post brain with privileged access and a right to rule, served by sense organs with permission to speak, and muscle cells to do the hard lifting, all connected by nerve cells to keep in and channel sentience. In their assigned provinces, the individual cells can still have private lives of their own as long as they faithfully do their chores and are discrete. If not, they are hunted down and killed by special cellular SWAT teams. In this understanding, in other words, sentience is *not produced, only processed* by the brain and its nerves. How this is done adds still another mystery to the case, of course.

Before the bodily version of Plato's Republic was finally in place, hundreds of millions of years had passed, so what did the large cellular communities do until then? Liking the brain to "a conductor coordinating a group of players in the orchestra," Francis Crick (of DNA-code fame) and Christof Koch had this to say: "Without the conductor, the players can still play but they fall increasingly out of synchrony with each other. The result is a cacophony of sounds."[9] So prior to the regimentation of brains and nervous systems, large multicellular communities would be cacophonic, but does that necessarily entail asynchronicity and chaos? It may, if you are a nerve man, but not if you are a field man, like Köhler. When communication calls for something faster than the dispersal of chemicals between members, could not overlapping sentience fields achieve the necessary synchronization, nearly instantaneous, too? Of course, they could, if they exist. Since we do not know, let us just take it another step.

If there is any reality to parapsychological phenomena, they are rooted in the nether world of physics where our ordinary order of time and space is not obeyed. It is merely a coincidence, of course, that the wave function in quantum mechanics and the unknown factor in parapsychology are both named *psi* and symbolized with the Greek letter ψ; still, coincidence could be unto something. Maybe *psi* and *psi* are siblings, and *phi* a close cousin; maybe cells in large cell assemblies—sponges and plant communities, for instance—can communicate and synchronize by some sort of telepathy. Piped down when sentience was pipe laid in nerves, this ability has been lost to the higher animals and us, but who knows, it may have been retained by our individual cells and show itself on occasion.

This is crazy stuff, obviously, but the crazier the better for two reasons: First, to emphasize how deep and strange a mystery we have on our hands; and second, to admit that we do not have a clue. Of course it is a comedown to open our four-cornered general psychology with such a shortcoming. Then again, if the physicists can live with ninety percent of the universe being unexplained *dark* matter, we can surely endure a single *dark* corner. If you hesitate, we have this tempting alternative: To hand over the subdomain of sentience to a separate science of *psycho-physics* and to future discoveries in physics and start psychology proper with the subdomain of intentionality.

[9]Crick and Koch (2005).

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Chapter 5
Intentionality

Abstract This chapter, following Franz Brentano, defines intentionality as the essential feature of the psychological, and, following Immanuel Kant, an a priori temporal–spatial format. It is argued, against Kant, that the format can be placed in the extra-mental world by making it a corollary to the second law of thermodynamics. Living beings can only exist under this law if they are regularly sustained by an outside source of energy, food in the case of animals, and it is argued that the self-initiated locomotion toward this food brings the format of intentionality into existence. It is further shown how locomotion through the interspace between organism and goal passes through four distinct phases, each of which has been the focus of a major field of psychology.

Anchoring Intentionality in the World

For Franz Brentano, psychology began with intentionality.[1] For William James too; in the American's seminal *Principles of Psychology* he wrote "The pursuance of future ends and the choice of means for their attainment are thus the mark and criterion of the presence of mentality in a phenomenon."[2] But if intentionality marks the crux of psychology, it involves a mystery too, only this one can be solved with present means.

Leontiev introduces distance perception at this stage in animal evolution; that is, Locke's primary qualities. This is not wrong; but lest the nerve of Berkeley, the analytical solemnity of Hume, and the intellectual courage of Kant be in vain, neither is it possible without a priori immanent objectivity. That is, the framework of time, space, and objects must be in place on beforehand and cannot be induced by the senses on their own.

Leontiev wavers. On the one hand, he agrees "that the concept of its object is already implicitly contained in the very concept of activity," and "the expression

[1]See Engelsted (1989).
[2]James (1890, p. 8).

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'objectless activity' is devoid of any meaning."[3] On the other, he remains loyal to Sechenov, and everybody else since Galileo, and insists that reactivity must precede activity: "All activity has a circular structure: initial afferentiation → effector processes regulating contacts with objective environment → corrections and enrichment by means of reverse connections of the original afferent image."[4] Or in plain English, activity is the active exploration of the source of stimulation, which initiated the event. But while this stimulus-induced activity is a step up from the mere orienting reflex, it is still a response to stimulation and does not solve the philosophers' problem.

The solution requires two steps: First, to accept as valid Kant's Copernican reversal of *mind-in-the-world* (A) into the opposite *world-in-the-mind* (non-A); and then, to reverse the reversal and bring the a priori world-in-the-mind back into the physical world (non-non-A), but with the immanent objectivity intact.

The A → non-A → non-non-A sequence is called the *negation of the negation*. Already an old idea among Jewish scholars—*omnis determinatio est negatio*, Baruch Spinoza famously said[5]—it was developed by Fichte as a reaction to Kant, and exploited to the hilt by Hegel as the principal dialectical vehicle by which new knowledge was gained and consciousness born through contradictions.[6]

Immanent objectivity in the natural world outside the mind certainly seems like a contradiction. Is it at all possible? It is, in fact, it could be called a corollary to a law of physics even more fundamental than the mechanics of Galileo. Namely, *the second law of thermodynamics*, which states that energy must disperse in the universe, and order become disorder (*entropy*), and that local pockets of order can persist over any length of time only if they are fed energy from outside the pocket.

The organism is such a pocket of complex order and entirely dependent on an outside energy source for its continued existence. It follows therefore (Fig. 5.1) that *the smallest natural unit of life*—the living being—is an organism *and its energy source;* and, consequently, that *the smallest natural unit of animal life* is an animal *and its food*. They belong together as an inseparable set, the primordial subject and object, and make immanent objectivity defining of the living being, and food the original Aristotelian telos; or, as the Greek says himself, nutrition is "the first and most common capacity of soul, in virtue of which life belongs to all living things."[7]

In other words, to understand life, your unit must have two centers, the subject *and the object*. You could call this the Keplerian turn on Kant's Copernican revolution. Like Copernicus' heliocentric model was correct, but still not right until

[3]Leontiev (1978, p. 52).

[4]Ibid., p. 53.

[5]Every determination is negation. Spinoza's letter of June 2, 1674 to his friend Jarig Jelles.

[6]In Chap. 11 we shall use the double negation to explain the arrival of the human consciousness, but here an everyday example should provide the gist of how negation and contradiction can serve as development. When your unmarried stand (A) is negated, you become married (non-A), but if your married stand is negated, you do not simply become unmarried again (A), you become divorced (non-non-A), which is something entirely different. Even when negated, the intermediate stage stays, as divorced people will happily tell you.

[7]Aristotle, *De Anima* ii, 4, 415a24–25.

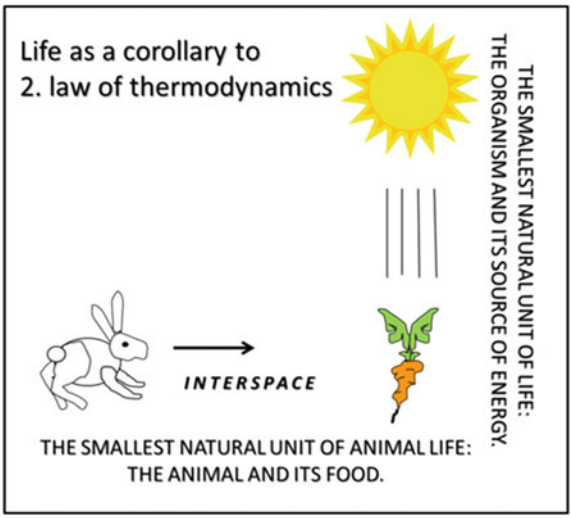

Fig. 5.1 Life as a corollary to second law of thermodynamics

Kepler added another center to make the Earth's orbit elliptical, Kant's immanent objectivity notion is correct, but still not right until a real object is added as the second center to confront the subject.

Two Defining Paradigms: Dash and Slash

While animal and food are inherently (or bio-logically) inseparable, in real life, they become separated all the time. Now you have the pudding, and now it is gone. It is here *locomotion*, the second defining feature of the animal being, enters the equation. All animals are able to move spontaneously, i.e., under their own power and volition, and this enables them to re-connect with food, when contact has been lost.

Locomotion requires an investment of energy, as does the sprouting of light-capturing leaves in plants. Life can therefore be defined as *the investment of energy to gain more energy*, which again can be invested and so forth.[8] As the subject *by virtue of the whole setup* is directed toward the object (S → O), locomotion is activity and intentionality, and with the object out of sensuous contact, it is a priori and immanent objectivity. As the subject and object find themselves separated, the immanent objectivity must take on the dimensions of locomotion, that is, the traversing of spatial distance and temporal duration, in other words, the time and space dimensions in Kant's a priori matrix of intuition. *Sentience* brought *the present moment* or *Now* into being; *intentionality* brings *the future* into being.

[8]If you write the sequence as *E-Activity-E'*, a Marxist will recognize the structural similarly with the *M-C-M'* of capitalist production. It is no accident. Capitalism is the life algorithm taking on a life of its own like the broom in the story of the Wizard's Apprentice.

This gives intentionality the double meaning of immanent objectivity and future direction, and the Aristotelian activities their so-called teleological character.

"Not to explain but to accept the psychological phenomena - that is what is so difficult," said Ludwig Wittgenstein, and though not a favorite of mine, he is right here.[9] But if you for a moment can suspend the imparted mind-set of empirical RT psychology and accept the explanation, the pieces of the puzzle fall into place. You will even get a better understanding of RT psychology and its important place in the scheme of general psychology.

The solution leaves us with two setups, *dash-psychology* (S–O), where a dash connects subject to object, and *slash-psychology* (S/O), where a slash keeps them apart. In the first, the subject and object are connected *and separated* by an *interspace*, in the latter by an *interface*. The interface connection is causal and physical and based on *local motion*; the interspace connection is intentional and non-physical, and based on *locomotion*, as explained above.

As the vital connection to food defines the first interspace, and the organism–food link constitutes the basic element of the ecology, the connection can be called *ecological.* The interface connection can then be called *environmental* as it concerns the forces impinging on the surface of the organism. The distinction between ecology and environment is important and useful, though often confused.[10] *Ecology* is what sustains us. *Environment* is what surrounds us. It is not the same.

While RT psychology ($s \rightarrow r$) and interface psychology (S/O) are obviously the same, AT (S → O) must be founded in interspace psychology (S—O) and intentionality. Only this AT foundation must not serve to expel RT from the class; rather it must caringly instruct the bully in his proper place and thus secure the general peace, Bühler's general psychology.

The Interspace Passage

You cannot have AT without RT, only RT must be subordinate to AT rather than the opposite as presently taught. This follows from the passage through interspace, which has four clearly distinguishable stages as shown in Fig. 5.2.

In the first stage (*Search*), with the object out of touch and out of view, and the subject setting out into the blue, the object takes the form of a pure *existence* claim: "There is food to be found out there in time and space." Obviously *uncertainty* reigns, but the animal must take the existential plunge (S → O).

[9]Wittgenstein (1980, #509).

[10]James Gibson's ecological psychology, for instance, is basically an environmental psychology, where the term ecology is mainly reserved for the title, while the term environment is used throughout the text.

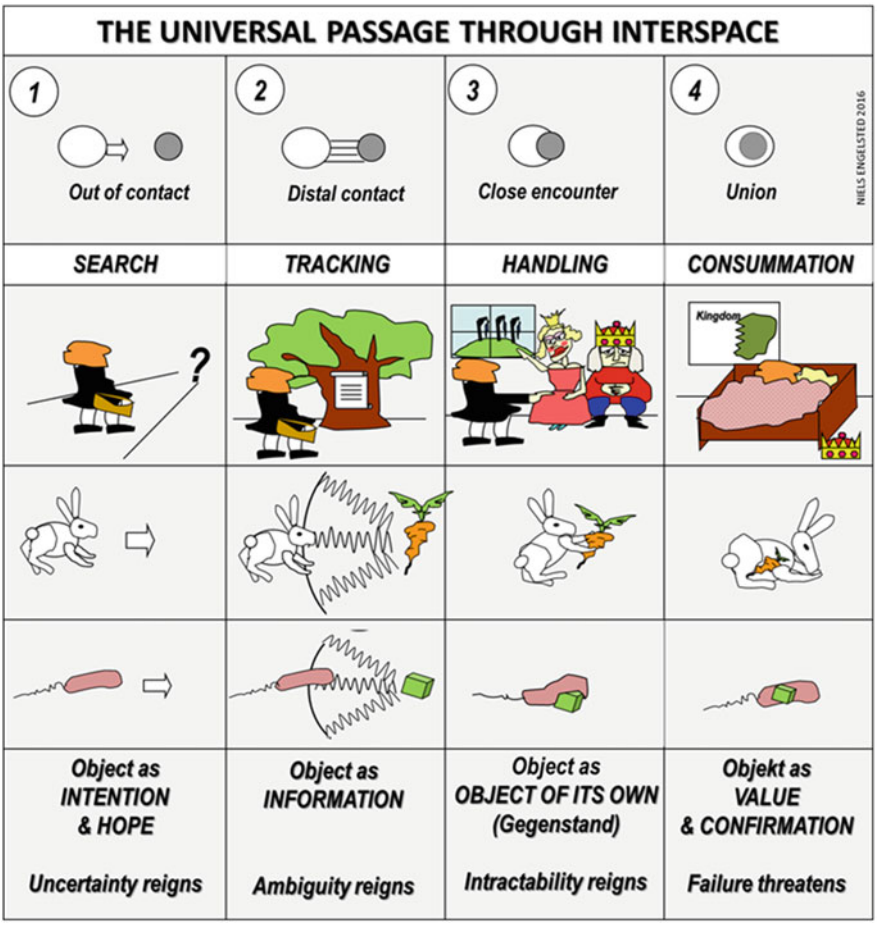

Fig. 5.2 The universal passage through interspace

Thus, as inherent in the activity itself, the concepts of hope and belief are brought into the world.[11]

With any luck, locomotion brings the animal into contact with distant traces emanating from the object, be they chemical, electro-magnetic, or mechanical, and it enters the second stage (*Tracking*). Here the object takes the form of *information.* Gregory Bateson sometimes defined information as the answer you get to a question. This definition is appropriate here with locomotion serving as the question that

[11]E.C. Tolman in his Purposive Behaviorism convincingly argues that the basic psychological concepts are grounded in patterns of behavior before they become mental and not the other way around.

frames the input much like Kant's a priori bottle did. Fed into the programs of the stimulus-response apparatus ($s \rightarrow r$), the information, if correctly read—*ambiguity* reigns—will steer the animal toward the object.

When this taxis, as it is called, eventually brings the animal in direct tangible contact with the object, it enters the third stage (*Handling*). Here the object takes the form of a numerical identical *thing* with the ability to stand up against the subject (*Gegenstand*) and offer resistance.

If the resistance is overcome—*intractability* reigns—the animal enters the final stage (*Consummation*), where the object takes the form of *confirmation* and *value*, and while every successful stage transition is reinforcing in itself, it is here the whole sequence receives its final validation, satisfaction, and disappointment equally possible.

Observe how major fields of psychology have each taken their own piece of this pie: Existential psychology, the searching first; cognitive psychology, the informing second; behaviorism, the handling third; and humanistic psychology, the self-congratulating fourth. Existential and humanistic psychology are, of course, traditionally reserved for humans able to talk with themselves, but *the logic* of the hopeful (and risky) plunge, and its subsequent validation, resides in the activity itself prior to any conscious reflection and is shared throughout the animal kingdom.

If we call this logic spanning the beginning and end of the epic interspace passage for the *psycho-logic*, the two intermediate steps in the basket, tracking and handling, could be called the *psycho-logistics,* as they deal with the ways and means of accomplishing the already given project. The majority of psychology has been about psycho-logistics. As long as you do not lose sight of the psycho-logic, this is reasonable. While the beginning and end from the first animal life have remained the unchanged premises, it is the logistics stages that have developed and undergone change, often tremendous, worked upon by natural selection in evolution, and thereafter by human culture, design, and engineering. Nature—and today human ingenuity—has been on the constant look out for more efficient algorithms to connect the premises, you might say, and quite appropriately, as the logistic stages are where RT rules and algorithms are applicable.

Modern psychology began with Fechner's equation, and German cognitive psychology thereafter ruled for a long time until overtaken by American behaviorism. Cognitive psychology is straight RT; behaviorism can be, as for instance Watson's chain-reflex behaviorism ($s \rightarrow r$) based on Pavlov's classical conditioning. But often behaviorism integrates AT also, as, for instance, in William McDougall's early—"*the healthy animal is up and doing*"— behaviorism, and in Tolman's purposive behaviorism. In B.F. Skinner's operant conditioning behaviorism, the latest arrival, the scheme is, in fact, demonstrably the same as the one argued here, as the *operant* is the animal's spontaneous activity *prior to* its meeting with the stimulus that will steer its behavior toward the goal. Or, put one–two–three simple: (1) AT, the operant; (2) RT, the stimulus; and (3) AT&RT, the handling response.

Skinner's operant behaviorism triumphed for a while, but then he also became guilty of the grievous fault of overgeneralizing and when trying to explain language was easily slain by the cognitivist Noam Chomsky. Hereafter—and with the explosive development in computer science probably inescapable—American cognitive psychology, and thus RT, has ruled supreme.

Psychology was never in more dire straits. Like Galilean science, cognitive psychology has been a great success, and you cannot argue against it within its own bounds, neither would you want to. However, staying within these bounds, cognitive psychology is blind to the psycho-logic, and as RT—like in a variation of Gresham's Law—drives out AT, psychology is soon reduced to brain-science and cybernetics. Tellingly, the enterprise has been rebranded as *cognitive science*; psychology proper has been turned out and a different science has taken its place. This, of course, explains why partisans from humanistic and existential psychology have kept sniping at cognitive science.

Soldiers of cognitive science have returned fire with a vengeance and they have a big gun: mathematics. As we do here, the tender minded humanists employ ordinary descriptive language in their argumentation, which their tough-minded opponents think is entirely inadequate and wishy washy; terms like 'philosophy' are even used. What they demand is the rigor of mathematics, without which, as Galileo said above, it "is humanly impossible to understand a single word," and "one is wandering about in a dark labyrinth."

Most humanists buckle under this attack; but it is not really true that the existential realities are beyond mathematical description; only it requires an existential mathematics and not only the traditional rule-bound one. One such is found in the fundamental *axiom of choice*, which has caused the mathematicians some anxiety. "It is not altogether uncontroversial that the axiom of choice should be accepted as something that is universally valid… The trouble with this axiom is that it is a pure 'existence' assertion, without any hint of a rule," Roger Penrose writes.[12] Exactly!

Existence and rule is the same fundamental distinction as we have here made between interspace AT and interface RT. The intimate correspondence between mathematical description and the physical order, which never fails to amaze, has its counterpart in a similar correspondence with the psychological order!

To discover and unfold the axiom of choice as the mathematical gateway to a true psychology is a feat comparable to Fechner's, when he discovered the gate between the physical and the psychical, and should have a similar impact on the future of psychology. The discovery and its unfolding in a rigorous mathematical topology was made and first presented by the Danish psychologist Jens Mammen in 1983.[13]

[12]Penrose (2004, p. 366).

[13]See Mammen (1983, 2016).

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Chapter 6
Mind

Abstract This chapter defines mind as a subdomain and internalized posting of the psychological and makes it a specific and defining feature of the mammal. It is argued that mind as a faculty of emotion, memory, and representation, and anchored in the limbic system, has evolved from REM sleep in the early evolution of the mammalian brain. The name-giving feature of the mammal is the breast-feeding of its off-spring, and it is described how this reproductive mode is the end-result of an evolutionary trend from a quantitative reproductive strategy (safety in numbers) to a qualitative (safety in extended care). Finally it is described how the unique mammalian features form a complex and place the mammals in their own distinctive life-world.

From Theatre to Computer

If you found *sentience* and *intentionality* to be stressful subjects, *mind*, the next evolutionary subdomain, should come as a relief. It simply means what it has always meant to English speakers, or at least has since the days of the first British Empiricists. Namely, a receptacle inside the head, fed with sensory input from the outside, in which impressions, emotions, and thoughts reside. David Hume, co-owner of a theatre in Edinburgh, said it perhaps best: "The mind is a kind of theatre, where several perceptions successively make their appearance; pass, repass, glide away and mingle in an infinite variety of postures and situations."[1] A theatre is exactly what the mind is, complete with front stage, stage lightening, curtains, backstage, wardrobes with costumes of the wildest variety, cellars with old sceneries and props, and lofts with trunks full of scripts and old screen plays that can be replayed again and again and reworked over and over, a place of memories, imagination, and dreams.

When Aristotle said that higher animals—a step above simple animals on his psyche-ladder—have imagination and nocturnal dreams,[2] it would be *mind* he was

[1]Hume (1739, Book I, Part 4, Section 6).

[2]"Imagination is that in which an image arises for us…Imagination takes place in the absence of [sensation], as e.g. in dreams … If actual imagination and actual sensation were the same, imagination would be found in all the brutes: this is held not to be the case; e.g. it is not found in ants or bees or grubs." Aristotle, *De Anima*, iii, 3.

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talking about. In his evolutionary AT scheme Leontiev identified this stage with intellectual activity and insight, that is, the ability to combine operations into new solutions in the head before proceeding to execution, and that would be *mind* also.

A station between input and output, mind is basically the *intervening variable* between stimulus and response ($s \longrightarrow o \longrightarrow r$) introduced by Tolman, sometimes called *the black box,* and supplied with an elaborate algorithm[3] by Clark Hull, who said, "It should be a matter of no great difficulty to construct parallel inanimate mechanisms, even from inorganic materials, which will genuinely manifest the qualities of intelligence, insight, and purpose, and which, in so far, will be truly psychic." Hull, the founder of what has been called Mechanistic Behaviorism, continues: "That such mechanisms have not been constructed before is doubtless due to the paralyzing influence of metaphysical idealism." That would include the intentionality described above, which RT considers its anti-scientific archenemy; victory was in sight, however: "The appearance of such 'psychic' mechanisms in a not very remote future may be anticipated with considerable confidence."[4]

With the advent of the computer soon after, the prediction came true with a vengeance, and lowly stimulus-response psychology was elevated to cognitive science. As RT recognizes no principled dividing line between man and machine, cognitive science was born with two programs: To turn the mind into a computer; and to turn the computer into a mind (AI). In other words, with cognitive science, our mind is made into a computer in place behind the eyes and between the ears, a carriable and programmable *head-top* with memory storage, editing facilities, and analytical capabilities.

This is very excellent too; the mind is precisely such a head-top. To have the courage to accept this is vitally important. Because it is basically correct, but first and foremost because it is the key to understand psychology. English speakers use the terms 'mind' and 'mental' for everything psychological, which tends to make a distinction between mind and the psycho-logical impossible, and, by turning everything into mind, makes the psycho-logical invisible.[5] The first step is therefore to separate the two, next to give each their due, and finally to have them meet again in mutual respect.

We give mind its due, when we accept that it is precisely what the RT-people say it is, an informational input-output machine, a head-top computer, albeit built from sentient bio-components. Only this logistical device is *not* itself the psycho-logical; Hull's inverted commas around 'psychic' were rather well-placed. As Leontiev

[3] $sEr = sHr \times D \times K$.

[4] Hull (1930, p. 256).

[5] Continental thinkers do not have the same problem, but when Samuel Coleridge first tried to introduce the term 'psychology' he was met with little success. Glasgow professor William Hamilton explained: "[*w*]*hy use an exotic, a technical name? Why not be contended with the more popular terms, Philosophy of Mind, or Mental Philosophy—Science of Mind or Mental Science—expressions by which this department of knowledge has been usually designated by those who, in this country, have cultivated it with the most distinguished success?*" Hamilton (1866, pp. 91–92).

writes, "The introduction of the concept of intervening variables undoubtedly enriches the analysis of behaviour, but it does not remove the postulate of directness."[6] (That is, the local motion character defining of stimulus-response.) Mind, however elaborated, is still stimulus-response, RT and not AT. If not itself the psycho-logical, mind, however, becomes a receptacle of the psycho-logical.

The *psycho-logical* is first and always *a relation in the world,* the intentionality corollary to the second law of thermodynamics described above. With mind, however, the psycho-logical becomes *internalized.* The psycho-logical is still a relation-in-the-world, but this relation can now be represented as an *internalized relation-in-the-world* also; bits and pieces of real life can be played out in the mind, as our nocturnal dreams vividly show. The content comes from the world, only it is moved unto a different stage, placed in a different medium, and that is what makes both the theatre- and computer-analogies so apt. And like the theatre-goer has no interface problem because the life content is already hers from her real life before she starts watching the play on the scene, the owner of the mind head-top is not cut off from real life and has no interface problem either. The interface problem severing mind and world only appears if you insist that your only access to the world is sensory, not existential, which, of course, the Empiricists did for theoretical reasons. Clever David Hume was well aware of that. Or, at least he was when he played back-gammon.[7]

As a mechanism of internalized representation intervening between input and output, and the brain being the ultimate intervening variable, mind is a brain-feature also; the only field of psychology to which the brain holds a necessary key, in fact. Which, of course, explains and justifies the preoccupation cognitive science has with the brain, even if this has furthered the unhappy reduction of psychology to brain science that is the present trend.

The REMS Model and Mammalian Evolution

In a tentative model I suggested many years ago,[8] and the principles of which I still believe, the intervening variable in the stimulus-response link is an ability momentarily to arrest the efferent response while the nervous impulse loops through the limbic carousel with its memory banks and emotional stations (see Fig. 6.1).

The most primordial form of the withholding is found in rapid eye movement sleep (REMS), which combines vivid imagery and affective arousal with cataplectic

[6]Leontiev (1978, p. 47).

[7]"I dine, I play a game of back-gammon, I converse, and am merry with my friends; and after three or four hours of amusement, I wou'd return to these speculations, they appear so cold and strained, and ridiculous, that I cannot find in my heart to enter into them any farther. Here then I find myself absolutely and necessarily determin'd to live, and talk, and act like other people in the common affairs of life." Hume (1739, Book 1, part 4, Section 7).

[8]Engelsted (1977), see also Engelsted (1989).

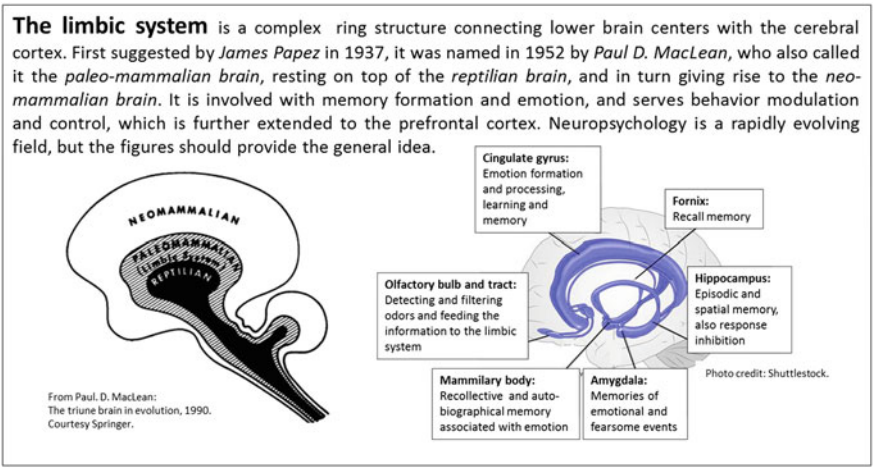

Fig. 6.1 The limbic system

inhibition of the large skeletal muscles, thus making action impossible. With evolution this halting mechanism with potential for deliberation prior to action developed into the more versatile mechanism we here call mind. It is mind that enables the animal to pause instead of immediately jump to conclusion. This allows time for consultation with past experiences stored in limbic and other brain centres, and thereby enables anticipatory future planning.

Notice that this could be called another instance of the negation of the negation. The immediate response (A) is arrested (non-A), leaving time for mindful deliberation, then the inhibition is negated (non-non-A) giving rise to a more deliberate response, which is the new attribute of the mammal.

The included non-A, Tolman's intervening variable, is the mind, and with it a whole new dimension comes into being: *The past.*[9] Thus as *the present moment* came into being with *sentience*, and *the future* with *intentionality*, *the past* comes into being here with *mind*. Present, past, and future are notions of living beings and not of physics, which parses the passing of time with other concepts.

The ability to suspend immediate action extends the time scale of action and transforms the snap *reflex* to the measured *reflection*, the impulsive *affect* to the more persistent *emotion*. It also allows separate actions to be mentally combined and tested before being carried out, as Wolfgang Köhler's Sultan did with sticks and boxes, and Leontiev called insight. Mind simply makes animals smarter.

Birds may have a kind of mind of their own, our family budgerigar did, but the mind we have is a specific mammalian trait. In Aristotelian parlance, mind would

[9]'Mind' is etymologically derived from Old-English 'mynd' and proto-German '*mundiz', which both mean 'remembrance'; 'minde' in my native language means 'remembrance'.

be *the mammalian psyche*. The evolutionary history is a cascade of new and spectacular developments, from prokaryotic to eukaryotic cells, from single cells to multicellular organisms, from invertebrates to vertebrates, from amphibians to reptiles. The mammal is another such invention, and quite radical too.

In contrast with the reptiles from which they first developed in the Permian 265 million years ago, our mammalian ancestors were *endothermic* (warm-blooded) and became for a time the dominant land vertebrates, but only to be later overtaken by another reptile descendant, the dinosaur. Filling all habitats from water to air, dinosaurs ruled supreme for 160 million years until destroyed in the mass extinction following an asteroid strike at the end of the Cretaceous 65 million years ago. The mammals, which had survived the terrors of the Jurassic World hiding away as small night-living insectivores, survived the mass extinction too. With the dinosaurs gone, they came out of the night to fill all the vacated habitats except the air, which birds, the only dinosaurs to survive, held on to.

Their long, long exile during the reign of the dinosaurs explains the major adaptational traits of the mammals, which form an integrated complex. Night-living made *olfaction* the dominant sense—in day living dinosaurs/birds it is vision—and led to a predominance of the olfactory centres, which grew into the *limbic system* as a storage of memories and reminiscences, and, fully to exploit the possibility for deliberation and calculation this offered, next the *neocortex* was added as server support with enormous computational power. Cortex is a neural structure specially designed to analyze sensory patterns, but contrary to vision and hearing, which—James Gibson-wise—produce refractionary images from the perceptual fields of light and sound, there is no such pattern for olfaction to read, its stimulus being only large, drifting molecules. The only way olfaction could 'see' beyond its own nose was if the odour was tagged with the memory of previous relevant situations, and, by recalling these situations—'oh, oh, we have been here before'—make more educated decisions possible. The ability of smells to call forth detailed and emotional memories and images from the past has been famously described by Marcel Proust, but is, of course, known to nearly everybody. This is how olfactory centres developed into limbic structures with memory imagery, and how the neocortical structures were subsequently added as analytical tools to wring out as much information as possible from the relevant images and reminiscences.

The limbic system and neocortex are prominent mammalian features. None of this would be of any use, however, if the immediate response could not be arrested, which made the halting mechanism of REMS a key to the whole mammalian complex. All mammals have REMS and the concomitant imagery; they dream, as Aristotle recognized: "It would appear that not only do men dream, but horses also, and dogs, and oxen; aye, and sheep, and goats, and all viviparous quadrupeds; and dogs show their dreaming by barking in their sleep."[10]

Viviparous means producing live young instead of laying eggs. This is a mammalian feature, though not unique, as hatching inside the female body is found

[10]Aristotle, *The History of Animals,* book IV, 10.

with some reptiles and fishes also. The way it is done in mammals is unique, however. Fetuses must feed too. In the egg, inside its protective shell, they are supplied with non-replenishable yolk and must hatch before the food is used up. In the protection of the female mammal's womb, the fetuses get their nourishment from the body of the mother herself through an umbilical cord.

From the fact that fetuses show extensive REMS in the later stages of pregnancy, it can be argued that the response halting mechanism plays a role here as well. Having a belly full of live and kicking progeny without some means to quiet them down would probably be disruptive. After birth, REMS would be very useful too, to keep the vulnerable young in the nest quietly sleeping for lengths of time during the day when the dinosaur predators roamed, and during the night when the parents went away in search of food. And should a wayward young list away and be chased by a predator, the fright might release the REMS mechanism and trigger a cataplectic collapse, leaving the fleeing and flailing victim prostrate and immobile, and thus—with luck—fall under the radar of the vision dependent predator.[11]

Feeding off the female body does not stop with birth, however. For a long time after, the progeny is provided for with nutritious milk flowing from their mother's teats, which the young suck for life. This is uniquely mammalian, and how the order got its name, *mammae* meaning teats. This makes mammals a radical new leap in a long-lasting trend.

Reproduction, Life's First Priority

Keeping entropy at bay, food and feeding are what living essentially turns on; only the second law of thermodynamics cannot be denied forever. Even before death by aging became programmed into living cells early in evolution, an organism could not count on eternal life; accident, disease, or falling prey to predators would eventually terminate it. Without some other and more permanent way to sustain life than feeding, the food-chain alone would soon finish off life on Earth. Reproduction was the solution, of course. While it still has time, the organism must simply make copies of itself, so that life can continue when it dies. Organisms do; next to feeding, reproduction was always the main preoccupation of living beings, and Aristotle rightly made it the second defining attribute of the living being. From the species' point of view[12]—which the individual does not necessarily share—you may even argue that feeding is subordinate to reproduction, as keeping the individual alive is only a means to make reproduction possible and thus secure the continued existence of the species.

[11]This REMS-response to fright and stress is still around, cataplexy, dream, and all; it is called *narcolepsy* and considered a sickness, which today it is, of course, as the program should have moved up since the Jurassic.

[12]A species does not have a point of view, of course, but species existence has a bio-logic, which in the interpretation of sociobiologists for easy communication often is rendered as a point of view.

Biologists have distinguished two different strategies of reproduction, *r-selection* and *K-selection*, named after factors in a population dynamics equation. In the r-selection, the strategy is safety in numbers. The organism produces a large number of offspring—a female herring as many as 200.000 eggs—and chances that at least a few will survive to reach reproductive age. In K-strategy only a few progeny are produced, sometimes only one, instead the energy is invested in quality rather than quantity, with lengthy parental caretaking greatly enhancing the survival chance of the offspring. As we move up the phylogenetic ladder, K-selection becomes more and more prominent. Magpies build a nest, lay six or seven eggs, sit on them for 17 days until they hatch, and keep watch over and feed the hatchlings for nearly four weeks after. With the mammal, new heights are reached with apes and humans at the summit. The gestation period for chimps is about 240 days (266 for humans); the new-born is helpless and cannot support itself, only after five months is it able to ride on its mother's back, and only at two years of age is it able to move independently; the mother provides the young with food, warmth, and protection, and teaches it certain skills; the young are weaned at the age of four to six, but still need parental backup for several more years; adult males lend a hand—adolescent males are invited to join male social activities like hunting and boundary patrolling—but the bulk of the work is left with the mothers.

The spouting of 200.000 eggs must require some effort, and hatching and feeding a brood of fledglings is no vacation either, but months of cumbersome gestation, draining your body and straining your mind, the labour of birth, with years and years of laborious caretaking following, that seems an almost devastating toil, which raises the question: Why do they do it?

Food is a natural reward; it restores with interest the energy expended and sustains the animal. Reproduction may sustain the species, but certainly not the reproducing organism, and it does not restore the energy expended but is a great drain on the animal's resources. There does not seem to be any natural incentive to engage in the labours of reproduction, including the strenuous act of mating, which became necessary when reproduction early in evolution became sexual; on the contrary, from the point of view of energy economics, there seems to be ample reason not to.

Natural selection—always (and tautologically so) on the side of the species—has come to the rescue, however. Natural rewards lacking, a set of *artificial* rewards was installed, with pleasure centres and hormonally induced instincts, and a chemistry so powerful and addictive that sex and reproduction would always have highest priority and justify any cost. In other words, nature's solution to the un-obviousness of reproduction was to turn us into addicts. It worked, has for more than a billion years.

In this sense, we are servants of the species as much as free self-seeking individuals. Males, with their little squirting appendage, may be excused in believing that they are the sovereign owners of their own bodies, but females with cumbersome bulging breasts, aching menstruations, trying gestation, painful birth-giving, flowing teats, and pushy litters, would certainly know that the species is a very demanding co-owner.

The Mammal's Unique Life World

With the mammal, natural selection took the inherent conflict between the interests of the species and the interests of the individual one step further. By letting the progeny feed off the mother's body directly, in gestation first, then in breast feeding, literally serving up the mother as a meal, a curl was created on the food-chain. The link in the food chain between predator and prey is a relation *between* species—between rabbit and carrot, between fox and rabbit—*inter-specific.* In the mammal, with the cannibalistic feeding of the young, it becomes a relation *within* the species as well, *intra-specific.* This curl on the food-chain means that the two essential attributes of the living being, feeding and reproduction, in the mammal have become intertwined with a host of interesting consequences to follow.

To keep under wraps the contradiction of being at the same time mother and prey would require the mental gymnastics and ability to arrest the immediate response defining of mind. It still does. It is not without cause that modern mothers often must battle to dispel the notion that the little new is a life sucking parasite.[13] And if the family, and sometimes the mother herself, believes that it has been a battle won, her therapist will soon know better. But seen from the young, the situation is not less interesting.

The existential link between organism and food is the origin, prototype, and foundation of the subject-object relation (S ⟶ O), and the structure and content of this relation come to define the world of the organism, its bio-logic and psycho-logic (episteme), its *Lebenswelt,* or *life world*, as the phenomenologists aptly called it. The general structure is the same for all animals, the intentionality and interspace explained above, but for each species, there are particular features beginning with the choice of food and the methods of its attainment. In this sense, each species lives in its own specific—Jakob von Uexküll-like—world. *Econiche* is the term biologists use for these specific worlds, aptly calling the econiches, defining of each species, for *the business* of the species. It is a good analogy; as the specific business demands and conditions of a plumber are different from those of an accountant, so are the demands and conditions of the hawk different from that of the mouse. Extending the definition of a species from the physical characteristics of its members to include their particular way of life, with its wider conditions and demands, is, of course, what we named *ecology* above, the food-source being its first determinant.

Now the very first food-source that a new-born mammal meets is its mother's nipple, and this specific particularity becomes defining of the subject-object relation, as the first instance always does, and therefore constitutive of the mammal's world. As the food is also mother, and mother and young are of the same kind, and interactions between members of the same kind are called social, the defining

[13]The ancient immune system did recognize a parasitic intrusion, and had not the placenta been inserted as an immunological barrier between mother and fetus, the latter would have been killed off as had it been cancer.

relation is social, sociality constitutive of the mammal's world, and mammals inherently social, which means that the co-evolving mind also becomes inherently social.

But the contradiction faced by the mother, is also faced by the young. Is mother friend or foe, prey to be attacked and sucked, or support to be sucked up to? Is the breast good and giving, or evil and denying? To this first perplexing world of the infant, perceptively explored by Melanie Klein, comes next the world of the toddler, where males are introduced as rivals to the mother's goodies and affections, the world imaginatively explored by Sigmund Freud. Whether he was right or wrong in all his pronouncements, Freud was certainly right in this, the mammalian mind, with its archives of past memories, inhibitions and emotions, is psychodynamic through and through, as revealed in its wild nocturnal dreams, but also in its daytime productions where the favourite drama on the theatre's repertoire is playing house.

So while *mind* is just an intervening variable between stimulus and response, a dumb head-top computer built into the wetware of the brain, it is also the messenger and medium of our most complex and dynamic real-life adventures, and the most marvellous piece of work with which psychologists have had to deal. But we would not have known that, had it not been for our human consciousness.

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Chapter 7
The Problem of the Human Being

Abstract This chapter narrates how A.R. Wallace, Charles Lyell, and Thomas Huxley disagreed with Charles Darwin on the question of whether the human being is different in kind from our closest animal ancestors or merely different in degree. Siding with the first three, it is explained how difference in kind in evolution can be created not only by genetic mutation, but also by behavioral innovation. Jean Baptiste Lamarck's important contribution is discussed, and it is explained how the concept of the econiche easily unites Lamarck's notion of behavior as an evolutionary force with Darwin's and Wallace's notion of evolution by natural selection.

The Secret

With human consciousness, we have come to the fourth subdomain in our general psychology. Human consciousness is not mind, which all mammals have; nor intentionality, which all animals have; nor sentience, which all living beings have; it is something that belongs exclusively to the human being. The secret of the human being—hilarious but true—is the story of the forbidden fruit Eve offered Adam in the ancient legend. To make that case, however, a load of preliminary work is needed.[1]

The Premise

That human consciousness makes us unique and qualitatively different from all other living beings is an old, old story, of course. But was not the notion of human exclusivity finally quashed by Darwinism? Well, the codiscoverers of evolution by

[1]"Impatience asks for the impossible, wants to reach the goal without the means of getting there," Hegel warned in *The Phenomenology of Spirit,* but if you want to shirk the work, just go to Chap. 10.

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natural selection, Charles Darwin and Alfred Russel Wallace, were divided on that issue.[2] Wallace wrote: "*The belief and teaching of Darwin was…that there was no difference in kind between man's nature and animal nature, but only one of degree. My view, on the other hand, was and is, that there is a difference in kind*."[3]

Darwin insisted upon difference in degree only because his theory was founded on the geological theory of his mentor Charles Lyell, who held that geological change is always uniform and gradual. Besides, Darwin believed he had witnessed the human being in its near animal stage when during his voyage with the HMS Beagle he had seen "a party of Fuegians on a wild and broken shore … absolutely naked and bedaubed with paint, their long hair tangled, their mouths frothed with excitement … man in his lowest & most savage state."[4]

It was also with Lyell in his rucksack, Wallace during a fever bout in the Moluccas independently had discovered evolution by natural selection, but his experience with the South American Indian had been a different one. He had not spied the natives from the upper deck of a British naval vessel, but had lived among them in their village in the Venezuelan jungle, and wrote: "The more I see of uncivilized people, the better I think of human nature on the whole."[5] So, where to Darwin (and most of his compatriots) the natives were halfway down the ladder to the animal kingdom, to Wallace, all human beings—savage and civilized—were on the top rung of evolution and of the same unique kind.

Wallace's heresy did not please Darwin. "I hope not you have murdered too completely your own and my child," he wrote in a despairing letter.[6] Thomas Huxley, the anatomy professor who fought Darwinism to victory in the famous debate with Bishop Wilberforce in Oxford in 1860, earning himself the epithet 'Darwin's bulldog,' only added to the aggravation; in his scholarly *Man's Place in Nature* in 1863, Huxley wrote that "no one is more strongly convinced that I am of the vastness of the gulf between civilized man and the brutes; or is more certain that whether from them or not, he is assuredly not of them."[7] Even Lyell, whose faithful agent and eyes Darwin had been during the Beagle voyage, and who had saved him when Wallace was pressing for publication, seemed willing to disown his own doctrine of gradualism. In *The geological evidences of the Antiquity of Man* in 1863, he wrote that on the evidence available it seemed that mankind "may have cleared at one bound the space which separated the highest stage of the

[2]Darwin discovered the theory first, but as he did not publish, he was scooped by Wallace. After Charles Lyell's intervention, the theory was jointly (without Wallace's prior knowledge) presented at a meeting at the Linnaean Society of London in 1858.

[3]Wallace (1905, p. 17).

[4]Darwin (1874, p. 618).

[5]Wallace (1905, p. 178).

[6]Darwin (1869).

[7]Huxley (1863, pp. 152–153).

unprogressive intelligence of the inferior animals from the first and lowest form of improvable reason manifested by Man."[8] It 'makes me groan,' wrote Darwin.[9]

Deserted by his closest allies and left to hold the fort alone, Darwin had to come up with a counter strike. It came with *The Descent of Man* in 1871. Dedicated to prove that in evolution there is difference in degree *only*, the book went through every trait conventionally considered uniquely human and attempted to show how it was already to be found—to a lesser degree—in subhuman animals; religious feeling Darwin recognized in his dog, language in Admiral Sullivan's father's parrot, and so on. Many thought it convincing.

So who were right, Darwin or Wallace, Huxley, and Lyell? Obviously, we have to side with the last three as our Aristotelian general psychology is premised on differences in kind. It also seems unreasonable to deny differences in kind in evolution. Darwin was fond of repeating that nature does not make leaps, but—just to take the first major innovations—the evolution from prokaryotic to eukaryotic cells, from single celled to multicellular organisms, and from invertebrates to vertebrates, all seem to be leaps producing truly different kinds. So why should not another difference in kind separate the human being from our closest animal ancestors? I doubt that anyone outside the seminar rooms would not agree. Anyway, it is the premise for the following.

Innovation in Evolution

Difference in kind means true novelty; how does that enter evolution? Natural selection cannot do it as it can only select among already existing variations. There are two basic ways, genetic mutation and behavioral innovation.

The cause of the spontaneous variations his theory needed was unknown to Darwin, but the theory was not helped when genes were discovered. On the contrary, the theory was nearly given up when the rediscovery of Mendel's Laws made plain that genetic recombination in sexual reproduction can only reshuffle the deck, not produce new cards. In the last moment, however, the theory was saved by Hugo de Vries' discovery of genetic mutations, which do create new cards. Armed with mutations, and relaunched as Neo-Darwinism, the theory ventured forth again and never looked back.

By now everyone knows that genes are the bread and butter of evolution and natural selection the knife that slices and spreads; less known is that a living and breathing chef sometimes enters the picture in a decisive way. By changing their behavior in novel ways, animals can simply change the direction of evolution. Darwin provides a perfect example in *Origin of the Species* when he narrates the story of a North American bear, "swimming for hours with widely open mouth,

[8]Lyell (1863, pp. 504–505).

[9]Darwin (1888, p. 12).

thus catching, like a whale, insects in the water."[10] With a constant supply of insects and no better suited competitors about, Darwin could easily imagine how this behavior, in conjunction with natural selection, would in time transform the bear into an aquatic creature like a whale.

While Darwin's bear may have been anecdotal, the fact remains that the aquatic mammals did descend from terrestrial forebears that took to water, and that, much earlier, terrestrial animals did ascend from sea-living creatures that went ashore. Since—as all beach-goers know—going in and coming out are well-defined acts of individual behavior, acts of individual behavior can obviously direct evolution in radical new directions when passed on to the next generations. But is such passing on not Lamarckism?

Lamarck and Darwin

Jean-Baptiste Lamarck, the first discoverer of organic evolution, is a hero in our story. Against the Romanticist spiritualism and vitalism that would come to rule science in the long post-revolutionary period, Lamarck insisted that only the known physical forces were at work in the body, and—forecasting almost exactly—Stanley Miller's famous 1953 experiment described how simple life could have originated from the interaction of ordinary chemical and electrical forces. Using other words, he correctly defined life and nonlife in terms of entropy and the second law, still waiting to be formulated by science. Against the timescale of the Bible, a timescale everybody believed, whether they believed in creation or not, he introduced the modern and hugely larger timescale to make room for the evolution, which he described comprehensively, in tentative detail, and basically correct. In his main work, *Philosophie Zoologique,* published in 1809, the year Darwin was born, he described what today is the standard story, how our progenitors were a race of primates, which descended from the trees; how with the freeing of the hands, better dexterity and manipulative skills these proto-humans gradually evolved, with growing intelligence and progressively better sign communication, and so on.[11]

Insisting that the animals were not permanently fixed but could rise above their station by their own activity, Lamarck's theory of evolution was an activity theory and the crowning achievement of the French Enlightenment. It should, of course, have been recognized as such, only Lamarck was late and was overtaken by *the Restoration*, as the counter revolution was called. His books were not burned, as were the writings of Protagoras, Averröes, and Hobbes, but his reputation was, apparently for all time. His nemesis was George Cuvier, a brilliant paleontologist and professor colleague at the Natural Museum, who also happened to be Minister of the Interior in the new regime with responsibility for the public order. He pointed

[10]Darwin (1859, p. 184).

[11]Lamarck (1809, pp. 349–357, 1914/2012, pp. 169–173).

out every little flaw, inexactitude, and unsupported proposition in Lamarck's work, an easy enough task for any good scientist when dealing with an early and unfinished theory, and Cuvier was a truly eminent scientist. Upon Lamarck's death, Cuvier hammered the final nail in the coffin by making the eulogy he was called to make as President of the French Academy of Science so scathing and denigrating that the Academy at first refused to publish it. This basically became the final word. To the world, Lamarck became the curious Frenchman who ridiculously claimed that the giraffe got its long neck from stretching after leaves in high trees, and Lamarckism the wrong belief that acquired characters are inherited by the offspring.

This left the field open for the rediscovery of evolution 50 years later, this time as a direct descendant of the counter revolution. In 1798, the English priest and economist Thomas Malthus had anonymously published a tract titled *An Essay on the Principle of Population as it effects the future Improvement of Society, with remarks on the Speculations of Mr. Godwin, M. Condorcet, and other Writers.* William Godwin and Marquis de Condorcet were prominent and energetic advocates for the idea that humans by their own efforts can create a better and more equal society, and this idea Malthus wanted to dispel before it got too much traction. How much a world without want and misery is to be wished for, he said, alas, it is impossible; nature would not allow it; there would always be too many people, too little food, and unavoidably some would have to bottom out; the invisible hand of nature—disease, pestilence, poverty, and starvation—would see to it. It was when reading this in 1838 Darwin got the idea of evolution by natural selection. Like the invisible hand of market competition—not unknown to Darwin whose affluent maternal Wedgwood family wrung their hands over the horrors of the child labor that competition had forced them to adopt in their industrial potteries—competition in nature would pick the winners and the losers by natural selection, and make certain *the survival of the fittest,* a phrase adopted in the fifth edition of *Origin*.

Econiches and Answer Keys

Lamarck's notion of transgenerational inheritance of acquired characteristics was basically wrong but shared by everyone, Darwin included. One should think it would have been easy to disprove, but in an age where sons inherited their fathers' occupation and occupational attributes, and with evidence from epigenetic inheritance[12] providing some corroboration, the notion was not so easily dispelled. With no better alternative available until the later discoveries of genetics, it simply seemed the only choice. Still, that the bodily changes acquired in individual

[12]*Nongenetic* transgenerational inheritance of acquired characteristics. Commonly found in plants, it was well known to botanists and agriculturalists. Lamarck was a botanist; the hapless Lysenko an agriculturalist.

behavior are not being genetically passed to the progeny, does *not* mean that individual behavior cannot pilot evolution in new directions. In fact, it can, as the notion of *the econiche*, the business of a species, will help to explain.

In the business world competition favors those on top of their game and punishes those lagging in business acumen, and so it is in nature. But the rules of the game are different in different occupations. Improvements introduced in the plumber's business may not be of advantage if introduced in the accountant's; likewise, improvements sharpening the claws of the bird of prey would certainly be of disadvantage if introduced to the wading bird. Changes that make one species more fit could make another unfit, often disastrously; the answer to a math test that the answer key will reward with an A, the answer key in civics would probably fail. From this follows that in order to decide who should pass the exam of fitness, natural selection must have a different answer key for each business or econiche, and every little spontaneous variation will be judged according to this particular answer key. Mutations that gave giraffes a longer neck would be impermissible if the elongation of the neck did not suit the giraffe's business plan, so, of course did the giraffe get its long neck from stretching, only not directly, but by welcoming the appropriate mutations and flunking the inappropriate.

Now while, contrary to what Lamarck believed, present behavior has no hand in the variations that appear in the next generation due to spontaneous mutation, it can decide what answer key the variations should be judged after. Behavior can do that by simply changing the animal's business in a new and hitherto unseen way and thus creating a new econiche. The insects that first invaded dry land did. The fishes that later went ashore did; and so did the mammals that turned back to the sea, each time radically changing the criterions of subsequent selection. In evolution, it must have happened time and again.

This means that Lamarck's idea that individual behavior can shape the future evolution of a species is correct; it can. Only it cannot do so directly, but only by affecting the answer key that guides Darwin's natural selection, which is the mechanism by which evolutionary changes become fixed. First, the animal by its action creates a new econiche, then it must adapt to the demands of the econiche it has created through natural selection, precisely as in Darwin's bear example. In many cases, natural selection will work alone, of course, but it is also possible that individual acts of behavior take charge, and if radical, as the leaps in and out of water mentioned above, create new kinds of living beings when the new behavior, by circumstantial necessity, imitation, or cultural learning, is adopted in the population. This model is what we need to be able to claim that the human being is such a radical leap, creating a new econiche and a difference in kind. We only need to identify the act of individual behavior that set it off. So what did Leontiev, our Russian trailblazer, have to offer?

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Chapter 8
The Marxist Legacy

Abstract This chapter is in search of the evolutionary leap from animal existence to human being. First, the Marxist legacy is visited; the roots of Marxism in German Romanticist philosophy, British Political Economy, and French radical politics are recapitulated. Next the Classical Anthropogenesis from Democritus to Jean-Jacques Rousseau is described with its defining Robinson features. Then it is shown how Friedrich Engels' essay, "The Part Played by Labour in the Transition from Ape to Man," is just an upgraded version of this classical story. Finally, it is concluded that nowhere in this historical corpus of Enlightenment thought is a leap into difference in kind identified.

Almost Right

Alexei N Leontiev agreed that consciousness is a unique human feature and described it this way:

"The transition to consciousness is the beginning of a new, higher stage in the evolution of the psyche. In contrast to the psychic reflection peculiar to animals, conscious reflection is reflection of material reality in its separateness from the subject's actual attitudes to it, i.e. reflection that distinguishes its objective stable properties… The distinguishing of the reality reflected in man's consciousness as objective has as another aspect the distinguishing of the world of inner experiences and the possibility of developing self-observation on that basis."[1]

In other words, human consciousness is a split in the subject–object unity, which allows each pole to step forward on its own, as *the objective* and *the subjective*, respectively, neither of which exists in isolation in the animal mind.

This could hardly be said any better; human consciousness is precisely such a fileting that makes us cognizant of the world, as it is, and aware of ourselves, as we are—and able to say it. It was in recognition of this extraordinary acumen that Carl Linnaeus in *Systema naturae* 1758 said, "*Know Thyself*," and named us *Homo sapiens*, savvy man; and also why Aristotle long before had defined us as a *Zoon logon echon*, an animal with language and reason.

[1]Leontiev (1981a, b, p. 181).

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Leontiev further explained how this unique—and eerie—quality had come about: "The cause underlying the humanising of man's animal-like ancestors is the emergence of labour and the formation of human society on its basis. 'Labour,' Engels wrote, 'created man himself'. Labour also created man's consciousness."[2]

The quote is from the opening line of Friedrich Engels' essay, *The part played by labour in the transition from ape to man.* The essay belongs in the obligatory Marxist canon, and not to cite it would have been out of the question for a Soviet scholar at the time. Still there is no reason to think that Leontiev did so unwillingly, as it could not have been said any shorter, nor any better. *Labour did create the human being, the human society, and the human consciousness*. Leontiev and his Marxist forebears had got it perfectly right.

Or they almost had. The italicized statement above allows more than one solution. Judging from what Marx and Engels were working on in their final years, they would have arrived at the right one had they lived longer, only they did not. They had all the vital pieces to the puzzle, labor, society, consciousness, but still not the perfect fit, and therefore missed the deep secret of the human being. If we want to uncover that secret, their story will be helpful, however.

The Historical Heritage

As everybody else, Marx and Engels were made *and bounded* by history. The historical sources that made and bounded them were three: German romanticist philosophy, British political economy, and French radical politics.

As Enlightenment cousins, British political economy and French radical politics both subscribed to *the classical anthropogenesis*, the materialist story that first launched by Democritus, and retold at every Enlightenment event, explained how wits and individual effort, Pico-wise, and step by step, had raised the human individual from a near animal state to society and civilization.

Proceeding from that narrative, John Locke begins British political economy by explaining that the fruit of a man's labor is his *private property* and inalienable natural right.[3] William Petty—his brilliant and corrupt friend from the Oxford group of savants that included the Atomist Robert Boyle and eventually morphed into Royal Society—subsequently added that the value of that fruit was determined by the amount of work put into it, the so-called *labour theory of value*. Based on the same narrative, Bernard de Mandeville's ideas on the unintended benefits of greed and depravity next led David Hume's Edinburgh friend, Adam Smith, to *the invisible hand* of the market and *the division of labour* to bring the science of economics to full flower with his seminal *Wealth of Nations* from 1776.

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[2]Leontiev, ibid.

[3]Locke had been co-writing the constitution of the slave-owning American colony Carolina and wisely included as a man's private property the work of the man's employees.

With less success against their blue bloods, the French branch of the Enlightenment family had less reason to be smug and took a dimmer view of property. "The first man who, having fenced in a piece of land, said 'This is mine,' and found people naïve enough to believe him, that man was the true founder of civil society. From how many crimes, wars, and murders, from how many horrors and misfortunes might not any one have saved mankind, by pulling up the stakes," wrote Jean-Jacques Rousseau, Lamarck's botany-mentor, in his famous version of the classical anthropogenesis.[4] Declaring—like the social reformer and anarchist Pierre-Joseph Proudhon—property to be theft,[5] pulling up the stakes became the aim of French radical politics.

German romanticist philosophy was born when Kant's German Enlightenment faltered and can at best be seen as a bastard member of the family. The hopes of the French Revolution had made expectant German citizens wear tricolore cocardes and plant freedom trees, but when the dreams were quenched, and feudal Junker rule confirmed, the creative energies turned, as already told, from the outer political scene to the inner spiritual life. As the student activist, Johann Gottlieb Fichte intoned in one of his rousing speeches to the German Nation, the armed struggle was temporarily over, and now the battle would be on the field of character and ideas.

So said, so done. Kant had made a blunder, it seemed; the master had made *cause* both an a priori concept of the mind *and* the influence from the unknown outside activating it, bottle and fill both; thus—in contemporaneous lingo—making *ego* and *non-ego* the same, which qualifies as a contradiction. Fichte, however, grabbed this contradiction, and turned it into grand philosophy. The object is of the subject's own making, he declared. The subject posits the object, and confronts it as its own limitation; in the confrontation, the subject gets to know itself, and it is with this self-consciousness, the subject becomes a conscious being. In short: "The character of Reason consists in this, that the acting and the object of the acting are one and the same; and this description completely exhausts the sphere of Reason."[6]

If it sounds weird and convoluted, it is because it is. Bertrand Russell in his *History of Western Philosophy* thought Fichte insane. If so, there was a method to his madness. Suffice to say that the identity in polarity of subject and object did make sense when we talked about the organism and its food as a natural unit; the food is obviously only 'food' by virtue of the wanting and searching organism. But besides being an object for the subject, the food material is something on its own also, a material *Gegenstand* confronting and resisting the organism, but if Fichte in his idealistic quest conflated the ideal object and the material Gegenstand, his general idea was not daft at all; it was (S → O), if (S → O) gone into orbit. What is more, it was Fichte's weird determination of human consciousness that lay, if not directly, the ground for Leontiev's definition above.

[4]Rousseau (1754).

[5]La propriété, c'est le vol! A slogan coined by Proudhon in his 1840 book What is Property? Or, an Inquiry into the Principle of Right and of Government.

[6]Fichte (1869, p. 9).

Friedrich W. J. Schelling, the next horse in the Troika of German romanticist philosophy, chose another way to conflate mind and matter. Marrying his mentor Fichte's ideas on the rise of self-consciousness to Baruch Spinoza's old Pantheism (Nature = God), he declared that Nature was the World Spirit becoming conscious of itself. Dead asleep in the mountains, slowly waking up in the plants, coming to its senses in the animals, the World Spirit finally gains self-consciousness with the human beings and knows itself for the first time. It smacks of cosmogenesis and evolution, but no, the evolution proposed by Lamarck made the Germans cross themselves. Still, Schelling's philosophy of nature gave natural science a real boost by creating great interest in nature studies and opening fields that were beyond the customary realm of mechanical physics; it gave suffering psychology a new lease on life too, as already told.

Schelling had brazenly declared that there was no excuse for not being a genius; the third charger on the Troika, his former university roommate, Georg W. F. Hegel, certainly was. Hegel took the idea of the World Spirit's rise to self-consciousness to new heights by including the whole compass of human history, philosophy, science, politics, religion, and art. Political economy was included too, as Hegel quite ingeniously used Adam Smith's division of labor, where you must part with your product, as a prime example of how Fichte's subject gets separated from its object, and how this self-estrangement leads to self-consciousness. A huge tapestry weaved by contradictions and negations, portraying human history as a cascade of dialectical leaps, Hegel's work was a virtual piece of art, and so masterful, erudite, and full of surprising insights, that for good reasons, it beguiled a whole generation of German intellectuals, Karl Marx, and Friedrich Engels among them.[7]

Hegel held that the Kingdom of Prussia marked the completion of the World Spirit's historical quest, which grandly suited the traditional Prussian elite. It did not suit the liberal Young Hegelians, however. The radical students did not think that the authoritarian Prussian state was the high point of freedom and reason and with their protestations started *German Enlightenment 2.0.* In the first wave, Ludwig Feuerbach and friends denied that the human being and human society were projections of the World Spirit; rather, they insisted, creating great furore, it was God and the divine realm that were projections, manmade fantasies. Marx agreed; his Ph.D. dissertation about the Atomists Democritus and Epicurus rejected theology in favor of philosophy, and when the conservative professors in Berlin turned it down, had to be resubmitted to the more liberal University of Jena. But in the second wave, Marx insisted that the mere unmasking of religion was not enough, to end the estrangement you also had to disclose what "cleavages and self-contradictions" within society gave rise to these chimeras in the clouds.[8]

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[7]Even clever students, who wanted to depart from the master, merely became converse Hegelians. The self-confessed 'Anti-Hegelian' Soeren Kierkegaard, for instance, who had followed Hegel's lectures in Berlin, remained a Hegelian, only he insisted that the individual could not leave it up to the World Spirit or God, but had to take the leap himself, the fateful leap out on the 70.000 fathoms, which became the basic tenet of Existentialism.

[8]Marx (1845, 4).

The authorities did not like this any better; suspect and blacklisted from civil service, the young law graduate had to take employment as newspaper editor in Rhineland, Prussia's most liberal province. It was here Marx first met Engels. On his way to his family's textile factory in Manchester, the young Engels had stopped by the offices of the *Rheinische Zeitung* to offer a cross and non-committal chief editor articles on the economic revolution in industrializing England, which was how Marx was first instructed in these matters. He was instructed in French radical politics when his co-worker Moses Hess ran a number of articles on the French Communists. Unfortunately, the articles also attracted the attention of the Prussian censors. When the newspaper was banned, Marx had to go into exile with his family in Paris, where again he met and teamed up with Engels, who had just written a shocking book of *The* [deplorable] *Condition of the Working Class in England,* based on British government reports and his own observations. When Engels convinced Marx that the working class was next in line to be emancipated, *German Enlightenment* 3.0 began. Its founding text would be the *Communist Manifesto*, which Marx—expelled from Paris on the insistence of Prussia—wrote in Brussels together with Engels in 1848 on assignment from the Communist League, but the following 1844-synthesis of Hegelian philosophy, political economy, and radical criticism was certainly a stepping stone, an important exhibit in our inquiry, too:

"The worker puts his life into the object; but now his life no longer belongs to him but to the object. Hence, the greater this activity, the more the worker lacks objects. Whatever the product of his labour is, he is not. Therefore, the greater this product, the less is he himself. The alienation of the worker in his product means not only that his labour becomes an object, an external existence, but that it exists outside him, independently, as something alien to him, and that it becomes a power on its own confronting him."[9]

When overtaken by the bloody 1848-revolution, a Europe-wide mix of bourgeois and socialist insurgency, Marx and his family had to flee again. Their final residence was a humble abode in London where, financially supported by Engels, Marx spent his day in the library of the British Museum studying and working on his mature economic theory.[10]

Co-opting Darwin

To the three components, German philosophy, French socialism, and British political economy, Engels now wanted to add yet another: *Modern science*. Taking great pride in reading up on the newest science, Engels had bought one of the first 1250 copies of *Origin of the Species*, and immediately realized Darwin's importance (Marx did not and had to be lectured by his friend). Later, when Marx had

[9]Marx (1844).

[10]'If you don't like Marxism, blame British Museum,' Mihail Gorbachev is said to have quipped.

died, Engels compared the two in his eulogy at the graveside in Highgate, saying that "just as Darwin discovered the law of development of organic nature, so Marx discovered the law of development of human history."[11]

Obviously, a link between the two great discoveries had to be made. Important in itself, but so much the more urgent, since no sooner had the initial shock following *Origin's* publication been absorbed, before many in the educated classes embraced Darwinism as the answer to society and history. History was simply the seamless continuation of natural history; survival of the fittest explained why native peoples had to go down before British colonists; natural selection explained why England's upper classes were upper, its lower classes lower; and—for good measure—Darwinism also explained why women were less developed and had to defer to men.[12] Darwin's cousin, Francis Galton, himself an IQ-genius, wrote *Hereditary Genius*, which explained that the reason England had been ruled by a small number of eminent families through ages was the higher intelligence these people had inherited.[13] Anxious that the English race should slip from its top position among nations, Galton also advocated *eugenics*, the culling of the lesser breeds that Plato in *The Republic* had recommended to improve the state. Preparing this venture, practical and versatile Galton invented most of the ingenious methods and procedures adopted by psychology to measure human traits and capacities, for which reason the prodigious Englishman should also be counted among the founders of scientific psychology.

Fearing that Darwinism would supplant Marxism, it did among many of his socialist comrades, Engels wanted to explain why both discoveries were necessary, and in the process correct the obvious class bias of *Social Darwinism*, as it has been named. It was with this in mind, he in 1876 began to write the essay *The part played by labour in the transition from ape to man* from which Leontiev quoted.

The Classical Anthropogenesis

As it should be, Marxism being the latest leg of the Enlightenment cascade, Engels' essay is another species of the classical anthropogenesis. First developed by Democritus,[14] beautifully retold—now dressed as myth—by his student Protagoras,[15] greatly expanded by Epicurus (and lost), retrieved by the Roman poet Lucretius (and lost), retrieved by an Italian book finder 1000 years later to fire the

[11]Engels (1888).

[12]Under the brand names 'Sociobiology' and 'Evolutionary Psychology,' Darwinism is still seen by many as the sole answer to the secrets of human society and human psychology.

[13]Galton (1869).

[14]Diodorus of Sicily (90 BC–30BC): Universal History http://penelope.uchicago.edu/Thayer/E/Roman/Texts/Diodorus_Siculus/1A*.html, book 1, Chap. 1, p. 17.

[15]Plato, 350 BC, Protagoras http://classics.mit.edu/Plato/protagoras.html.

luminaries of the Italian renaissance, subsequently informing Erasmus, Hobbes, Locke, Mandeville, and Smith, and grandly laid out by Jean-Jacques Rousseau,[16] the plot of the classical anthropogenesis has been unwavering the same. If you have yet to read Protagoras' and Rousseau's wonderful accounts, and you should, you will be familiar with the scheme from Daniel Defoe's 1719 novel *Robinson Crusoe*. The story about the marooned sailor, who, alone and exposed, used his wits and hands to make tools and provide himself with clothes and shelter, and then, at last, met and teamed up with another human being, became immensely popular—it ran through four editions in the first year alone—because it spelled out the three-step scheme of the classical anthropogenesis, which perfectly expressed the ideology of the aspiring burghers. The steps are as follows:

- First, *brains*. Weak, alone, and without the natural means by which the other animals excelled, the first human individuals had the intelligence to learn from circumstance and improve.
- Second, *tools* and *handiwork*. Using their wits and hands, the struggling individuals began to manufacture the—better and better—artificial implements and means by which they managed to survive and thrive.
- Third, *social cooperation*. Hesitantly at first, the individuals eventually began to dare trust their fellows and live and work together, which step by step led to families and communities, followed by division of labor, exchange and barter, property, and, finally, civil society with classes and all.

True to the Enlightenment tradition, Engels' version is about these three universal components. It is also an evolutionary account, by now a must. Rejecting the supernatural intervention cavalierly invoked by the mythologies, the classical anthropogenesis authors had for ages been unable to explain from where the smart humans had come in the first place. Lamarck had ended that embarrassment by pointing to our descent from a race of monkeys, which had left the trees. And if the vilified Frenchman was to have little following,[17] Darwin told the same story 60 years later in *Descent of Man*.

Engels' essay is basically a faithful compendium of *Descent of Man,* only it wants to correct a bias, the class bias exemplified by Galton. Since antiquity "all merit for the swift advance of civilization was ascribed to the mind, to the development and activity of the brain," Engels writes, and this "idealistic world outlook" still dominates "to such a degree that even the most materialistic natural scientists of the Darwinian school are still unable to form any clear idea of the origin of man, because under this ideological influence they do not recognize the part that has been played therein by labour."[18]

[16]Rousseau (1754).

[17]Except in Enlightenment Scotland where in Edinburgh young Darwin learned about it from a teacher and rejected it.

[18]Engels (1876).

In the *German Ideology* in 1846 Engels and Marx had written: "Men can be distinguished from animals by consciousness, by religion or anything else you like. They themselves begin to distinguish themselves from animals as soon as they begin to produce their means of subsistence."[19] In his *Outline of the Critique of Political Economy* from 1857 Marx later wrote: "No production possible without an instrument of production, even if this instrument is only the hand."[20] Engels therefore concluded: "Labour begins with the making of tools."[21] In other words, man is a tool-making animal, as the American Enlightenment icon Benjamin Franklin had said. And tool-making became possible when the apes left the trees and upright posture freed the hands, "the organ of labour." "This was the decisive step in the transition from ape to man," Engels writes.[22]

Reversing the traditional sequence and placing the hand first, Engels now has the mind benefit from the freed hand: "Mastery over nature began with the development of the hand, with labour, and widened man's horizon at every new advance. He was continually discovering new, hitherto unknown properties in natural objects."

Next followed—in the classical order—social cooperation, as "the development of labour necessarily helped to bring the members of society closer together by increasing cases of mutual support and joint activity, and by making clear the advantage of this joint activity to each individual."

Next language, as "men in the making arrived at the point where they had something to say to each other. Necessity created the organ; the undeveloped larynx of the ape was slowly but surely transformed by modulation to produce constantly more developed modulation, and the organs of the mouth gradually learned to pronounce one articulate sound after another."

Next accelerated synergies, as "[t]he reaction on labour and speech of the development of the brain and its attendant senses, of the increasing clarity of consciousness, power of abstraction and of conclusion, gave both labour and speech an ever-renewed impulse to further development."

And, finally, the "new element which came into play with the appearance of fully-fledged man, namely, society."

Except for the initial reversal, Engels' essay is a vintage classical anthropogenesis, but who was right? Did the working hand and not the brain take the lead in human evolution, as Engels claimed? What did the fossils show? What did the paleoanthropologists say?

When they eventually arrived, the paleoanthropologists sided with the brain. To the Oxford people leading the field, a fossil combining a modern human brain with primitive ape-features discovered in a quarry in Piltdown in England in 1912 proved irrevocably that the brain had led evolution, as Galton and the Social

[19]Marx and Engels (1845, Part 1A).

[20]Marx (1857, Introduction, part one).

[21]Engels (1876).

[22]Engels (1876).

Darwinists claimed. A fossil combining a small ape brain with nearly perfect human posture, discovered in 1924 in South Africa, and named Australopithecus, was therefore dismissed as an aberration, if not an outright fraud. Then, 30 years later, the Piltdown fossil was exposed as a forgery, and a surprisingly clumsy one at that; only ideological bias explains how it could possibly have been accepted in the first place. With the Piltdown fossil a hoax, the Australopithecus was now our ancestor, which confirmed that the hand and its handiwork had preceded the expansion of the brain. Engels had been proven right.

As in time more and more fossils were unearthed and studiously described by the paleoanthropologists, the growing bulk of evidence confirmed Engels' essay. The scheme he presented—the Darwinianly evolutionized classical anthropogenesis, corrected and updated—is today's universally accepted mainstream understanding of human evolution. It allows for a plethora of minor variations, and thus the hefty theoretical disputes any scientific field thrives on, but the basic scheme is the same and presented in every textbook.

Engel's ape-and-hand narrative is also precisely the story told, for long stretches ad verbatim, by Leontiev 60 years later in *Problems in the development of mind*,[23] which adds further relevance to it and justifies our interest. And the more so since the story is also wrong!

Where the Difference? Where the Leap?

How could it possibly be wrong? It is evidence-based, practically self-telling,[24] and underwritten by Darwinism? Yes, well, but if it is not wrong, it is certainly not right either. To line up the human traits that characterize us and explain that they have evolved through natural history adds nothing new but merely repeats what we already knew from the outset. That a theory is evidence-based merely means that it got the pieces right, not—as Ptolemy showed—that it got the puzzle right. And Darwinism is hardly a magical potion you can sprinkle to make things happen; though conventionally applied as an all-purpose explanation, natural selection cannot explain novelty in evolution, and Darwin, in fact, denied that there was any.

This denial violates our premise that presumes difference in kind, but one should think that Engels, torn between Hegel's dialectics that demands leaps and Darwin's Uniformitarianism that denies them, would have had a problem also. He and Marx agreed with the tradition of the classical anthropogenesis and saw brains, tool-use, and productive work—labor—as the uniquely human features, but Darwin denied

[23]Leontiev (1981a, b).

[24]Humans are characterized by the attributes *x*, *y*, *z*; if these are not of divine origin, they must have come about in a natural way; suggest therefore a credible route this development could have taken starting from scratch. Add to this formula your own familiarity with men and society, your own experience of learning, and the documented facts of historical progress from savagery to civilization, and the story pretty much tells itself.

that any traits were uniquely human; you would always find a precursor among the animals, if in a lesser degree.

Aware of this, Marx writes: "Admittedly animals also produce. They build themselves nests, dwellings, like the bees, beavers, ants, etc."[25] But "[w]e are not now dealing with those primitive instinctive forms of labour that remind us of the mere animal. We presuppose labour in a form that stamps it as exclusively human." So what is that exclusive stamp? Marx explains: "[W]hat distinguishes the worst architect from the best of bees is this, that the architect raises his structure in imagination before he erects it in reality. At the end of every labour-process, we get a result that already existed in the imagination of the labourer at its commencement."[26] In other words, what the animals only achieves by instinct, the human being realizes by conscious design. Engels, however, was not so sure and wrote: "It goes without saying that it would not occur to us to dispute the ability of animals to act in a planned, premeditated fashion." On the contrary, among mammals "the capacity for conscious, planned action…attains quite a high level." An avid fox-hunter, Engels could draw from his own experience: "While fox-hunting in England, one can daily observe how unerringly the fox knows how to make use of its excellent knowledge of the locality in order to elude its pursuers, and how well it knows and turns to account all favorable features of the ground that cause the scent to be lost."[27]

But what about sociality then? Now it seems a little unclear to me whether Marx and Engels saw Robinson Crusoe—"a favourite theme with political economists"[28]—as an ideological chimera or a favorable example, but if the latter, the lone entrepreneur, *Homo economicus*, certainly had to be socialized, and they never tired of insisting that labor was inherently social. So could not sociality be the human mark? Alas no, "our simian ancestors were gregarious," Engels notes, and "it is obviously impossible to seek the derivation of man, the most social of all animals, from non-gregarious immediate ancestors."[29]

So there are defining human traits, labor and human consciousness, only this difference in kind grew out of difference in degree, gradually—"hundreds of thousands of years certainly elapsed"[30]— without any demarcation line separating us from our animal forebears; no vast gulf (Huxley) to be cleared at one bound (Lyell); nature did not take a leap; Darwin would have been very pleased.

It should be mentioned that Hegel had made available a trick that would turn difference in degree into difference in kind if only there were enough degrees, namely the dialectical law of the transformation of quantity into quality. Hegel's own example was the boiling of water. When heated, water upon reaching 100 °C

[25]Marx (1844), first manuscript, estranged labour.
[26]Marx (1867, III, Sect. 1).
[27]Engels (1876).
[28]Marx (1867, I, Sect. 4).
[29]Engels (1876).
[30]Ibid.

passes into a different state, not "gradually, on the contrary, [the] new state appears as a leap, suddenly interrupting and checking the gradual succession of temperature change."[31]

Sir Arthur Keith, the leading British paleoanthropologist, who had vouched for the Piltdown fossil and led the attack against Australopithecus, apparently took up this idea when he claimed that the ape turned into Homo when it reached a cranial volume of 750 cc, (100 cc more than tepid Australopithecus). Even if the notion of non-linearity in nature today is uncontroversial, 'Keith's Cerebral Rubicon,' as it was named, is, of course, pure voodoo. If it is to qualify as an explanation that adds to our understanding, you need to show what concretely happens when the symmetry is broken; the transition of water is not magical, and neither should be the transition of the ape into man. Engels was well aware of that. His formula was "not to foist the dialectical principles on nature, but to find them in it," Vygotsky writes.[32]

This would explain why Engels did not make mention of this law in his essay where—discounting the leaving of the trees—no concrete leap is identified; and this, in turn, may be the reason why Engels vacillated. He never finished the ape-essay. Broken off in mid-sentence, it was left in the drawer for twenty years until upon Engels' death it was found by his literary executors and published in the Social Democratic newspaper *Neue Zeit*. Seen as a prime example of dialectics in nature presumably, the Russians 30 years later included the essay in a collation of Engels' scientific writings titled *Dialectics in Nature.* From here Leontiev inherited the project. And the problem of the leap-less leap.

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[31]Hegel, G.W.F, 1812–1816, *Science of Logic*, § 775.

[32]Vygotsky (1927, p. 330).

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Chapter 9
The Overlooked Dimension

Abstract This chapter continues the search for the evolutionary leap from animal to human being. First A. N. Leontiev's model of the evolutionary Activity-stages is laid out. As the elegant model both completes the productive sphere and fails to deliver the defining human difference, it is argued that the missing link must be found in the reproductive sphere. Since reproduction of new generations—from birth to gestation to nurture and extended care—is surplus labor by another name, we are led back to the Marxist idea that labor created the human being. How human labor could spring from animal reproductive labor has still to be explained though.

Sultan's Challenge

By this time, 60 years after Engels first jotted down his thoughts on human evolution, a lot more had been learned about animal behavior, and Leontiev knew. Engels had said that the human being starts with labor, and that labor starts with tools, but "there are already the rudiments of tool activity among certain animals," Leontiev writes. That is, "the use of external means with whose aid they perform separate operations (e.g., an ape's use of a stick)."[1]

The stick-wielding ape no doubt referred to Sultan, the chief star in the famous chimpanzee experiments Wolfgang Köhler had performed during his involuntary WW1 stay in Tenerife, interned by the British suspected of being a German spy. In a book Vygotsky and Luria wrote in 1930 about "the path of psychological evolution from the ape to civilized man,"[2] Vygotsky had devoted a whole chapter to Sultan. The purpose of the experiments was, in the words of Vygotsky, "to find among the apes rudimentary versions of those forms of behavior specific to man that are usually denoted by the general term, rational behavior or intelligence."[3]

[1]Leontiev (1981, p. 209).
[2]Luria and Vygotsky (1930/1992, p. xi).
[3]Ibid., p. 4.

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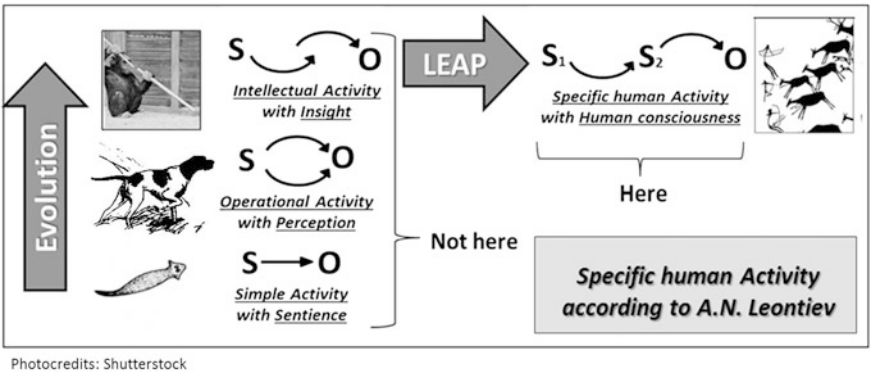

Fig. 9.1 To socialize the intellectual activity of his activity scheme was therefore Leontiev's solution

Köhler found plenty of that, and Vygotsky had to admit that the chimp "exhibits a type of behavior that is specifically human."[4]

Nothing could make the problem more obvious than the glaring contradiction in this admission, and though Vygotsky, with usual acumen, labored over 35 pages to spring the human from the ape, he met with little success. Unable to pin down the decisive qualitative difference, he resorts to the quantitative and writes that our similarity "does not, of course, apply to *volume* of intellect."[5] Possibly this was a reference to Engels' idea that a volume expansion of the brain had followed when early man became a hunter and gained access to a rich protein source—"with all due respect to the vegetarians, man did not come into existence without a meat diet," the old Huntsman wrote.[6] But possibly, Piltdown man still being the gold standard, Vygotsky also had Keith and his Cerebral Rubicon in mind; after all, Vygotsky did write: "One should remember, however, that quantitative differences become transformed to qualitative differences."[7] Engels and Keith, (and the irksome problem of the human prerogative), may also have been the reason why Leontiev later in *Problems in the Development of Mind* felt called to write in length about the brain, detailing the neuroanatomy and cubic volumes of different species.

With the whole range of *individual* tool activity—tool *use*, tool *making*, and tool *combination*—out as the human prerogative, Leontiev still had one arrow left to fly: *Social* tool activity. That is, activity where individuals serve as tools for each other in a joint effort. Furthermore, it seemed the most obvious choice, since Marx and Engels, when they identified labor with tool use, never tired of emphasizing its inherent social nature. To socialize the intellectual activity of his activity scheme was therefore Leontiev's solution, as seen in Fig. 9.1.

[4]Ibid., p. 30.
[5]Ibid.
[6]Engels 1876.
[7]Luria and Vygotsky (1930/1992, p. 32).

Choosing the cooperative hunt as the first instance—and thus prototype—of uniquely human behavior, Leontiev got smarts, tool use, and division of labor in one throw: "Some of those taking part in the collective hunt fulfilled the function of pursuing game, others the function of waiting for it in ambush and attacking it. This led to a decisive, radical change in the very structure of the activity of the individuals taking part in the labor process."[8]

It also enabled him to endorse Engels' emphasis on the meat-providing hunt and pay tribute to Jean-Jacques Rousseau's early recognition of the immense mental task involved. In his classical anthropogenesis from 1754, the Frenchman wrote: "If a deer was to be taken, everyone saw that, in order to succeed, he must abide faithfully by his post: but if a hare happened to come within the reach of any one of them, it is not to be doubted that he pursued it without scruple, and, having seized his prey, cared very little, if by so doing he caused his companions to miss theirs."[9] It was precisely with this need not to lose sight of your own role in the collective setup that Leontiev identified the specific human consciousness.

Leontiev explains over many pages, but the gist is this. He calls man's collective hunt "[t]he most important, decisive step" because in the division of labor, where beaters have to drive away the prey they want to catch, "[m]en's activity is now separated from objects in their consciousness." For the hunter partaking in a division of labor, what he wants and what he does become two different things, which means that the object is "singled out from its oneness with his biological relations." This split, soon widened, is consciousness. "[I]rrespective of whether the person concerned directly experiences a need for it and whether it is now the object of his own activity," the object now becomes 'objective', or, as Leontiev writes, "'theoretically,' i.e., it can be retained in consciousness, can become an 'idea'." And all this is the result of the division of labor in the hunt: "Obviously, nothing other than the given individual's relation with the other members of the group, by virtue of which he gets his share of the bag from them, i.e., part of the product of their joint labor activity … constitutes the direct reason why a specifically human form of reflection of reality, human consciousness, arises."[10]

Leontiev's description of human consciousness as an 'objectification of objects' is spot on. So his founding story would have been, was it not for this little problem. While Leontiev may not have known back in 1940, it is well-documented today that collective hunting with a division of labor is found among animals too. In lions, for instance, lionesses hunt collectively with some individuals forming the driving wings and others waiting in ambush in the center. Bottlenose dolphins do it, with one 'driver' dolphin herding the school of fish toward 'barrier' dolphins. And, as described in blood-curdling detail by Jane Goodall from Gombe Stream National Park, our cousins, the chimpanzees, do it too when hunting small colobus

[8]Leontiev (1981, p. 187).

[9]Rousseau (1754).

[10]Leontiev (1981, pp. 188–189).

monkeys.[11] These animals obviously have sufficient insight to engage in this cooperative activity, and 'insight' is the operative word.

In insight, the object is not singled out and separated from its biological oneness with the doer. Rather, an outside implement—Sultan's stick, for instance—is invited into and added to this relationship. Insight means complication, not separation. So either human consciousness is an advanced and more complex instance of insight, which—*so oder so*—has grown out of simpler forms of animal mentality; or, it is of a completely different kind with a completely different origin. As we here claim that the latter is the case, Leontiev's explanation is insufficient. Consciousness does characterize human hunting activity, as Leontiev rightly states, but the objectification of objects did not originate with the hunt, and therefore must have arrived from somewhere else. In other words, we are back at square one. But there is more.

The Social

Intellectual activity is not the only activity type to have a social version; in fact, all the activity types in Leontiev's scheme have, as shown in Fig. 9.2.

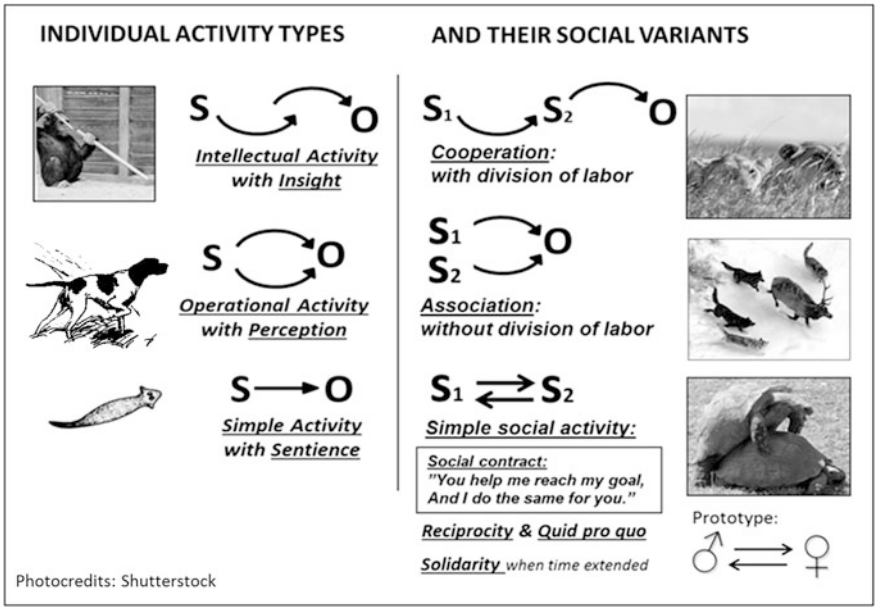

Fig. 9.2 All the activity types in Leontiev's scheme

[11]Goodall (1986).

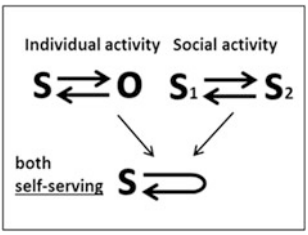

Fig. 9.3 Social activity is ruled as much by self-interest as is individual activity

While the cooperative hunt of the lion pride and the associative hunt of the wolf pack are trivial cases, the simple social activity requires a word since the very nature and definition of the social are expressed here, which the sex-prototype in Fig. 9.2 will help to explain.

As a food object is required in feeding, a sex object is required in mating. By agreeing to be the male's sex object, the female enables the male to achieve his end, and by offering himself as the female's sex object, the male enables the female to achieve her end. (Extensive negotiation—courtship—is often required to assure the participants that they are to be sex objects and not food objects, and it has been known to go wrong.)

To be in need of another participant, who in turn is in need of you, is the essence of the social relation. Symmetrical and reciprocal, it is basically a *quid-pro-quo* trade. It has often, if slightly tautological, been referred to as *a social contract*; (all contracts are social, and all social is contractual whether stated or implicit). The contract can be with instant delivery as in sex, pack hunting, and barter. Or it can be spaced in time—'you owe me one'—giving rise to insurance contracts, musketeer oaths, principles of solidarity, and what with a wonderful contradiction in terms has been called reciprocal altruism. In every case, social activity is ruled as much by self-interest as is individual activity, as Fig. 9.3 makes clear.

Thomas Hobbes, who insisted that all behavior is selfish, maximizing pleasure and minimizing pain, called the social contract rational or enlightened self-interest; and though they disagreed vigorously about who was to be the arbiter of the contract, Enlightenment philosophers from Hobbes, Rousseau, and Locke to Proudhon, saw it as the very foundation of civil society: "The social contract is an agreement of man with man; an agreement from which must result what we call society … [and] first brought forward by the primitive fact of exchange."[12]

The idea of the social contract has been part and parcel of every classical anthropogenesis since Protagoras had Hermes, patron deity of commerce, bring "the ordering principles of cities and the bonds of friendship and conciliation," to the suffering humans, who "having no art of government … were again in process of dispersion and destruction."[13] Society as a contract between individual actors, growing out of barter and exchange, is still the basic mainstream understanding, shared by conservatives, liberals, and socialists alike, and the foundation of today's

[12]Proudhon (1851/2013, p. 112).

[13]Plato: Protagoras.

ruling economic theory. As with the other defining constituents of the classical anthropogenesis, brains and tools, the idea is evidence based and therefore not entirely without merit. But like these, it also misses the point completely. Humans have bigger brains, more advanced tools, and more complex social cooperation than their animal ancestors. But if we insist on a difference in kind, we not only have to conclude that the secret of *humankind* does not rest with the brain, or the tool, we must also conclude that *it does not rest with the social.*

This conclusion is radical, of course. It means that the human secret is not to be found among the activities in Fig. 9.2; yet the figure seems to exhaust all the possible individual and social activity combinations. So either has the claim for a difference in kind been defeated; or somewhere in the maze of activity arrows there is still one hitherto missed. The latter is the case.

Self-interest and Other-Interest

The chicken does not always end up in the stomach of the vixen that caught it. Sometimes it ends up in the stomach of the vixen's cub, as shown in Fig. 9.4.

The figure illustrates the two fundamental tasks of the living being. As already discussed, the individual must feed to sustain itself, and reproduce and feed its young to sustain the species. In the first case, the doer is herself the end user and material beneficiary of the activity; in the latter case, she is not, someone else is.

This adds another arrow to the activity system. In a simplified form, it consists of the three fundamental relations in Fig. 9.5 (or two-and-a half as the social relation is at best a hybrid). As the Other-interest relation is asymmetrical, it breaks into two different positions, that of the benefactor and that of the beneficiary. This gives us four fundamental stands with associated sentiments. They are called the primary colors of engagement here to signify that they are mixable and give rise to a palette of both secondary and tertiary 'colors.'[14]

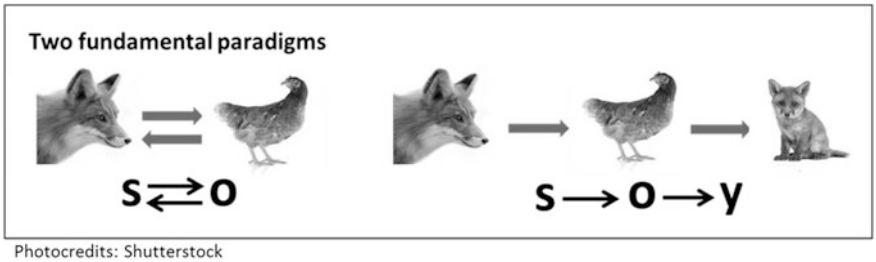

Fig. 9.4 Two fundamental paradigms

[14]If you are familiar with the German philosopher Alex Honneth (1995) and his renowned theory of social recognition based on Hegel's Philosophy of Right, you will find a correspondence between his spheres of recognition and moral grammar and the above stands and sentiments.

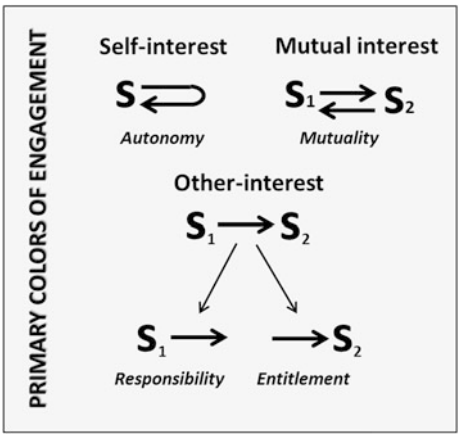

Fig. 9.5 Primary colors of engagement

Self-interest and *Other-interest* have traditionally been referred to by the Latin terms *egoism* and *altruism*, which means exactly the same. We prefer not to use the Latin terms here, as they are carriers of an old ideological controversy we do not need. Proponents of the Atomist and Hobbesian philosophy that human beings are fundamentally egoists—rational self-seekers—deny that altruism can exist at all. Their argument, called *psychological egoism*, is basically this: Every task that meets with success is rewarding; successful altruistic acts are therefore rewarding, which excludes that they can be called altruistic. As David Hume maintained, this is way too simplistic.[15] We are not disinterested in the outcome of our activities, of course, but this does not by itself turn them into selfish acts. If we keep an eye on who the material end user of the activity is, the distinction between self-interest and other-interest should be unproblematic; and as the material end user in reproduction and parenting is the young, other-interest is a fundamental fact of the living world.

It is with *other-interest*, the asymmetric and nonreciprocal activity arrow missing in Leontiev's scheme, our hope to find the difference in kind now rests.

Lost and Refound in Translation

The original title of Engels' ape-essay reads: *Anteil der Arbeit an der Menschwerdung des Affen*. English speakers have two words with different connotations for *'Arbeit.*' *'Work'* highlights the change effected and result produced. *'Labor'* emphasizes the toil experienced and energy expended to the exclusion of the product. In the German 'Arbeit'— as in the Russian 'rabota'—both meanings are compounded, but English does not invite such equivocation, so what was the

[15]"What interest can a fond mother have in view, who loses her health by assiduous attendance on her sick child?" David Hume (1777), Appendix 2, p. 300.

translator Clemens Dutt to choose? The Communist Party of Great Britain had sidestepped the issue by naming its two regular publications the *Daily Worker* and *Labour Monthly*, but Dutt, a writer for both publications, did not have this easy way out. As Marx and Engels had repeatedly emphasized as uniquely human the huge transformation effected by production, 'work' seemed the obvious choice; when Dutt therefore chose 'labor' he must have had an even better reason. A good guess would make Marx's great discovery this reason.

Marx's Great Discovery

In capitalist production, a capitalist buys raw materials and tools and hires a worker to make a product, which subsequently is sold in the market at a profit. Added to the capital and reinvested, the profit allows the process to be repeated and expanded, in principle, ad infinitum. It was this snowballing growth power of capitalism that did in the ineffective feudal economy and gained the bourgeoisie its victory with the world-changing things that followed, Enlightenment among them. But where did the profit come from? The question divided the political economists and the political factions. The liberals held that it was just the capitalist's fair cut for putting up the money. The socialists held like Proudhon that it was thieving. The profit proved to them that workers were paid less than the full value of their work, and that the social contract was therefore being breached.

Marx saw it differently; things were a little more complex than the simple social contract understanding of liberals and socialists let on. The worker is not a craftsman paid for his work, but a wage-laborer paid for his labor, which is something entirely different. Using a distinction first formulated by Aristotle, Marx explained that the worker sells his labor power as a commodity and receives as wages its *exchange value*, its price in the market. Now the temporary owner of the commodity, the buyer is free to make use of its *use-value* (utility), which happens to be *the ability to produce more than its own upkeep requires*. In other words, here is a *surplus* to harvest for the owner of the commodity, thus *surplus labor* is the origin of the profit. The worker may be abused and exploited, forced to sell his labor to live, as he is, but he is *not* being cheated. Marx: "The circumstance, that on the one hand the daily sustenance of labor-power costs only half a day's labor, while on the other hand the very same labor power can work during a whole day, that consequently the value which its use during one day creates, is double what he pays for that use, this circumstance is, without doubt, a piece of good luck for the buyer, but by no means an injury to the seller."[16]

The ability to produce more than your upkeep requires—surplus labor—is the source of the surplus upon which the capitalist society rests and grows. But, as Marx explained, it was also the mainstay of the former feudal society where serfs produced the surplus, and of the slave owning society before that. It was simply the

[16]Marx (1867), 7, Sect. 9.2.

basis of the human society, and—as he tried to explain to his Social-Democratic comrades, who kept insisting that workers should receive 'the undiminished proceeds' of their work—even the future communist society must be based on surplus labor, if differently organized. Without a surplus, there would be no investment in infrastructure, no funds "intended for the common satisfaction of needs, such as schools, [and] health services," and no "funds for those unable to work."[17]

Keeping in mind labor's power to produce a surplus, Dutt's translation of the very first word in Engels' essay makes sense: "Labor is the source of all wealth." It makes sense in our story, too. While Engels' own word, Arbeit, encompasses a whole bouquet of sliding meanings, hands and tools, work and production, intelligence, social cooperation, labor, and surplus, Dutt's choice is unequivocal and precise; and by picking the only flower in the bouquet we have not yet discarded as the keeper of the human secret, his translation is indeed helpful. It continues: "But [labor] is even infinitely more than this. It is the prime basic condition for all human existence, and this to such an extent that, in a sense, we have to say that labor created man himself."[18] Labor and its power to produce a surplus could be the unique characteristic that made the human being. Engels could be right; at least in the English translation he could.

How Dumb Can You Be!

In the original version of the theory Engelsted (1984), I am about to present, I did assume that surplus labor was the human prerogative. Only humans were capable of going beyond their own needs and produce a surplus for others to enjoy, I claimed; animals were trapped in a Hobbesian world where an iron law ruled: *Everyone for themselves.* This was the qualitative difference between humans and animals, the difference in kind.

Then one leisurely summer afternoon in Jens Mammen's garden I was watching a pair of blackbirds flying to and fro, frantically feeding their screeching nestlings. What better life those birds would have if someone freed them of the little blood suckers, I was musing, when my error struck me like a bolt. *Selfishness is not a universal law in the animal kingdom!* On the contrary, animals spend a large part of their time unselfishly servicing their young and bringing new generations into the world. New generations are the surplus upon which the living world is built, and the parent organisms are producing this surplus at great expense, unrequited, and with no material benefit to themselves. If ever there was surplus labor, it was here.

As *other-interest* precisely was the activity arrow we saw missing in Leontiev's scheme, here we seemed to have the solution (Fig. 9.6).

[17]Marx (1875), part one.

[18]Engels (1876).

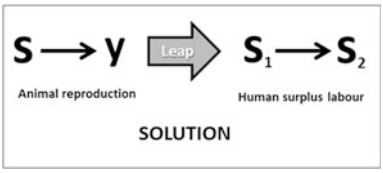

Fig. 9.6 The looked for solution

Or we would have, had the solution not again threatened to obliterate the borderline we are trying to establish. If surplus labor—by another name—is a fundamental fact of the living world, it cannot at the same time be the unique and defining human characteristic; at best, we are back to difference in degree. Unless we can point to a *specific* difference between the other-interest in animal reproduction and the other-interest in human surplus labor, our claim for a difference in kind has been defeated.

Fortunately, we can. In animal reproduction, the material beneficiaries are exclusively the young; in human surplus labor, the beneficiaries can be somebody else; this is the difference. If we can now just show how animal parenting could turn into human surplus labor in a single decisive event, like the fish coming ashore, the secret of the human being could finally be within reach.

Now my gross oversight had only proven once again that authors often do not themselves understand what they are copying down, because despite my folly, my theory had precisely been a theory about how animal other-interest turned into human surplus labor. It is to this theory we now turn.

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Chapter 10
The Secret of the Human Being

Abstract This chapter proposes that human surplus labor originated from reproductive labor in an Adam and Eve-like event, in the process creating the human society as a generalized reproductive platform, and making economy the special human ecology. It is further suggested that it was the investment of a surplus from female gathering that made the development of male hunting possible in the first place, thus making hunters and gatherers the first societal formation in human prehistory.

Hunters and Gatherers

The first societal formation to come out of the prehistoric haze, and still around when Westerners started to explore and exploit the wider world, was the *hunters and gatherers*. The name refers to their forage—'meat and potatoes'—but also to a division of work between the genders. While females could hunt, their main occupation was the gathering of plant food, and, conversely, while males were able to collect plant food, their chief occupation was hunting.

A need to exploit fringe resources would explain this spread and division. If their original and common 'ape fare' had been exhausted, either because of climate change, or because of the competition—when baboons became able to digest unripe fruit, they beat everybody to it—the proto-humans had to look around for new and less accessible foods. There were two on offer, a rich protein source running around, and a rich carbon hydrate source partly buried underground. As the first was fast moving and difficult to catch, and the last was difficult to find and hardly edible without processing, they required different sets of expert skills to exploit.

As mammalian mothers with an extreme K-strategy, that is, one offspring at a time, lengthy nursing and feeding, and stretched out parenting, the females were permanently burdened down with infants and juveniles, and lest reproduction suffered, they could not roam the territory's periphery in search of prey; neither could they chase it down when found. Thus, females had to settle for the challenges of the 'potato' fields; but at least their food objects were sessile, and if managed,

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N. Engelsted, *Catching Up With Aristotle*,
SpringerBriefs in Theoretical Advances in Psychology,
DOI 10.1007/978-3-319-51088-0_10

often a very rich resource. Leaving this resource as a reserve for the females and the young, the males took up hunting for meat and the challenges that entailed. Precisely the division of labor Rousseau envisioned in his classical anthropogenesis: "The sexes, whose manner of life had been hitherto the same, began now to adopt different ways of living. The women became more sedentary, and accustomed themselves to mind the hut and their children, while the men went abroad in search of their common subsistence."[1]

It is generally agreed that human society developed from the hunters and gatherers. Since a seminal symposium in 1966 with that title, it is also generally agreed that *man the hunter* led the way.[2] In the mainstream understanding, males began to provide the females and the young with meat from the hunt, which in a difficult situation eased the female burden and improved the survival rate of the offspring. One theory explains that females became sexually receptive 24/7 (human females are) to make sure the males brought back their game, and that this food-for-sex agreement became the basis for the emergence of the human family, where, in the words of Rousseau, "the habit of living together soon gave rise to the finest feelings known to humanity, conjugal love and paternal affection."[3] The demands of the cooperative hunt also explained the emergence of strong male coalitions and strong reciprocal altruism and social exchange.[4] Hunting further explained the emergence of stone tool use, both as clubs, projectile points, and butchering knives. Evidence based and reasonable, the mainstream understanding is not wrong, only there is a missing link.

Man did become a big-game hunter, and the emergence of hunting was no doubt crucial to the evolution of the human society. It hardly proceeded in a straight path, however. It would have been extraordinarily difficult for a small anthropoid plant eater to turn into an effective hunter overnight; the ferocious chimpanzee only manages to bring two percent meat into its diet, for instance. Even as a scavenger, now a favored theory, the predator competition on the savanna would have given our ancestor quite a match. For a long time, therefore, our prospective hunter and human candidate must have depended largely on gathered plant food. Nonarctic hunters and gatherers still do. The majority of calories is obtained through gathering. Hunting provides no more than 20–40% of calories in the diet.[5] This fact also explains why women as a rule perform the bulk of the effective work in hunters and gatherers, and throws in doubt the cherished image of man the hunter as the provider of mothers and children patiently waiting back in camp. This sets the background for the following theoretical model, myth if you like.[6]

[1]Rousseau (1754).
[2]Lee and De Vore (1968).
[3]Rousseau (1754).
[4]Buss (2015, p. 80).
[5]Ibid., p. 82.
[6]Engelsted (1984, 1992).

The Fateful Adam and Eve Event

The gender segregated foraging strategies meant a partly territorial separation with the slow-moving females and young in the center, and the faster moving males patrolling the wider ranges of the territory. This territorial gender segregation was not new, however; the setup with the mother group in the center, and males roaming the periphery, is not unknown in mammalian species; it is found among chimpanzees, for instance, and among elephants, where the mother group is led by an old matriarch, who decides when and where to trek in search of food. Only the food specialization of the genders was new.

When fast foods became unavailable, to acquire the necessary skills of gathering took not only lengthy learning, but also much teaching. Working along with their mother and her sisters, the girl was taught the necessary botanical expertise and kitchen technology; which plants were good, and which were to be spurned as inedible or toxic; which parts to pick, and which to leave alone; which plants were ripe to eat, and which had to wait longer into the season; and, most importantly, how roots and tubers had to be processed with stone, air, and water to become comestible. The boy learned a little of this too, but paid less attention as he had different role models, and his future laid elsewhere. With the onset of puberty, the young males were coming of age, and this passage also meant the passage from the mother group to the male group, where the adolescent male started his long apprenticeship as hunter and man. This passage from mother group to male group upon sexual maturity is found in other mammals too, chimpanzees, for instance.

It is easy to imagine the pride a youngster must have felt when he left his mother group to seek his fortune in the men's band of brothers. Neither is it difficult to imagine what he would likely have done when first time the hunters' luck failed and starvation threatened. After weaning, he had for years received food from the collecting bags of his mother and sisters, so finding his way back to his maternal group would have been his first thought. Being sexually of age and having passed to the men's side, the youngster was now no longer eligible for female child support, but what else to do in dire need than break this old law of nature? Mothers, with new underage dependents on hand, would per instinct perceive the approach of such a man–child as monstrous and routinely reject it, but on one occasion …

He should not have, but did; she should not have, but did; and from this transgression—insignificant in the modern eye—*the human way of being began.*

A reconstruction of the crime scene by Titian can be seen in the Prado Museum in Madrid.[7] In Titian's picture—*The Fall of Man*—we see three characters, all nude. Standing to the right, a woman is keenly eyeing a young child in the tree above; an apple passes between them, and immediately we think of a mother feeding her child. Sitting to the left, apparently exhausted, a grown male has his eyes fixed on the apple; he reaches out and touches the woman lightly on her

[7] https://en.wikipedia.org/wiki/The_Fall_of_Man_%28Titian%29#/media/File:Tizian_091.jpg.

shoulder, as if saying, "Me too!" Responding to his beckoning, she gives him some to eat.

What next happened we learn from an extant copy of the police report. "Then the eyes of both were opened, and they knew that they were naked, and they sewed fig leaves together and made themselves aprons." They had eaten from the tree of wisdom, we are told, and had become "like God, knowing good and evil." As a penalty for their transgression, they were driven from their innocent state of nature and condemned to a future life of labor; and, as the female was particular to blame, females from then on had to submit to the rule of males. As only consolation, if that it was, humans were now by far the cleverest creatures on the planet.

The report, though antediluvian and heavily mythologized, got the essentials of the case right; with wonderful irony, the Adam and Eve story in *Genesis 3* has captured what its secular and proto-scientific rival, the classical anthropogenesis, has not: the missing link in human evolution. The story of the female feeding the male forbidden fruit is the key to understanding how reproductive surplus labor was turned into human surplus labor, and how this created the human society as a new platform of life promotion, and, in the bargain, human consciousness, and language.

A hard-tried youngster that received maternal support could return to the hunting band restored and, in time, become a proficient hunter. Thus, if the safety net of female subvention spread to the other males in the group, the cause of hunting would have been greatly furthered. Thus, it may have been female gathering that made male hunting feasible in the first place, and therefore the division into hunters and gatherers the precondition for man's evolution to hunter. As it explains a lot of things, the educated guess is that this was actually what happened.

Merely an extension of female parental care to an illegitimate recipient, female gathering subvention demands *the procurement of a surplus in excess of her own survival needs*. This, as already told, is *materially* the same as the surplus labor political economy talked about. Not only does the individual female gather more than she herself needs, in hunters and gatherers, the group of females as a rule provides the community with food in excess of what they themselves consume. It is the creation of this communal surplus that turns *biological* parental care into *human* surplus labor, and the *biological* platform of reproduction into the completely new *human* platform of reproduction: *the human society*. In other words, *female surplus labor created the human society, and the first investment of the societal surplus was in male hunting.*

The mainstream understanding is to pick the male hunter for the leading part and make the females extras, so did not hunters bring something to the table? They did. If not quantitatively and calorie-wise as much, qualitatively the hunters' catch was of great importance. Not only was meat considered a treat and of great nutritional value, above and beyond its dietary attractions, the sharing of meat came to play a pivotal *social* role, and the more so since the procurement of meat, contrary to the procurement of plant food, was unsteady and unreliable. But even if meat had weighed in as much as plant food, there is this difference between the two items that makes the sharing of meat different from the provisioning of plant food. The size of most prey means that a kill will provide a hunter with more food than he can eat,

and larger game will provide a band of hunters with more than they can eat. Hunters, in other words, do not have to labor in excess of their own need to gain a surplus; they automatically and unavoidably get ample extra to share. Though hunters must do some extra work when they choose to bring surplus meat back to camp, (often they do not), hunting and sharing are not in a proper sense surplus labor. Contrariwise with gathering, the unit of plant food is as a rule smaller than the gatherer needs to reproduce herself, and she must repeat her action; in order to acquire a surplus to feed others she must therefore always labor in excess of her own need. If surplus labor created the human being, females were first to do it.

The red thread in the ecology is the food chain, and the constituting unit of the food chain is the relation between the organism and its food. As a rule *inter-specific,* this relation, as earlier told, turned *intra-specific* when *mammalian* mothers became food objects for their offspring, thus meshing the reproductive unit with a string of food chain. Now this relation undergoes yet another twist when the intra-specific feeding of the mammal becomes *generalized* to include other recipients than the proper offspring. This means that human society is also a mesh of reproductive unit and food chain and can be defined as an *intra-specific, generalized food chain and reproductive unit*. The special *ecology* of this new platform of living is called the *economy*. Note that Melanie Klein's good breast, bad breast complexity applies here as well. From the recipient's point of view, is the provider a dear benefactor or simply prey? From the provider's point of view, is the recipient a worthy beneficiary or simply a parasite? It is still being discussed.

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Chapter 11
The Creative Double Negation and the Non-Non-Cascade

Abstract This chapter describes how the Adam and Eve-like event unfolded to create the human being with its cascade of unique features. Employing a dialectical scheme, the negation of the negation, it is argued that a contradiction in the new way of being created human consciousness, self-consciousness, and language as new templates for evolution to fill out. An educated guess places the first time event with the Australopithecines. With reference to Claude Lévi-Strauss, it is further described how the event led to the development of human institutions like exogamy, totem and taboo, marriage, and social contracts. A brief sketch of society's subsequent economical history follows. A pivot in this history is the introduction of slavery, which fatefully changes the status of women, here quoted from Friedrich Engels' rendition of Lewis H. Morgan's work.

The Primal Scene

If this was how the *zoon politikon*, the societal animal, was born, how did we also become Aristotle's *zoon logon echon*, the animal with consciousness and language? To answer that question, we return to the primal scene where female gatherers were first confronted with a young male asking for food.

What happened I like to imagine was this. Watching his approach with hostile suspicion and bewilderment, the tension was suddenly released when the females burst into a joyous giggle. Humor had defused an unsettling and threatening situation. But what is humor? The archetype of humor is found in the children's riddles. Excitedly they ask: 'What runs and runs and never gets anywhere?' And when you, as you should, give up, they clap their little hands and laugh: 'A clock, dummy.' Humor is simply a solution to a cognitive contradiction, which releases tension in laughing and amusement.[1]

[1]You get the same sudden feeling of elation when in stereoscopy you manage to fuse two disparate images into 3D depth, and when in problem-solving an Heureka-moment is reached.

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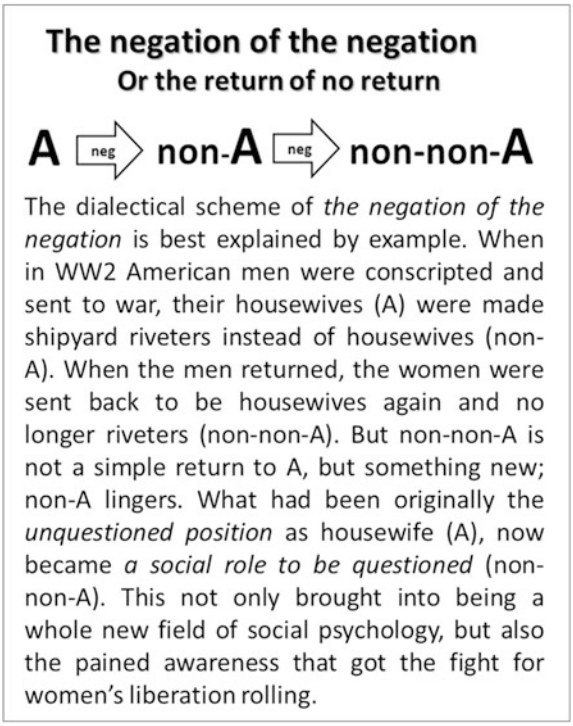

Fig. 11.1 The negation of the negation

A cognitive contradiction was exactly what faced the females. A child once (A), the youngster had come of age and was no longer a child (non-A); now he effectively claimed to be a child again (A). In mechanical physics you can turn back the clock, but you cannot undo human development, so, with his manly physique, voice, and genitals, to accept him as a child was impossible. Humor, however, makes the impossible possible when it allows the coexistence of contradictory claims, and this happened here. Instead of seeing him as a child, or a non-child, the females suddenly saw him as simultaneously both, a *non-non-child*.

With this wondrous construction, we are back in Hegel's land of dialectics, where the new is created from negations of negations (see Fig. 11.1).

The new that was created by the entering of the non-non-child is unfolded in Fig. 11.2.

1. In the natural state, as earlier explained, a biological identity relation exists between an organism and its food (a). An identity relation also exists between a mother and her change (b). By a rule of biological transitivity, an identity relation between the food and the young follows and (c) makes the young a legitimate recipient.
2. Place a *non-young* in the young's place and the identity relation with the mother, as well as with the food, is broken and void.

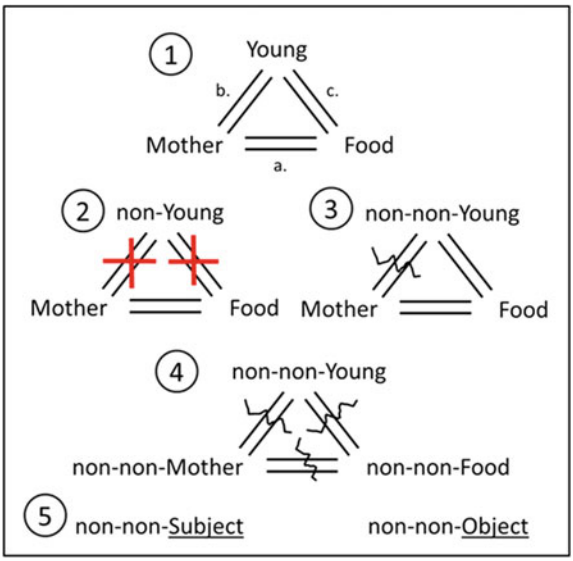

Fig. 11.2 The non-non dialectics

3. Place a *non-non-young*, however, and the triangle might still work, because the double negation *in a sense* restores the young. But only in a sense; in development return is the return of no return, the non-young, *in a sense*, is still in place. And because of the double sense, the relation between mother and non-non-young becomes wavering.
4. The wavering spreads to all the sides of the triangle, where the entering of the non-non-young results in the mother becoming a non-non-mother, and the food becoming non-non-food.
5. If we generalize, we can say that the event has transformed the biological subject into a *non-non-subject*, and the biological object into a *non-non-object*. This transformation is the arrival of the human consciousness and self-consciousness.

The double sense renders the object *a part of me* and something *apart from me*, my thing and a thing of its own; a duality precisely carried in the equivocal term 'object'. Objects do have this dual existence in nature as explained in the chapter on intentionality, but until the human being, animals could have no awareness of this. Only we can keep the object inside the hand (subjectively) and at the same time look at it from an outside position (objectively). Appropriately in the context of our Adam and Eve story, the latter has been called '*the God's Eye View*'. Not surprisingly, considering the non-non-complexity of the case, among philosophers its possibility has been heavily contested. If we are to base our decision on the evidence, however, the unique development of human science and technology proves that in some way at least it has been possible. The earlier quote from Leontiev sums it all perfectly up: "The transition to consciousness is the beginning of a new, higher stage in the evolution of the psyche. In contrast to the psychic reflection peculiar to animals, conscious reflection is reflection of material reality in its separateness from

the subject's actual attitudes to it, i.e., reflection that distinguishes its objective stable properties."[2]

What happened to the object also happened to the subject when transformed into a non-non-subject. In contrast to the animal's monolithic sense, the new double sense made the human subject view herself from both the inside (subjectively) and the outside (objectively). Observe that an inside view requires an outside view, inside has no meaning without outside. It was when the subject became an object for herself that subjectivity and self-consciousness came into existence. Leontiev got that right also: "The distinguishing of the reality reflected in man's consciousness as objective has as another aspect the distinguishing of the world of inner experiences and the possibility of developing self-observation on that basis."[3] Only it did not start with communal hunting, as Leontiev believed.

Language

Now human language, the enigma of enigmas, has become easy. In nature, the identity relation between mother and young is maintained and constantly confirmed by vocal and nonvocal signals passing between the two. When the non-non-young enters the equation, the communicative link must waver too. This transforms the signal into a *non-non-signal*. The non-non-signal shares the same duality as the non-non-object. Whereas the signal is locked in and part of the present situation, the non-non-signal, being both part and apart, reaches beyond the situation given. Potentially it can point to things not here and not now. A signal with this transcending duality is called a *sign*, and the sign is the soul of language. "Signification, that is, creation and use of signs", Vygotsky writes, is "the basic and most general activity of man that differentiates man from animals in the first place."[4] As long as we remember that signification began as a carryover from another activity, we can only agree.

While signals are sensory and make immediate local sense, signs, going beyond the situation given, have meanings that need interpretation; what do the issuers intend, what do they have in mind? The step from signal to sign therefore brings into being the distinction between sense and social meaning studied by Leontiev.[5] But as words became transferable vehicles of intention and meaning, so did any other man-made thing. As later explored by ingenious French philosophers, artifacts were signs too, and to understand what the makers had in mind, children, in addition to the vocabulary of words, had to be instructed in the semantics of things. As the curriculum expanded, so must childhood, and in time, the extra stretch was

[2]Leontiev (1981, p. 181).

[3]Ibid.

[4]Vygotsky (1997, p. 55).

[5]As the subjective is born with the objective, objective *social meaning* is immediately followed by subjective *personal meaning* or *personal sense,* which Leontiev (1978) also deals with.

inserted that Freudians call the latency stage. Cultural transmission, not unknown in the animal world, now simply took off. Mythology may have originated here too, as the notion of makers with intentions implied in the concept of meaning was projected onto the whole of nature. Externalizing what the makers had in mind, the artifacts created a world of *mind-products*. Mind-products now surround us everywhere. Hardly anything in our environment is not man-made, and not made for the maker to use but for the benefit of someone else. It is so pervasive that we do not give it a thought, but nothing proves better the importance of surplus labor in the constitution of the human world.

The evolution of language has invited some lame explanations, Engels perhaps taking the prize when he wrote that "the organs of the mouth gradually learned to pronounce one articulate letter after another."[6] Convinced that human language must have arrived in a leap, and despairing of the insufficiency of the proffered explanations, Noam Chomsky in sheer mockery proposed that "some random mutation took place, maybe after some strange cosmic ray shower, and it reorganized the brain, implanting a language organ in an otherwise primate brain."[7] A 'fairy-tale,' he admitted, but at least a better one than the other fairy-tales on offer.[8] Chomsky is certainly right about the discontinuous leap; only our fairy-tale is vastly preferable to his about the cosmic ray-gun.

Still the pedestrian explanations could be right also if we keep in mind Ferdinand de Saussure's crucial distinction between *language* and *speech*. Basically, language is the sign system and speech the act of communicating with signs. Chomsky's point was that you cannot get from the latter to the first. Once language came into being, however, speech must have followed, developing in the Darwinian way, step by step, as natural selection began to shape brain and vocal organs in accordance with the new answer key introduced with the demands and potentials of language.

Having one, we automatically think that a big brain must be of great advantage, but if it was, more animals would have one, surely. In fact, big energy-guzzling brains are a liability spurned in nature. Representing only two percent of our body weight, the brain consumes twenty percent of our bodily energy. Obviously, only the most extraordinary circumstance—threatening or promising—would justify energy expenditure so excessive and skewed, and no such circumstance existed in nature prior to the non-non-world of the human being. The main growth—ballooning—of the human brain has been in the neocortical layers. They can be thought of as pattern analyzing neural filters, and facing the human beings were precisely patterns of unprecedented complexity.

Consider only that the first word uttered in human history was a lie. In every physical aspect, the utterance—'me-child-food'—was the same as it had been in the past, only now the youngster's begging grunt had become a non-non-signal, not only a dual sign, but a duplicitous one at that.

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[6]Engels (1876).

[7]Ulbaek (1998).

[8]Chomsky (2000, p. 4).

The theory that our brains grew to enable us to identify social cheaters may not be wrong, but even more important than exposing such trickery was upholding the illusion when the new human way of life *required* the acceptance of the non-non-child. The identity triangle between mother, young, and food (Fig. 11.2: 1) now called into question and no longer a natural given, to persist had to become an artificial given. This 'artificing' happened when the wavering turned instinctive signals into signs and symbols. This was only the start, of course, but the start was decisive. In time, the first artificial identity triangle (Fig. 11.2: 4) in the hunters and gatherers evolved into *totemism*, an elaborate symbolic code linking kinship and food objects. But totemism was also only a start; later, all subsequent societies have worked their pants thin to establish and uphold symbolic identity triangles between the society's opposing participants and the societal surplus. Marxists sometimes refer to this as illusion and false consciousness, but this is perfunctory if it fails to recognize also that illusion has been the cement that made the human non-non-society possible, and that false consciousness is also consciousness.

An Impostor to Be Believed

More than communicative spin was required, however, to uphold the illusion that the man was a child; he also had to act like one. Thus a show of boyish charm and impish behavior became a priority. It still is. As denounced the man-child is in our modern culture, as beloved he also is, the paradox a reflection of the non-non-child problematic.

The roguish man-child is found in most ancient mythologies in the archetypical character of the *trickster*, a boundary crosser, says Paul Mattick, who violates principles of social and natural order, playfully disrupting normal life and then reestablishing it on a new basis.[9] The description fits, and even more evoking is the analysis of the French anthropologist Claude Lévi-Strauss. Insisting that mythical thought always progresses from the awareness of oppositions toward their resolution, he saw the trickster in Native American mythology—usually rendered as a raven or coyote—as a contradictory and unpredictable character mediating between the opposites of life and death. Science needs two kinds, dot collectors and dot connectors; with their particular limitations, they rarely see eye to eye. A dot connector of the first order, Lévi-Strauss was heavily criticized, and he did go a bridge too far. He should have stopped his chain of reasoning where the trickster was made out to be the ambiguous halfway between the plant eater and the meat eater! Then again, the bridge between gatherers and the hunters was a matter of life of death; it hardly is an accident that Hermes, who in Protagoras' story brought society to the humans, was a trickster in Greek mythology.

[9]Mattick (1998).

It should be mentioned also that natural selection, impressed by the need to make the non-non-child more convincing, lent a hand by selecting for childish facial features. This development, called *neotony* or *juvenilization,* explains why even our top alpha males resemble the juvenile chimpanzee much more than they resemble the juvenile's severe looking father.

Taboo, Exogamy, and the Importance of Being the Man

Childish theatrics was fine, but most importantly was not immediately to give the game away by behaving manly. As Rule Number One, it meant that the man-child must NOT behave sexually in his mother group, not flaunt his private parts, not propose any females, nor accept any advances from their side. In the antediluvian report, we read that their eyes were opened, and they discovered nudity—no animal could ever have discovered nudity—and consequently felt the need to cover themselves. In the hunters and gatherers, the need to keep separate food subvention and sex in time evolved into another symbolic code, the cultural institution of *taboo*, which dictated where you could not feed and who you could not have sex with.[10] Together with totemism, it laid the groundwork for an incredibly elaborate social order; no later society can show anything this intricate, but neither have any lasted more than a fraction as long.

If you cannot have sex in your mother group, you must have it in somebody else's mother group. This brought into being *exogamy*, another universal human institution.[11] For mating away from home to work, another mother group—or *matriclan*—had to be within reach, but would the males there accept such an approach? The threat of marauding males being real, they would certainly be wary of trespassers, but here communal hunting worked its wonders. Males hunting together, bonded together, and with the sharing of hardship, danger, and meat, enough trust was built for a fellow to visit another fellow's sister, or her him. The best hunter with most meat to share became *The Man*, able to parlay his social status and prestige "into powerful social alliances, the deference of other men and greater mating success."[12] Thus the ring was closed; *hunting made exogamy possible, exogamy made provisioning by females possible, and female surplus labor made hunting possible.*

Men, as has been argued by the American anthropologist Kristen Hawkes, did not hunt so much to provide for their own families but rather to gain the status benefits of sharing their bounty with neighbors.[13] So crucial were these benefits that

[10]Most illustratively described in Evelyn Reed's *Woman's Evolution*, 1975. Together with Elaine Morgan's *Descent of Woman*, 1972, it has been an original inspiration of mine.

[11]Chimpanzees outbreed too as a rule, but not as a law.

[12]Buss (2015, p. 79).

[13]Hawkes (1991).

hunters went out of their way to give away meat. In the original societies first visited by Western anthropologists, *The Big Man* willingly spent everything he had in great feasts, and often ruined himself. It took the anthropologists some figuring to understand why this irrational behavior was rational. As Lévi-Strauss showed, it all came down to sharing as the key to social control. In the end, to be king, you had to have meat in abundance to share with your brothers, with your sisters too on occasion. The American anthropologist Harris (1978) has convincingly argued that this was the reason Aztec rulers, when their game became exhausted, turned to the hunting of people and mass cannibalism. And it explains why kings and nobles through history have been such obsessive hunters, clearing large tracts of land of farming villages to make game reserves, and exacting terrible punishments on poachers. And while they may not know it, when elites today pay crocks of gold to blast away at birds and hares, and fight to the death for the right to trash through woods on the heels of yelping dogs, there are deeper things in play than just love of the great outdoors.

The Human Choice

While the fateful event may have happened in different places and more than once, an educated guess places *the first time* in Eastern Africa a little more than two million years ago. The argument is this.

When the food crisis struck, and our ancestors had to seek out new and difficult food, there were two options. Males could try to become hunters, or failing that, they could become gatherers too. The first would lead to big brains, the second to big teeth. Big brains we have explained; big teeth are explained as an adaptation to difficult chewable grains and gritty plant fibers. With a mixed diet, a grinding denture would be a mixed blessing and the hunters and gatherers were therefore spared; if both sexes took up tough plant foods, however, natural selection would go full out for massive molars and huge masticatory muscles. If therefore we find a branching on our family tree leading to big brains and big teeth, respectively, the event would have happened somewhere prior to that. As seen in Fig. 11.3, this is precisely what we find. The event that changed natural selection's answer key and brought the human way into being may first have happened with the small African australopithecines.

If so, the next big thing that happened was big-game hunting. It created a crisis of its own. As the large hoofed grass eaters and the elephants were migrating animals, to chase them hominids had to migrate too. That the females would have been reluctant to leave behind their familiar tracts, and thus their intimate local flora knowledge, is not difficult to imagine. For those who chose to follow the hunters, general abstract botanical concepts had to replace their former local concrete experience, but with the nascent linguistic consciousness ready to be filled out, they came prepared for that. Starting right away, this *general knowledge* in time grew into a syllabus of rhymes and song lines taught to new generations.

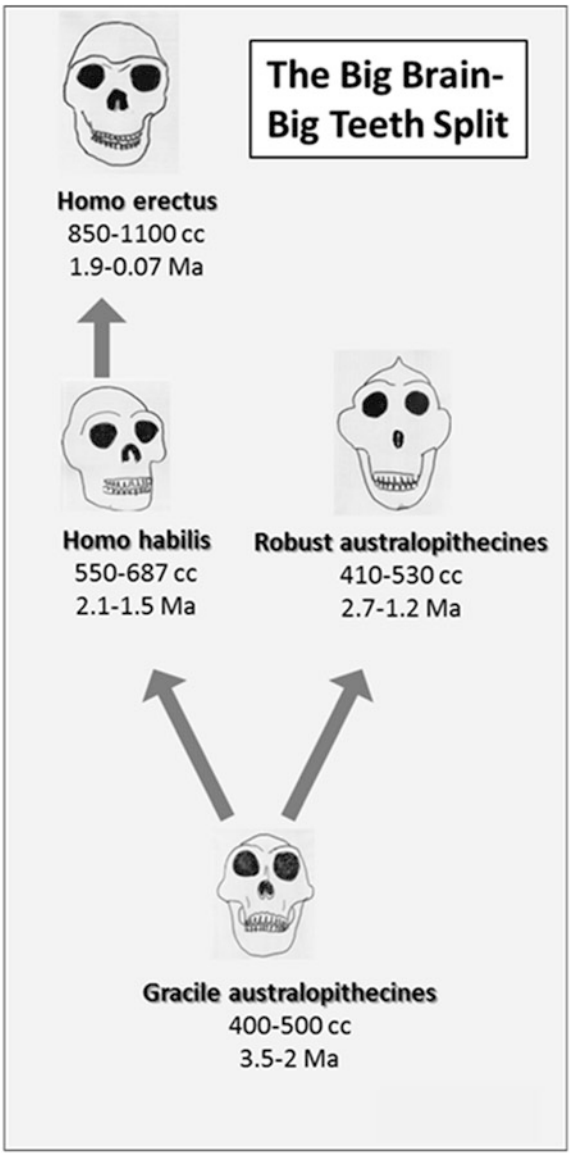

Fig. 11.3 The telltale split

The new hunting way of life made the little community highly dependent on meat, but not only was its procurement unreliable, as a source of energy, it was uneconomical. Raw meat costs nearly as much energy to digest as is gained. Until that problem was solved, big-game hunting remained a questionable proposition. It was solved with the invention of *cooking and use of fire*. Homo erectus, the next brain size up from Homo habilis, used fire and became a big-game hunter.

Marriage

Depending on the fickle game resource, the traveling hunting bands had to be small and widely dispersed. The necessity of smallness placed the original *support/sex arrangement* under great strain and big-game hunting would hardly have been feasible without a new invention. The new invention was the *support—sex arrangement* called *marriage*. As an extension of parental care, the male had received his female support from genetically *related* females, which in turn required that his sexual needs were met by *unrelated* females. With fewer people around, an obvious rationalization would be to half this personnel requirement by turning the food-supporter and the sex-partner into one and the same. The male could have opted for the *related-related* combination and taken off with his sister, but if any did, they were never heard of again; exogamy being the linchpin of the societal order, only the *unrelated-unrelated* combination had any future.

With the introduction of *unrelated* female support, the genetic bond ceased to be the basis for surplus labor, a most crucial turning point. You could say that the human being had made the final switch from biology and ecology to culture and economy, only culture and economy *are* the specific human biology and ecology.

Marriage holds a deep secret too, and Lévi-Strauss found it out. Marriage is not—at least not until very recently—a contract between a man and a woman; it is a contract between a man and other men about the right to a woman. Starting out from Marcel Mauss' inspired book about *the gift* as the ultimate means of social control, ('by gifts one makes slaves and by whips one makes dogs,' an Eskimo saying goes), Lévi-Strauss identified the woman as the ultimate gift. This in turn explained taboo. "While men see the women who belong to their group as potential sexual partners, they recognize that these same women are also desired by men from other groups and are therefore means of securing alliances with them."[14] As alliances based on exchange is the foundation of the human society, "the prohibition of incest is less a rule prohibiting marriage with the mother, sister, or daughter than obliging the mother, sister, or daughter to be given to others."[15] This 'give away' is marked by the stippled arrow in Fig. 11.4. It is named 'control' because the giver remained in control of the gift; the woman and her children remained her brother's 'belongings' and he had a great say in their lives.

The central role of the maternal uncle was long an enigma to anthropologists, but Lévi-Strauss had the explanation: "The primitive and irreducible character of the basic unit of kinship…is actually a direct result of the universal presence of an incest taboo. This is really saying that in human society, a man must obtain a woman from another man who gives him a daughter or a sister. Thus we do not need to explain how the maternal uncle emerged in the kinship structure. He does

[14]Lévi-Strauss (1969, p. 51).
[15]Ibid., p. 481.

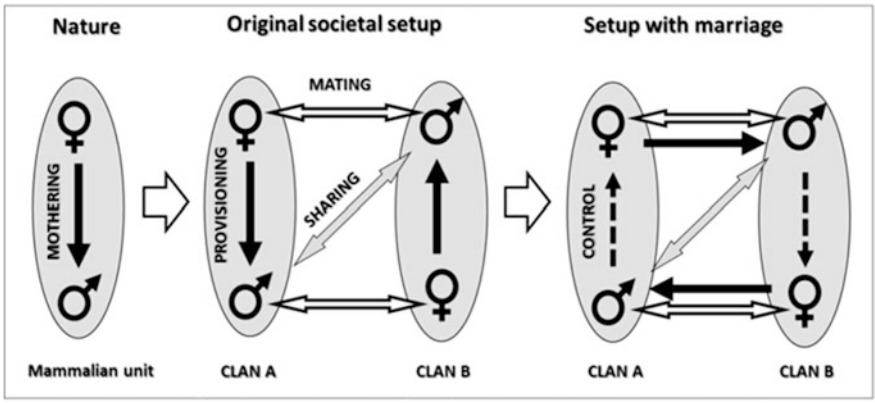

Fig. 11.4 The evolution of the human family structure

not emerge—he is present initially. Indeed, the presence of the maternal uncle is a necessary precondition for the structure to exist."[16]

Like Hegel, obviously a creative genius, Lévi-Strauss had numerous dazzling ideas and it should not detract much that he turned things on their head. Taboo is not explained by the need to exchange women; it is the other way around. Exchange of women is not explained by the need to make alliances; it is the other way around. And the need to marry a woman is really not about sex; it is basically about the female surplus labor.

Today in the West, where even the nuclear family is on the verge of dissolution, we are stunned by the extremes to which some traditional societies are willing to go to uphold the control of women. The fervor of the zealots is less inexplicable when we realize that at stake is the original foundation of society, ancient long before it was codified in holy books, now under mortal threat from Western modernization. But if the original extended family and clan structure is fast becoming obsolete, the *general societal model* remains undisturbed. The human society is still, as it always was, *socially controlled surplus labor,* as shown in Fig. 11.5.

Humanity on the March

With marriage, general knowledge, fire, and long legs, *Homo erectus* was ready to move into the world, and in wave after wave out of Africa, the hominins began to populate the planet, Homo sapiens the last emanation.

[16]Lévi-Strauss (1958/1963, p. 46).

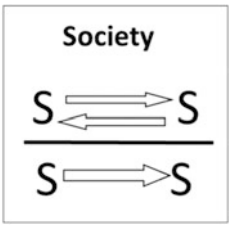

Fig. 11.5 Socially controlled surplus labor

Arguably, the last ice age was the heyday of the *Homo sapiens*. Plains teeming with big game like mammoths, wild horses, and bison, made possible a life of leisure[17] and rich culture, as attested by the magnificent rock cave art in the river valleys of France and Spain. But when the weather warmed and forests spread, the big herds could not be sustained, and the days of the big hunter were permanently over. A crisis no doubt ensued, but with a heightened need for gathering, the women rose to the occasion. Starting in tracts in the Middle East where many domesticable plants and animals were to be found, clever women began tending to the plants, seeding, watering, and weeding, and soon *agriculture* was invented. If the revered status of women had shifted to men with the advent of the big hunter, it now shifted back again. But not for long.

Our cousin, the chimpanzee, is a violent species, routinely warring on its neighbors, and so apparently are we. There was not much that hunters and gatherers could do with defeated enemies, however. They could kill their captives in some gruesome way to steal their souls; they could adopt them; or they could set them free. With the invention of agriculture, a new possibility presented itself. They could be put to work, laboring in the fields to produce a surplus. The *slave* had been invented, and history turned again.

History in a Thimble

Society as an engine that creates, accumulates, invests, distributes, and preserves wealth began with female surplus labor and the hunters and gatherers. The hunters and gatherers obviously wanted no more material wealth than they could carry; the great wealth they created was the nonmaterial social, intellectual, and spiritual capital that made the human being. Agriculture, however, meant a stationary life, which for the first time made the creation and accumulation of *material* wealth a worthwhile proposition; if you could find a large enough labor pool, very worthwhile. Thus with slavery, and the ensuing property relations, expanded material wealth became possible, and with this *civilization* began with all its achievements, towns and temples, priests and schools, markets and money, mathematics and

[17]Sahlins (1972) famously has argued for affluence among hunters and gatherers.

science, and administration and taxes. With serfs less costly and negligent than slaves, and fine-tuned by the invention of birth right and primogeniture, the accumulation of wealth reached a high point in the following *feudal society* as attested by its splendid treasures, ponderous castles, and magnificent cathedrals. It had an Achilles heel though. The excessive emphasis on accumulation caused congestion in the flow of circulation, and made the engine stutter.

What the nobles did not fathom was brilliantly grasped by the budding class of enterprising townspeople and merchants. Self-enrichment is fine, but if you want to accumulate wealth, you must spend it first! With this new emphasis on investment, *capitalist production* was born, and with it the *bourgeois society* with all its marvels, not least the Enlightenment the bourgeoisie unleashed in its struggle for emancipation. Yet, this society also had an Achilles heel. Having easily out-produced the feudal economy, it began to out-produce itself. To make a profit possible, the price of the commodity must exceed the cost of its production; thus wages must be less than the exchange value of the commodity. This surplus value is not theft, as Marx correctly saw, but it means that the production by necessity will exceed the buying power of the working population, and with unsold goods lying idle in the warehouses, there would be no profit to invest in new rounds of capitalist production. Industrial innovation would still make some growth possible, but as growth in time meant mass production, calling for mass consumerism, the problem was just exacerbated. There were two ways to muddle through this impasse. You could export your problem away by aiming at foreign populations; only opening up foreign markets usually meant colonial conquest and trade wars with huge overheads added. You could also let your own population go into debt to keep them buying, but besides being risky, there is a limit to how far people can mortgage their future. In other words, *capitalism*, its wonders of productivity and creative entrepreneurship notwithstanding, came riddled with crisis.

Here the working class and its struggle for emancipation entered history. As the slave owners had been dedicated to the *creation* of a material surplus, the nobles preoccupied with its *accumulation,* the capitalists fixated on its *investment*, the workers now made its *distribution* the issue. By organizing in trade unions and political parties, they gained the clout to improve wages and working conditions, win the suffrage—men first, women later—and redress the political balance of power. In the East, the workers simply took over the shop and began building a socialist society; in the West, they settled for social democracy and the welfare state, to which the capitalists grumblingly acquiesced as the lesser evil. Rather than an evil, however, the trade unions and the welfare state proved a gift to capitalism. By forcing through a wider distribution, the workers helped create the aggregate demand without which industrial capitalism could not function. For a time overcoming the economy's inherent contradictions, in the West this ushered in a golden age with unprecedented productivity, progress, prosperity, spread of wealth, and public services, creating a general mood of future optimism. But only for a time; after socialism stumbled and fell in the East (partly from envy), the priority in the West went back to cutting wages and dismantling public benefits with the

foreseeable return of escalating inequality and permanent crises. The capitalists were not to blame, though; they merely played their role, and the distribution of wealth was not part of it.

Morgan

The surrender of socialism would have been a surprise, otherwise the above history is basically the one Marx and Engels wrote about in *The Communist Manifesto*: "The history of all hitherto existing society is the history of class struggles. Freeman and slave, patrician and plebeian, lord and serf, guild-master and journeyman, in a word, oppressor and oppressed, stood in constant opposition to one another."[18] Of course, starting human society off with slavery was a little late; by the time this institution was invented, humans had already been around for immeasurable ages. Marx and Engels knew, but this was how it was told in the classical anthropogenesis, and they had no better source to the secrets of prehistory. Lewis H. Morgan changed that.

In the classical anthropogenesis, society grew out of the family as here described by Rousseau "The habit of living together soon gave rise to the finest feelings known to humanity, conjugal love, and paternal affection. Every family became a little society, the more united because liberty and reciprocal attachment were the only bonds of its union. The sexes, whose manner of life had been hitherto the same, began now to adopt different ways of living. The women became more sedentary, and accustomed themselves to mind the hut and their children, while the men went abroad in search of their common subsistence."[19] In seeming agreement, Marx and Engels in 1845 in *The German Ideology* wrote that the first social structure was "limited to an extension of the family," but their remarks about "the slavery latent in the family" in the next line[20] indicates that they did suspect that something was amiss in the standard story.

Morgan, an American railroad lawyer doubling as an anthropologist, discovered what it was during his field studies of the Iroquois and their kinship systems. Couched in terms of matrilineality and patrilineality, what Morgan discovered was basically that the marital family was not first, but had been preceded by a matriclan (or gens). Evidence of this could be found not only with the Iroquois, but with many other indigenous people, and also in Greek and Roman historical sources, and led Morgan to his grand theory published as *Ancient Society* in 1877. Subsequently Morgan's theory raised as much criticism as had Lamarck's, but critical points notwithstanding,[21] we obviously think that his discovery of the original sequence is

[18]Marx and Engels (1848, 1).

[19]Rousseau (1754).

[20]Marx and Engels (1845, 1A).

[21]For a critical survey of the current consensus see Knight (2008).

correct and important. So did Marx. Morgan's discovery had "the same significance for the history of primitive society as Darwin's theory of evolution, and Marx's theory of surplus for political economy," Engels later wrote.[22] In other words, Morgan's prehistory filled the gap between Darwin's natural history and Marx's history, only a bridge was needed. Wanting to build that bridge himself, Marx started extensive studies of the anthropological literature, setting aside his work with the last volumes of Capital, which Engels eventually had to finish. Engels also had to finish Marx's anthropological work, "the execution of a bequest," he called it. *The Origin of the Family, Private Property, and the State* was published in 1884—in Zürich to bypass the German antisocialist laws.

The work is of historical importance, but as we want to keep it simple and do not want to lose our way in the maze of anthropological intricacies, we shall stay at helicopter height and only quote this observation: "The overthrow of mother-right [matrilineality] was the world historical defeat of the female sex. The man took command in the home also; the woman was degraded and reduced to servitude, she became the slave of his lust and a mere instrument for the production of children. This degraded position of the woman, especially conspicuous among the Greeks of the heroic and still more of the classical age, has gradually been palliated and glozed over, and sometimes clothed in a milder form; in no sense has it been abolished."[23]

Another Fall

For maybe a million years everybody knew that females shouldered the main burden, gathering, cooking, bearing and rearing children; they were respected for it, revered, even feared; still were with the Iroquois into the modern times. As Morgan observed, "the women were the great power among the clans, as everywhere else. They did not hesitate, when occasion required, to 'knock off the horns,' as it was technically called, from the head of a chief, and send him back to the ranks of the warriors."[24] The 18th century Jesuit missionary and anthropologist Joseph-Francois Lafitau was duly impressed too: "Nothing…is more real than this superiority of the women. It is essentially the women who embody the Nation, the nobility of blood, the genealogical tree, the sequence of generations, and the continuity of families. It is in them that all real authority resides, the land, the fields and all their produce belongs to them: they are the soul of the councils, the arbiters of peace and war…"[25] The original prominence of women was reflected in the prehistoric mythologies where mother goddesses were in the lead; in Greece, for instance, *Gaia*

[22]Engels (1884/1972), preface to the fourth Edition.
[23]Ibid., II, 3.
[24]Morgan (1877, Chap. IV, footnote 1).
[25]Knight (2008, p. 66).

was the Great Mother of all, creator and giver of birth to the Earth and the Universe and to all the deities to follow in the pantheon.

Slavery changed all that. What happened to the skilled Detroit auto workers when cheap foreign labor took over their jobs, happened to the proud women when slavery was introduced; they lost their former status and became like slaves themselves. The women fought it; the echo is still there to be heard in the pre-historic legend. Monumental, for instance, was the primordial battle in *Enûma Elis,* the Babylonic creation myth, in which *Marduk*, rising male god and lord supreme, defeats and—in gory detail—destroys *Tiamat*, the reigning mother goddess, who resisted the takeover. Tiamat was referred to as the dragon or snake, which may explain the mischievous reptile in the Adam and Eve story, penned during the Jews' Babylonic captivity. Another example of early propaganda was the disturbances in Greece; where the killing of a male opponent by a party of angry women on Mount Pangaion has come down as the work of sex mad Maenads high on orgies and drugs. Women had suffered a 'world-historical historical defeat,' and the victors told the story.

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Chapter 12
Looking Toward the Future

Abstract This chapter argues that as female 'mothering' created the human way of being, it is now up to female 'mothering' to save humankind, which presently is facing huge and imminent dangers. Described is how in history each upcoming class brought something to the table of human wealth and progress: The feudal class a focus on accumulation, the bourgeois class a focus on investment, and the working class a focus on distribution. Now, in the fateful Anthropocene Age, a focus on the preservation of humankind's gains is essential. Following a discussion of the basic biological difference between males and females, preservation is shown to be the preserve of mothers, which burdens the upcoming gender with an unprecedented historical responsibility. The chapter ends with a call for women to lift that burden.

Rights and Responsibilities

Many thousand years after women first lost their rightful place, Mary Wollstonecraft demanded it back. Her treatise, *A Vindication of the Rights of Woman,* came in 1792 at the height of the French Revolution. The date and the title—and Wollstonecraft's argument that if women were allowed *education,* they would be equal to men and not chattel—spell Enlightenment and emancipation, only now the emancipation of women. As the bourgeois wing of the revolution wanted an end to aristocratic privilege, and the worker's wing wanted equal rights with the bourgeoisie, women should have equal rights with men, she insisted.

Wollstonecraft was married to the radical philosopher William Godwin, who Thomas Malthus attacked in the anti-revolutionary tract *On Population,* which led Darwin to the discovery of natural selection, which in turn explained as natural the inferiority of women, as "shewn by man's attaining to a higher eminence, in whatever he takes up, than can woman."[1] Luckily, Wollstonecraft got the last word. In time, as the women's cause for equal rights met with notable successes, she was

[1]Darwin (1871, Chap. XIX).

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proven right; in the West at least, only hard cases still believe in the twaddle about female inferiority.

As important it was for the bourgeoisie to break the ceiling of the aristocracy, and for the workers to break the ceiling to the bourgeoisie, as important it has been for women to break the ceiling to the men's domain. Crucial as it is, the cause for equal rights is mainly sanitary, however. Fine as it was that the rich bourgeois could now buy castles and titles, that savvy workers could sit on well-paid corporative boards, and that bright women could become professors and CEOs, progression-wise it is still of limited reach. Real progress lay in what the classes each could bring to the table of history. The *liberalism* of the bourgeoisie brought Enlightenment and liberal democracy, and—emphasizing the *need to invest*—the drive and ingenuity of entrepreneurship. The *socialism* of the workers brought solidarity and social democracy, and—emphasizing the *need to redistribute* —the welfare state and planned economy. So what besides equal rights could *feminism* bring?

As first the historical problem was lack of investment, then lack of redistribution, by now it has become lack of preservation. Capitalism was never keen on preservation, of course. As all chicks know, you must break eggs to prosper, and capitalists prided themselves on their 'disruptive innovation' and 'creative destruction.' Still, destruction is destruction, and does have unintended consequences. As Engels wrote in his ape-essay: "In relation to nature, as to society, the present mode of production is predominantly concerned only about the immediate, the most tangible result; and then surprise is expressed that the more remote effects of actions directed to this end turn out to be quite different, are mostly quite the opposite in character."[2] Hundred and forty years after Engels wrote this, the unintended and self-defeating degradation of the environment he warned about, can surprise no longer. The human impact upon the planet has reached such proportions that it has been suggested we name the present geological epoch the *Anthropocene Age.* As if we were an invasive species wreaking havoc on the ecology, we have set in motion a mass extinction event on par with the five prior catastrophic mass extinctions in Earth's history, the last of which killed the dinosaurs. Only this one is not caused by super volcanoes or asteroid strikes. It is of our own doing and may also be our own undoing. If science is to be believed, accelerating climate change, pollution, and habitat destruction may have brought our very future at risk. In short, by now clearly on a wrong course, if not to prove to be another of Nature's failed experiments, humankind stands in need of all-out preservation. Preservation is the preserve of mothers; mothering created humankind, and it seems it will take mothering to save it. This returns the woman to the forefront of history.

Flying in the face of equal rights, reducing womanhood to motherhood is considered reactionary, and rightly so. But the implied devaluation of motherhood is reactionary too, not least in the present situation. Mothering is called for; but it is not about rights; it is about responsibilities; it is not about reducing women; it is

[2]Engels (1876).

about raising everybody to the task. As nobles could take up the liberal cause, (Count Mirabeau, for instance), bourgeois the cause of socialism, (Marx and Engels, for instance), men could take up the cause of feminism, (John Stuart Mill, for instance). In our present predicament, all men should. Only women should take the lead as they were built for it.

A woman is many things; a unique *person* with free will and conscious choices; a *character* shaped by early biography; a socially defined—and socially changeable—*gender* role; and a biologically determined *sex*. The sex is about reproduction, and their different roles in reproduction define humans as females and males. Back in our days as fish, the difference was not that great. The female spawned a million eggs over which the male spouted tens of millions sperms, trusting the survival of the species to numbers and chance, the already mentioned *r-strategy*. While male physiology still employs this quantitative method, the subsequent evolutionary shift to the qualitative *K-strategy*—replacing a large output, left to itself and chance, with a small, select output, protected by womb and nest, and nurtured with dedicated care—changed the female physiology and turned mammalian females into veritable mothering machines. Physiologically, therefore, the human female embodies the K-strategy, the human male the r-strategy. As Sociobiology and Evolutionary Psychology will be happy to tell you, the difference does tell in subtle and less subtle ways. Suffice here to say that what for males are *territories* to be conquered, for females are *nests* to be protected. Territories are negotiable; nests are not, which make mothers the most fearsome creatures in the animal world.

Notice how our present mode of economic life resembles the r-strategy and the opportunistic territorial games. Since capitalism, besides huge material wealth, has brought us to the brink of disaster, the obvious corrective would be a shift to K-strategy. What the human world stands in great need of is safety rather than risk, care rather than competition, survival of every one rather than survival of the fittest, preservation rather than waste and destruction. In short, it stands in need of a culture of mothering, which calls for women to lead us out of our present predicament. Could this happen?

As a reflection of the nest thing, women by now have proven to be formidable leaders with unequaled determination. This can make women a force for bad as well as good, of course; a former British Premier is routinely cited as proof that the great hope placed in female leadership is an illusion. In her case, however, the nest was very narrowly conceived, comprising only a privileged few; imagine what could have happened had it been extended to the whole of humankind and our fragile planet. Only it could hardly have been; women today can reach the highest posts in the man's world, but only by out-manning the men while staying on the men's program. To place preservation and K-strategy on society's agenda would take more than female leaders; it would take leaders backed by vociferous woman demand and strident woman mobilization.

If only because there is no viable alternative, eventually this is bound to happen. In fact, it has happened already. What the ancient Greeks toyed with in Aristophanes' play *Lysistrata*, the women's strike, the women of Iceland made into

reality in 1975, turning massively out, refusing to work, cook, or look after children. The shock changed the balance of power overnight and paved the way for the world's first elected woman President, Vigdis Finnbogadóttir, who stayed in power for 16 years.

Her words sum up our argument perfectly: "It is my conviction as my belief in women and the capacity and intelligence of women that if the world can be saved, it will be women who do that. And they do not do it with war; they do it with words. Women, if they are running society, are looking for peace; they want to save humanity; they want to save the children. When the men on Earth open up to how women see things and add it to their way of seeing things, then we get a better world."[3]

Right, Eve created humankind, now it is up to her to lead our efforts to save it.

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Chapter 13
General Psychology at Journey's End

Abstract This chapter concludes the book by summarizing the presented general psychology with its four suggested subdomains: Sentience, Intentionality, Mind, and Human consciousness. The specific features of each subdomain are briefly recapitulated and drawn up graphically in an Atlas of psychology. Finally, the author's hopes that someone will pick up on general psychology are expressed.

Circles Within Circles of History

Someone once said that if you did not know history, you did not know anything, and were like a leaf that did not know it was part of a tree. Leaves can certainly live with that; still you should take stock of your branch sometimes, and throw in an appraisal of the forest too. This has been the aim here, placing my own work inside current developments in psychology; this inside the wider history of the field; this inside the legend of philosophy and science, in particular the enlightenment cascade; this inside the progression of human society from prehistory to the present; and this again inside the great story of life and evolution. If only swift and sweeping as here, a story such as this could be told for every individual project, and in many different ways. Mine does not claim any privileged place, but you should take away an impression of the historical depth of psychology and the profound coherence of things.

Atlas of General Psychology

In my story, the minuscule end point meets the great beginning as a fractal copy. The little seahorse is the proposed *General Psychology*; the large seahorse is the evolutionary domain it claims to map in large-scale outline. First drawn up by Aristotle, the map is old. It has been lost, but if retrieved psychology can finally catch up with Aristotle. In its present version, the map divides the domain of

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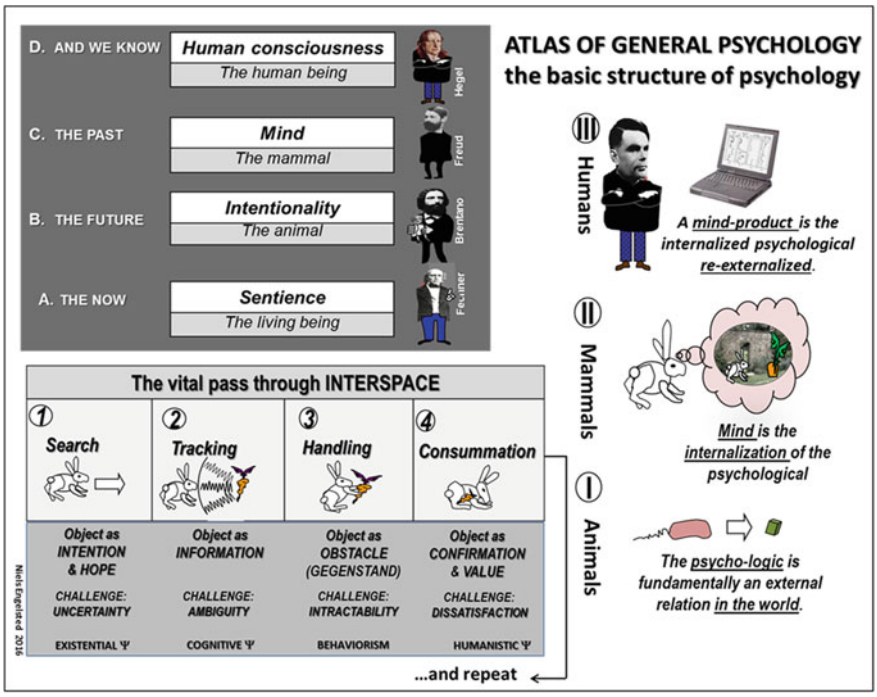

Fig. 13.1 Atlas of general psychology: the basic structure of psychology

psychology into four subdomains, the *sentience* of the living being, the *intentionality* of the animal being, the *mind* of the mammalian being, and the *consciousness* of the human being. As summed up in the atlas in Fig. 13.1, the subdomains are thought to have these characteristics.

Sentience, still an unexplained mystery, brings the temporally extended bubble of *the present moment* into existence with qualia, raw feel, and Nagel's 'what-it-is-like-to-be' quality. Bound to the *interface* between organism and *environment,* sentience is the pivotal link in *stimulus-response,* making—as intuited by Fechner—stimulus-response more than just the mechanical connection sometimes thought.

Intentionality, as a reflection of the ideal—thermodynamically dictated—*ecological* connection between the animal and its food (generalized as the *subject* and the *object*), reaches beyond the environmental interface. Bio-*logically* inseparable, animal and food are consistently separated spatially and temporally; life basically being the repeated effort to cross this *interspace* in order to reestablish the life-giving connection. Animals do that by self-powered and self-initiated *locomotion.* Like locomotion, intentionality comes with the dimensions of temporal duration and spatial extension and brings the concept of *the future* into existence.

From amoebae to human shoppers, the pass through interspace has four logical stages. (1) *Search.* Object out of physical contact and presenting itself in the ideal

form of the intention and hope behaviourally implied in locomotion. Uncertainty reigns. (2) *Tracking*. Object in distal physical contact—'in sight,' but 'out of touch'—and taking on the added form of information. Ambiguity reigns. (3) *Handling*. Object in tangible physical contact and proving to be a 'thing of its own,' a thing that resists, ('Gegenstand' in German). Intractability reigns. (4) *Consummation*. Object consumed and appearing as confirmation and value. Dissatisfaction threatens. The four stages are recognized in the major historical fields of psychology: Existential psychology, Cognitive psychology, Behaviorism, and Humanistic psychology.

The first stage—easy to lose sight of—defines intentionality as 'teleological striving' and 'conceptual idealization,' and the *psycho-logic* as an ideal realm of its own, with material effects and laws of its own, calling, as did Aristotle and Brentano, for a science of its own. The next two stages, with physical contact adding s-r tooling to the equation, are instrumental in reaching the concluding fourth stage and can be called the *psycho-logistics*. Nearly all psychological change in evolution has been about improving the psycho-logistics. Psycho-logistics has also been the predominant focus in contemporary mainstream psychology.

Mind is an internalization of the psychological to an inner scene, as Hume said. With the capacity to copy, store, edit, and re-enact past events, it is a dynamic bank of remembrance, and brings the concept of *the past* into existence, which greatly enhances the animal's ability to calculate and plan for the future. Evolving with the mammal's particular way of reproduction and nurture, mind coevolves with the emotional brain. Though basically a computing input–output device, it is the most strange and exciting land, humans will ever visit and artists and psychologists explore.

Human consciousness—not to be confused with sentience—is basically a severance in the otherwise monolithic subject–object connection, which dialectically turns the subject into an object (self-consciousness—subjectivity), and the object into a subject of its own (objectivity). It codefines the *human being* together with societal living. *Society* is a reproductive platform generalized from biological reproduction and like this all about producing a surplus. Society and its development are defined by the production, accumulation, investment, distribution, and preservation of surplus wealth. Called *the economy*, it is the human ecology. Even if it steps out of nature, society is our particular extra-biology. The stepping out explains the severance in human consciousness as the severance introduced when the receiver of parental care is no longer the natural receiver. Overcoming the contradiction (as in humor), a '*non-non-reality*' is created, which, by turning signals into signs, explains *language* as the twin of human consciousness.

With the ability to turn the subjective into the objective, mind becomes externalized as *mind-products*, turning human products from implements to books to apparel into vans of human intention and meaning. So prodigious is the mental-material world surrounding us that besides the dialectical 'non-non-reality' we are living in a *mindscape*. The appearance in the atlas of Alan Turing and the computer is an allusion to the mind-product which is literally an external mind making *artificial intelligence* possible; only we should here remember that like our internal mind, the external mind is no more than a logistical input–output device

founded in the real world psycho-logic from where all content and intention are ultimately drawn.

Hope

Though, of course, I think they are, the presented ideas may not be completely right. They need not be, however; my hope is that people with intellectual curiosity and imagination will find the presented ideas interesting enough to catch the ball and run with it.[1] But even if only tentative and partly right, I trust the case for a general psychology has been made. However, these subdomains are to be finally understood, much would be gained if the fourfold distinction between sentience, intentionality, mind, and human consciousness was recognized as the basic architecture of psychology. The division does not detract from anyone; on the contrary, it is an open invitation for everyone to join in the effort to make a divided psychology coherent and whole, to end the crisis of psychology, and to finally catch up with Aristotle.

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[1]For a fine example to follow see Elstrup (2010).

A Tale of Two Cities—Author's Postscript

To provide the reader with further perspectives on the book and to raise critical issues, commentaries from Professor Jens Mammen, Aalborg University, and Professor Aaro Toomela, Tallinn University, have been invited. The questions raised in the commentaries are too wide ranging to be answered here, of course, but as the editor thinks a brief response is called for, here is what springs to mind.

One city will open its gates to the traveler and lend the stranger an interested ear. Another will bolt its door and turn the wanderer away. The two stands are a burning hot issue in today's Europe, but in the history of thought they were always an issue. In order to protect our own identities and world-views, throughout history new ideas have routinely—and to psychologists understandably—been met with suspicion and quick rejection. "Our way, or the highway!" has been the rule rather than the exception; and all the heroes in this book have at some time been turned away at the door, or worse.

The traveler, of course, is much more appreciative of the welcoming city than the closed one, but here we should keep the wisdom of Saint Thomas in mind. With reference to Aristotle's vision of *Scala naturae*, he said that an angel is better than a stone, but an angel and a stone are better than two angels because they make God's creation complete. The two commentaries provide the book with such a perfect completion, for which I thank their authors.

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Commentary 1

East of Eden

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The Journey and Its Goal

I think Niels Engelsted's book: "*Catching up with Aristotle. A journey in quest of General Psychology*" is the most ambitious work I have met in psychology. It is not only ambitious to catch up with Aristotle's genius. It is perhaps even more to undertake a journey bound for General Psychology. The dominating opinion today is that this far destination is either unreachable or a Chimera like Treasure Island or the sunken Atlantis.

So, although Engelsted's voyage of discovery had its precursors through the ages, the destination seems unoccupied, despite some footprints left by Aristotle, perhaps.

In Engelsted's case, the ambitions are, however, well-founded, and he meets them, as we shall see, with convincing proposals and solutions, guided by Aristotle.

But why is General Psychology attractive, to somebody, and why has it been so unattainable?

Psychology as any other science should have some sort of coherent and effective frame of conceptual and methodological tools to be able to sort and order empirical facts in hypotheses or tentative conclusions, or even in theories. This is necessary if psychology shall be "cumulative" and progress in time, i.e. take in new discoveries without throwing out what we already know, but correcting it if necessary. And this is mandatory if psychology is to be an effective tool for analysis, critique, and intervention, as it is the goal for other sciences. And this is what should be demanded of a "General Psychology".

Very few psychologists think we are there today, however. But what is more worrying is that also very few even see it as a program for psychology.

This extraordinary situation in the scientific landscape may have many causes. Some of the explanations are rather gloomy and refer to widespread sub-discipline chauvinism in psychology actuated by the modern destructive funding and merit system, and to political or ideological disruptive disagreements. There is also widespread data-fetishism and theory aversion among psychologists, justified by a

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persistent and ignorance based myth that this is what we find in natural sciences, which ironically are more theory-driven than any. There is further an accelerating demand for quick and effective intervention here and now to a cascade of problems in modern society, which facilitates a development of pragmatic tools and solutions only corroborated by their immediate effect on the specific problems.

Some of these explanations are, of course, not only valid for psychology, and therefore not quite sufficient to explain the exceptional position of psychology. It is often referred to as the permanent "crisis of psychology". But that is perhaps a little exaggerated, as very few psychologists, in fact, seem to care anymore.

Leaving these depressing explanations aside, there still may remain some deeper and more inherent causes for the extraordinary situation in psychological science, and consequently also reasons for some indulgence towards its agents.

Engelsted ventures both to explain these causes and to propose a solid framework for a real General Psychology.

There is, however, not a comfortable scheduled airliner to the destination. It is a long and strenuous journey, but also a journey through fascinating landscapes of evolution of life, history of mankind, history of ideas, history of psychology, and on a smaller scale, history of Danish psychology, and personal history of the author.

This might seem a detour to a general psychology of modern human beings. But Engelsted shows, however, why it is not. To understand modern life, we must establish a conceptual co-ordinate system containing all the dimensions of our evolutionary and societal history and an essential part of the history of ideas also, that is, the history of the concepts we used through times to understand the world around us, our fellow human beings, and ourselves. The reason is that we always live in a state of transition. Not only do we live in a world filled with historical traces and artifacts, which is unintelligible without a historical perspective. We are also ourselves a pile of archeological layers both physiologically, culturally, and psychologically. We are carrying concepts of what it is to be a child, a man, a woman shaped through ages, and with inherent anachronisms and contradictions reflecting our changed conditions and our ways to meet them. And we always have a future perspective on the world and ourselves framed by the dynamic contradictions in our history.

So psychology and the history of psychology are merged with evolution of life, of mankind, of ideas, and perhaps more. This in turn raises a new question. Is psychology as a science then just the sum of all this, or is it still a science in itself? Or in other words: Is there a specific place for psychology in the scientific division of labor? Asking this does not imply that psychology should be isolated and not collaborate with other disciplines. All or most other scientific disciplines do that without losing their identity. I shall return to this intriguing problem later.

If the journey to general psychology involves this very broad field of investigation, and if it is even difficult to distinguish the goal from the journey, this may explain why it has been so hard to reach. But the problem is even worse!

The Leaps

The paths leading through evolution of life, history of mankind, and history of ideas and sciences have their own conundrums further complicating the journey. To take the evolution of life, it is obviously not some continuously, or just quantitatively,

growing phenomenon. There are qualitative leaps from inanimate matter to living organisms, from plants to animals, and from animals to human beings. There might even be qualitative leaps within these forms of life, e.g. from pre-mammalian to mammalian life, and between ancient and modern forms of human life.

Further, the qualitative difference between inanimate and living matter is reflected in a corresponding qualitative difference in history of ideas and science. Before the European renaissance we had the more holistic and organic understanding of the world, still shaped by the Aristotelian biological paradigm. After the renaissance this was almost completely replaced with the views of Galilei and Newton, understanding everything, also life, within a mechanistic frame, although sometimes with an appeal to God, to supply what obviously was lost.

To understand and explain these qualitative leaps is the theoretical pivot in Engelsted's work. There is a contradiction in this ambitious endeavor, between the discontinuity to be explained and the explanation seeking some bridge connecting the two sides, or the "before" and the "after". The irony of this situation is that the same theoretical difficulty serves as an explanation of contradictions in our lives, reflecting the opposition between such before and after.

The leaps have so far been very hard to integrate in a coherent theoretical frame, and this may also be part of an explanation of the lacking success of the general psychology program. It has been easier to divide psychology into mutually alienated sub-disciplines or theoretical schools within protecting boundaries defined by the leaps, or simply to deny the leaps and smear the understanding rooted in one of the sub-disciplines or theoretical schools over the whole domain. This is beautifully illustrated with very informative examples in the book.

Dramatic changes or qualitative leaps could in some cases be explained by reference to "external" events. The fabled meteor hitting the Earth 65 Mio years ago changed the opportunities for mammals, turning them from night-living into day-living after the resulting decline of the dinosaurs. And perhaps life itself entered the Earth as passenger on a meteorite from some distant planet. To use the latter as an explanation is of course just cowardly exporting the problem to the colleagues on the planet in question. Except for the mass-extinctive meteor, Engelsted refrains from such short cuts. He also refrains from the magical formula of "the dialectical law of the transformation of quantity into quality", introduced by Hegel and continued in Marxist literature but without any explanatory force.

The task is not easy, however, partially because some of the leaps are past and gone and have to be reconstructed. In fact you can take two directions facing these problems. One is the stance of continuity or gradualism, preferred by e.g. Charles Darwin stating that "Natura non facit saltus" or "Nature makes no leaps", emphasizing explanation of the process with conceptual means, which a priori excludes discontinuities, or qualitative leaps. This is the case when sticking to the mechanistic stance of renaissance physics. Or you can emphasize the phenomena as appearing in their obvious discontinuous consequences and view the process as a problem waiting for explanation, but not dismiss the phenomena with reference to the missing explanation. This more phenomenological solution was apparently chosen by Darwin's co-discoverer of evolution, Alfred Russel Wallace. In many

ways this more "humble" attitude, accepting the existence of phenomena despite the lack of explanations, (just think of modern cosmology) is, contrary to the prejudices, more common in natural science than in psychology. In psychology, the lack of reduction to the canonical forms of explanation has often been taken as evidence of non-existence (just think of the fate of "consciousness" under the reign of behaviorism and its continuation in mainstream cognitive science).

It is true that we don't really understand phenomena before we understand their genesis. Their consequences can, however, also open our eyes for what, in fact is, or was, going on. Understanding and explanation are running in both temporal directions. First when looking back at earlier societal forms, as e.g. feudalism, and seeing their defeat do we understand their determining conditions. The contemporaries were blind, being surrounded by what they found natural. Even Aristotle was so immersed in the slave society that he did not understand how goods got their price. Similarly, another genius G.W.F. Hegel thought that the contemporary Prussian state was the only natural one and the end of history.

This just to say that lack of "forward" explanation of the process is no final argument against qualitative leaps. And Engelsted as a good phenomenologist accepts the leaps, but of course also tries to explain.

The Leap from Inanimate Matter to Life

If you can't bridge the gulf between the sides of a qualitative leap with a processional explanation, you can at least bridge it conceptually. This is what Engelsted does with the leap between inanimate nature and life. If inanimate nature was just functioning according to the mechanistic laws of renaissance physics, this could not be done. The core of mechanicism is that any causation between distant objects or events can be analyzed as a chain of independent "infinitesimal" causations, i.e. causations between events in immediate spatial and temporal contact. The causal elements in the causal chain are "transitive" in the sense, that if *a* causes *b*, and *b* causes *c*, then *a* causes *c* in the same way as *b* does. The effect of *b* on *c* is independent of what caused *b*. Far or distal causations in space and time are therefore fully explained as "integrations" of independent proximal causations. This is reflected in the infinitesimal calculus as a tool for understanding mechanistic processes, invented by Newton and Leibniz.

This causational "atomism" is, however, not exhausting the interactions in nature. There are at least two exceptions. One is due to quantum mechanics where distant objects can be connected or "entangled" in a non-transitive way, without any causal mediation. A simplified model of this would be three distant events in space, *a*, *b* and *c*, where event *a* is coupled to event *b*, and *b* to event *c*, while *c* is coupled to event *not-a*. The logic of the triangle is "twisted" like a Möbius strip, and all three events are therefore indirectly coupled to, or co-existing with, their own negation. This means that quantum entanglement is a distant interaction not following the logic of causation, but also that it from the same reason can't carry causation or information between the distant events, although this possibility is sometimes mentioned in popular versions.

The other exception is thermodynamics. This is an example of a phenomenon that can't be explained by integration of all the proximal causal interactions

between elements in an ensemble of particles. This follows already from the fact, that the equations describing these proximal interactions are time-reversible, they can equally well run both ways in time, while the behavior of the ensemble can't. There is a physical measure connected with the ensemble, its entropy, closely related to heat and disorganization, which is not time-reversible. The entropy-measure is always increasing in time[1] in an isolated, or so-called closed, system and never decreasing. Entropy is e.g. produced from friction. And as any real moving mechanical system involves friction, no isolated real mechanical system can behave as when we run the movie with it backwards.

We don't know much about the consequences for life of the first, quantum mechanical, exception to mechanicism, except that we learn that the simple, transitive logic behind mechanistic causation has no hegemony in the real world, and for the same reason can't have it in science. Engelsted has a qualified guess, however, with reference to Roger Penrose, that quantum mechanics lays behind the emergence of sentience as a universal capacity in animals.

But we know much about the consequences of the second, thermodynamic, exception to the logic behind mechanicism, where we learn that there is a quantitative limit to the explanatory power of summating proximal causations in chains, or rather networks. An example justifying holism, you could say.

As said, an isolated ensemble of interacting particles, or a closed system, always shows an increasing measure of entropy, i.e. increasing disorganization or disorder. However, an open system interacting with its environment, and exchanging energy and information with the environment, can "locally" show decreasing entropy and an increasing organization, order, and stable structure. This is inanimate matter's opening for life as a possibility. How life in fact emerges as response to the invitation is only partly understood, but that life has come to stay on these conditions is an existential fact. This means, that life as a phenomenon in nature only can be understood in its asymmetrical relation to its environment, that life *is* this asymmetrical relation with two "poles", a subject and an object, the organism and its food, or its external resources. And this new stable local asymmetry, within an ocean of interactions, is indeed a "qualitative leap" in nature.

At the same time this bi-polar unit is the elementary unit of analysis in Engelsted's work, its basic "cell", to use Vygotsky's term.

However, the stability of life's bipolar relation certainly has its limitations, not as a phenomenon, but in its individual realizations. No organism can in the long run withstand the entropic pressure on its little island of order and stability. Individual death is a universal condition for life. And then the story could be over. We must suppose this has also been the rule for many of the first examples of life. But, by accident or not, some organisms, by division or export of material carrying enough energy and information to start a replica, managed to reproduce a successor to continue the vital relation. Perhaps this copying or reproductive power started in inanimate matter and joined life, as we see with vira. We don't know.

[1]In terminal cases the entropy can reach a maximum, with no further increase.

We can conclude that life is a bipolar asymmetric relation, or rather two asymmetric relations, between a subject and its environment, i.e. one relation between the subject and its food, and one between the subject and its successors or progeny. The first relation is maintained by import of energy and information, the second by export of energy and information to the environment. And this is now the "expanded" unit of analysis or "cell", already containing some tension between the two vital relations, one maintaining the individual, the other one maintaining the species.

The Logic of Life as the Unit of Analysis

This simple looking unit of analysis is followed the whole way up to modern human existence, and Engelsted shows that its potential is nearly inexhaustible, and that the consequences of this basic "logic of life" are dramatic.

To take an example, the reproductive relation of both plants and animals is becoming more complex by a new qualitative leap, and a new vital relation, with the emergence of sexual reproduction, which now ties the individuals to each other in new relations, defining new possibilities and tensions.

Such step by step additions of qualitative new relations between individuals and between individuals and their environment define the progressing evolutionary story told in Engelsted's work. And the point is that this is not only a story about the past, it is a story about present human life. None of the relations in the story vanish, they are supplemented and complicated, defining new possibilities and new tensions in our life, but they are here still. The problem of the amoeba to get its daily food is basically the same as ours, although it is now embedded in another context of a multitude of relations, forming a network with a "twisted" logic not inferior to what we meet in quantum entanglement. And Engelsted gives us a lot of very convincing examples of these "twists", coupling situations, properties, roles, and concepts indirectly or mediated to their opposites, illustrated with instructive figures, although traditional dialectical concepts used by Engelsted are not quite built for these apparently contradictory logics.[2] Perhaps our brains are neither. Perhaps they are too small?

[2]Engelsted does not compare the twisted logic of human relations with the ones in quantum mechanics, and presumably the similarities are also just formal and without any material couplings. But the formal similarities mean that twisted logic ought not to be ostracized a priori as "non-scientific", with reference to its transgression of the logic of classical causality. Its formal similarity with quantum logic should not even be taken as evidence of its "weirdness", but rather as a sort of "taming" or demystification of what at first sight may seem incomprehensible. The "weirdness" of quantum mechanics has unfortunately been much exaggerated in the public, and even by serious physicists. The fact is that figures or diagrams illustrating the twisted logic can be drawn on the flat blackboard without its audible objections and explained in ordinary language. There are beautiful and (classically) coherent mathematical models of all quantum mechanical interactions, and until now all observable interactions derived from the models have been empirically verified, and many even utilized practically. Basically quantum mechanics is conceptually and empirically transparent, and today it is just mainstream physics. In the present commentator's view, there has been too much voodoo about quantum mechanics, detrimental to progression of science. So the problem with understanding quantum mechanics and twisted logic is perhaps rather a question of education than about the size of our brains, as rhetorically suggested above.

The Logic of Evolution

The point is that we do not live the complicated and conflicting lives we do because of our big brains. It is the other way around. Our big brains are a desperate attempt to catch up with our human life. To understand this, we may ask how and why these big brains developed. The answer is not just hidden in a reference to natural selection. Natural selection itself can't explain the development of anything new, it can only select between something, which is already there. You could refer to natural biological variations, perhaps helped by random mutations, which made some brains bigger with a marginal survival advantage, compared with smaller ones, and thus step by step natural selection selected the bigger ones. This explanation has the big problem, however, that if big brains in general were an advantage, why do all animals not develop them? The answer is that big brains in general are a disadvantage. Compared with any other organs, including muscles, they use huge amounts of energy and bring a severe threat of starvation. After the hominids became bipedal with upright walk, the female pelvic floor further acquired a geometry that did not allow the passage of the baby's big head unless squeezing its soft skull out of shape, with great danger of lethal complications for both mother and child.

Despite all these disadvantages, there must, however, in the specific human case, have been very strong reasons for big brains still having a marginal advantage on which could be selected. And the advantage is hidden in the very special human form of life, in Engelsted's words, the special business of man, demanding handling of a lot of extremely complicated social and instrumental relations in societal life.

This is an example of a general logic of evolution from earliest life forms to modern human. It is not the anatomical changes, including brains when they arrive, that drive evolution. Neither is it changes in environmental conditions in themselves. It is the individuals' responses to the conditions, changing or not, which define new forms of life, i.e. new species-specific forms of life, actively chosen by the individuals and defining what is to be selected as advantageous. In this way, Lamarck was right. Acquired behavior is transferred to the offspring, not directly, but mediated by selection. Here Engelsted follows Lamarck and his scientific successor the late Russian psychologist A.N. Leontiev.

Activity Theory and the Leap to Animal Life

Placing self-initiated activity in front of evolution is in line with an understanding of animal and human life going back to Aristotle and running like a thread through the history of ideas and science, with German idealism and romanticism as an important station, continued by Marx and Engels, and later the Russian tradition of Activity Theory, represented by L.S. Vygotsky, A.R. Luria, and especially A.N. Leontiev. Engelsted finds this Activity Theory conceptually unfolded already by Aristotle, not with the modern understanding of evolution, but still with the main stages of life in plants, animals, and humans, with their essential characteristics. So what is needed today is to catch up with Aristotle.

The move (conceptual in Aristotle's understanding and further evolutionary in Engelsted's) from the life of plants to life of animals is paradigmatic here. Plants, as

a rule, are stationary although in some cases being moved passively by wind, current or animals. They receive water and minerals from their surroundings, but the source of energy, making their vital life-relation possible, is the radiation from the sun hitting their surface and driving the process of photosynthesis. In this respect the "world" of the plants stops with their surface, their immediate and proximal 2-dimensional interface with the surroundings. The reproductive life-relation of the plants is, compared to this, 3-dimensional and a little more active. There are cases of reproduction by growth of suckers and other extensions, but most common is the reproduction by spread of spores and seed, and in many cases, the reproduction is sexual, which means that some distal exchange of material between individuals is needed. Although reaching out in space, this process is, as a rule, passive, using wind, current, or animals as vehicles of transportation.

The situation of animals is qualitatively different from this, because the vital life-relation between the organism and its food (energy source) is quite different. Animals are in the unhappy situation that they have no access to the free and abundant photosynthesis. There is in most cases no immediate proximal contact (some parasites untold) with a food source. The subject's object, the food source, is distal and has to be found. First it has to be searched for, and if there is no proximal trace of the object this search is a matter of luck or failure. This means, that the life-defining relation between subject and object is not always there as a material interaction.

This does not mean, that the life-defining relation is not there at all, but rather that the animal now is living in relation to an object to be, in a hope, to an ideal object, in Engelsted's words. When there is no immediate object to re-act towards, the animal has to initiate its own acting, to be pro-active, not only being hopeful but also courageous. This "ideal" aspect of the animal's activity, this reaching out towards existence as uncertainty or as a question, is what Engelsted defines as psyche, a transgression of the immediate material interaction. The animal has "intentionality", a distal relation going beyond causal interactions. It is not only living in an "interface" relation with its proximal surroundings, it is also living in an "interspace" relation with distal objects. Here Engelsted follows Aristotle, for whom the self-initiated movement, or locomotion, of the animal was its specific "psyche", but Engelsted goes somewhat further, with echoes of existentialism.

If lucky, the animal gets some proximal trace of the distal object, and is now able to re-act to traces and stimuli from the object, and eventually to reach proximal contact also. Next the challenge is to handle the object, which besides being a suitable object for the subject, also is an object of its own, with an infinity of properties irrelevant for or even resisting the subject, a "Gegenstand", standing or turning against the subject. If in luck once more, and clever enough, the animal at last consumes the object, and the sequence can after some time start again.

This reaching out in a pro-active movement, spending or investing energy in hope of later compensation, and also some surplus energy, is essential for animal life, but re-active interactions with the material object are also necessary to reach final consumption.

And still the animal, as also the plants, has to invest much energy, taken from the surplus and never returning to itself, to secure reproduction through strenuous mating behavior and production of offspring. With mammals, this takes another

qualitative leap when the mother not only feeds her offspring with collected food, but makes herself a food object for it.

The leap to Human Life, A New Beginning

The story is repeated in humans, but now with a lot of complications in the relations between the sexes, between adults and their children, between subjects and objects mediated by tools, artifacts and technology, between different classes in society, etc. This is the story of early societies, hunters and gatherers, the invention of agriculture and slavery, the emergence of civilization, and the transition from feudalism to capitalism, told with great clarity, humor and wisdom by Engelsted, and with convincing illustrations of how these different societal formations form our mentality and our political and moral ideas, etc.

The pivot in Engelsted's conception of the qualitative leap from animal to human life is, however, not the immense quantitative increase of complication in human relations, compared with pre-human hominids, forcing our big brains. It is not either, as in many traditional versions of the anthropogenesis, the invention of language or tools and technology, and other such instrumental improvements in mastering and creating our life conditions. It is rather a qualitative change in the basic logic of life, found all the way back to the first animals, and therefore also much more fundamental and dramatic than in the traditional version of the anthropogenesis.

The new logic in human life is a shift in the fate of the surplus remaining after the animal has used the energy, gained after consumption of its food, to maintain its own life. In animal life, this surplus is used to secure its reproduction. In societal life, in Engelsted's conception the same as the specific human life, this surplus is increased so that there is also enough to be given away to members of the population other than the individual's offspring. This is the qualitative leap and the turning point, starting human history.

From then on societal forms are defined by how this surplus is distributed and applied, or invested, in common wealth, starting a new accumulation of common goods, monuments, institutions, and in the most general sense, culture. In other words, this is the economy of societies, and it determines societal ways of life, mentality, ideas, politics, moral, religion, etc., in short, the specific human consciousness. This also is beautifully and convincingly unfolded by Engelsted, a piece of the way following Marx, but also with many new contributions, especially about the different roles of men and women in society.

The latter is also in Engelsted's anthropogenesis the explanation of why this new application of surplus originated at all. The astonishing is here, that Engelsted's scenario, as a dramatic condensation of what happened, is an almost verbatim reproduction of the Adam and Eve myth, the fall of man and the loss of Paradise, now told with reference to the social, but still pre-societal, and pre-human life on the threshold to early human hunters and gatherers. The point is that in the beginning it was females who produced this new surplus. This is further corroborated by a lot of anthropological evidence, presented by Engelsted.

The consequences of this drama of human genesis are twofold. One is a new consciousness, forced by ambiguous and conflicting layers in the relations between

male, female, and child, a human consciousness. The other one is a new social order, born as a consequence of the appearance of new surplus labor, not any more reserved for the offspring but earmarked to be given away. This new social order is the societal order, and defining of human life.

Engelsted follows the evolution of the societal order through its historical formations, and the corresponding further leaps in human consciousness and ideas, up till now. Every formation has had its severe contradictions, and every formation had called for a new social class to take over. Today the fate of mankind is dependent on us saving the world from war, hunger, pollution, and climate catastrophes. This makes caretaking and the fight for preservation of our natural resources most important, and Engelsted concludes that this is primarily the responsibility of women, but also that men have to join women's enterprise, if it is to succeed.

The Journey and Its Goal, Once More

Engelsted's history of evolution is coherent, plausible, and extremely relevant for the understanding of the present situation of mankind and its (possible) future, and a general psychology has to take it as a premise. A general psychology should have the psyche as its subject or domain, and according to Engelsted, psyche is intentionality, qualitatively different from causality, and here is told the history of intentionality as a journey towards general psychology. However, there might still be a problem of distinguishing the journey from the goal. We have premises for a general psychology, but has it been established as a scientific discipline, as a precise figure on a sensible ground, which we perhaps now have for the first time?

I think the story has to be supplemented with another history running in parallel, but perhaps with the same roots. Let us start from the concept of surplus labor and the resulting surplus, which first takes form of extra time for producing value, and then some surplus product to be distributed for consumption or investment in common wealth, institutions, etc. This defines a flow of value in society, a societal metabolism, in other words, an economy. The goods produced have their specific utilities, but economy is about their non-specific value, expressed in their so-called exchange value, or in short their price. This is about circulation of quantities, not of specific qualities. In the economic perspective, what could be exchanged is equivalent. Engelsted is right, that economic relations define the consciousness of its agents. But it certainly does not exhaust it!

The Missing Dimensions

Let us take an example, where Engelsted talks of a woman being given as a productive resource and as a gift from one male to another. Engelsted writes (p. 80) that "The giver remained in control of the gift". The woman was in fact not quite given away. There still was an unbroken thread to the giver. She was not a pure gift but more a pledge, linking the giver and the receiver to each other.

This is not an exception. Personal gifts are not supposed to be sold or handed over immediately. They are not just exchange value, cf. that it in many contexts is not suitable to use money as presents. They are rather vehicles of links between people. And more important than their exchange value or their instrumental utility

is in most cases what we call their affective or sentimental value, linked to this specific individual object and its history, i.e., its unbroken trajectory in space and time between people, and not just a link to its properties.

When defining ownership to objects, this is also not a matter of quantity or properties. Another wedding ring may have exactly the same properties as mine, but that does not make it mine.

Our relations to each other are core examples of this. Our solidarity and love are directed to a specific person, not to anybody else having equivalent properties or capacities.

Humans not only live in a world of quantity or resources, but rather in a world of threads in time and space, with another more discrete and discontinuous logic than the equivalence logic of economy or of utility and affordances, based only on objects' instrumental interactions. Our cultural world of artifacts becomes meaningless without a "historical depth". The artifacts carry their history of production, telling what they were "meant for", and the ones we have acquired tell us what we needed when we did it, and perhaps also from whom we got them. The objects have "societal meaning" and "personal sense", with Leontiev's concepts, and these historical categories go far beyond the objects' physical properties and immediate utility or "affordances", and also their exchange values. The latter is of course also a historical category, as far as it reflects the amount of work used for their production, but that is only one single "abstract" dimension out of a rich historical context, defining the object's meaning and its personal sense.

In human life the basic relation of intentionality, the human psyche, is transformed qualitatively compared to animal intentionality. Intentionality is not any more just defined by its reaching out towards a distant object. The object is multiplied, as the object in itself with an infinity of properties, the object in its possible instrumental relations to other objects, the object "for me" (its personal sense), and the object "for others" (a Chinese box of societal, cultural and sub-cultural meanings). And intentionality is multiplied accordingly, with a multitude of possibilities and tensions.

The object is embedded in a network of physical interactions, defined by its inherent properties, and at the same time in a network of historical threads, not tied to its properties but to its existence as a particular piece of matter, and defining its personal, social, and societal meaning (Mammen 1993).

Our ability to investigate changes in nature, to make experiments, etc., is also dependent on our ability to follow the same particular objects through time and space, independent of their changing properties, and at the same time notice these changes or even metamorphoses of properties (Mammen and Mironenko 2015). In fact, Engelsted already opens for this duality, between identification and securing of particulars, and description of their properties, when he (p. 74) writes: "The double sense renders the object *a part of me* and something *apart from me*, my thing and a thing of its own; a duality precisely carried in the equivocal term 'object'. Objects do have this dual existence in nature as explained in the chapter on intentionality, but until the human being, animals could have no awareness of this. Only we can keep the object inside the hand (subjectively) and at the same time look at it from an outside position (objectively)."

Our moral problems, and our psychic troubles and pains, are most often related to problems of binding or breaking threads, of solidarity and love, of faithfulness or deceit, and not only in relation to economy.

The two sides of human existence in a world of interactions, including economy,[3] and in a world of threads, should be theoretically combined, and their coupling or merging described with precise analytical tools (Mammen 2016). This will perhaps bring us closer to the goal of the journey: A general psychology as a mature scientific discipline.

The Human Mind

What was just said above was aimed at the specific human societal consciousness. Engelsted has, however, also brilliantly shown in detail how we as humans are repeating and containing the life forms of our remote non-human ancestors, their sentience, intentionality, and mind. The latter we share with all mammals, and according to Engelsted, already Aristotle pointed to its essence by referring to imagination and nocturnal dreams. Mind is the ability to simulate situations and possible actions, without the situation necessarily being present, and without the actions actually being performed. We find this in animals when they make a pause before solving problems, and as modern research in REM-sleep has confirmed, all mammals also dream. Engelsted on this basis develops a very plausible theory of the importance of a "pause-mechanism", both explaining development of the emotional limbic system in mammals and of some defensive mechanisms that lead to depression, when getting out of normal control, a theory with important perspectives for clinical psychology and psychiatry.

In this way, the mind can be compared with a theater where things can happen, with reference to the world outside the theater, but without interfering directly. We share that with all mammals, but that is not to say that the same plays are performed. The reference to the world outside demands they are different. As Engelsted himself tells us, nearly all screen plays are family dramas, often merged with economic dramas, we can add. However, the core in human dramas is first of all threads of love and solidarity, and their being bound and cut, and only to a lesser degree about distribution of a surplus.

Engelsted sees some relation to cognitive science and its use of computer-models to understand the human mind. Computers also simulate human problem solution, according to cognitive science. The computer does so because it represents external events internally, and thus turns intentional relations to the world into internal relations in the computer. This, however, is a misunderstanding, shared with most mainstream psychology. Computers as such simulate and represent nothing. As little as a book knows what is written in it, the computer knows nothing about what

[3]Economy is a "hybrid", as it on one side is about the quantitative exchange value of goods, their equivalence interactions with other goods, appearing as an inherent property without a history, and on the other side, more hidden, is rooted in the history of production of the goods, their historical "threads". However, this kind of merging is pervading all our intentional relations to the world (Mammen 2016).

objects in the real world it is mapping. It does not even know what is written on top of the keys on the keyboard. It has no intentionality whatsoever and cannot acquire it through mechanical input-output interaction with the environment. All relations to the world, all "aboutness", are provided by the human user. The computer can assist us as a tool, but all reference to the world comes from us as users. Perhaps there is also that sort of tool in our brains, although our brains cannot only be a computer if we follow Engelsted's proposal for an understanding of sentience. And perhaps such a "computer-tool", carefully instructed, can assist with the set piece work, even if it can't play the drama in the mind's theater.

It is, however, an open question if the triangular relation between user, computer, and world can be transferred to the brain, at all, as supposed in cognitive science. In any case, it is hard to see what is theoretically gained by Engelsted's reference to computers, with the risk of importing the bad habits of cognitive science into an otherwise sound and rich theory about the human mind, and "the mind's theater".

Political Epilogue

Engelsted's book is not only a necessary premise for a general psychology. It also has political implications, and explicit ones. One example is the twisted triangular relation, described in the book, behind capitalist production of goods and the worker, whose wage should be held low to maximize the surplus, and the consumer, whose wage should be held high to be able to buy the goods, and thus provide the surplus. The problem, and the twist, is that the worker and the consumer in a global long-term perspective is the same in the world as a closed system. They can't be separated in the long run. This defines a contradiction, making capitalism impossible in the long perspective, but also making capitalism, and politicians defending it, fight desperately to maintain the present imbalance, keeping poor workers and rich consumers apart, although the situation is explosive for peace in the world.

Another political implication is, as mentioned above, Engelsted's concluding appeal to classical female caretaking to save the world from destructing its natural resources for ever, and the necessity that males join the caretaking preservation project.

Introducing thread structures describing affective links to concrete and not interchangeable places, persons, objects, monuments, etc. as a supplement to the more instrumental interactions between people as producing resources and consuming goods defined as quantities, could perhaps throw some light upon many contemporary societal problems of alienation and protest. People not only feel cheated economically. They feel reduced to tools with no respect for their human motives and defining intentions, which are only seen as noise and friction in the circulation sphere. Genuine motives for work are being replaced with measures and registrations, depriving persons of meaning. As a reaction, we see a desperate search for "replacements objects", in many cases leading to nationalism, etc., also threatening peace in the world. With appropriate analytical tools, we could perhaps understand these phenomena better, and prevent repetition of a catastrophe, which this time could be terminal.

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Commentary 2

Towards General-Unifying Theory of Psychology: Engelsted and Beyond.

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Psychology is in excellent state today—the number of publications and scientific journals is increasing, more and more scholars achieve high numbers of citations, psychology is very popular among students. Such numbers are formal, of course. But when we go to the content, the situation is similar. New questions are asked and answered in increasing number of studies, new approaches constantly emerge. Psychology is successfully becoming a true science by applying more and more novel and complex mathematical methods of inference on the one hand and by connecting, especially through neuroscience, to biology on the other. There is less space for speculations; these are replaced by colourful pictures of the brain and superb mathematical formulations of the scientific truths. Future of psychology seems to be bright. What else to wish for a prospering science?

Niels Engelsted seems to disagree. He suggests that psychology needs a theory —and not any theory, but a general theory. If psychology needs such a theory indeed, it follows that psychology today is actually in a miserable state. Engelsted put it very delicately: "Obviously, a scientific field has a problem if it does not know what its domain is, or even if it has one." (this book, p. 13). I am not sure whether such a "science" does "have a problem"; it is not even clear whether such field of human activities should be called science.

How would it sound—We study something we cannot tell exactly what, but we know increasingly well how to explain it? If judged by widespread textbook-type claims, psychology is the study of behavior and mind. But, as Engelsted also mentions, it is not clear so far, whether psychology has its own subject at all. Increasingly many scholars today believe the mind is located *in* (!) the brain—thus mind is not even a phenomenon that emerges as a result of the processes *of* the brain. These and other scholars find more and more psychological properties that are, according to them, determined biologically, by genes, for example. Take, for instance, consciousness. On the one hand, conscious experience and perception appears to be related to functioning of similar systems of the nervous system in humans and many other living creatures, including octopuses. Therefore, it is

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N. Engelsted, *Catching Up With Aristotle*,
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proven that consciousness characterizes not only humans but many non-human animals as well (cf. Low et al. 2012). Of course it would be useful to know also, what kind of a phenomenon exactly is consciousness; what it is we share with many other animals. This seems not to be important—there are more than 40 different (some of them mutually exclusive) definitions of the term consciousness (Vimal 2009) and those who suggest consciousness is present in animals do not tell us what exactly is meant by the term. This is an example of the cutting-edge psychology today—it is a science that studies nobody really knows what but explains with certainty the studied phenomenon by biological mechanisms. Whatever it is, what is studied, we actually learn that it is a biological phenomenon. Thus psychology has no domain, it is just a branch of biology.

It is true that not all psychology is occupied by biologists (yet?). Nevertheless, with extremely rare exceptions, these non-occupied fields share the same problem with the psychobiology: it is not defined, what is being studied. And if the phenomenon that is being studied is actually defined, then the definition is usually incomplete. As a rule, definition is understood as a statement that specifies the individually necessary and collectively sufficient characteristics of the definiendum. Such understanding of the definition is missing important aspect. In addition to defining what a thing or phenomenon is, the definition implies simultaneously exclusion—by defining X we (often implicitly) distinguish X from everything else, non-X.[4] If, for instance, we define life as a form of organized matter, then everything living would belong to that category. But nonliving matter would also fit the same definition. Thus we would be tempted to explain life by the principles of matter, i.e. by the principles of physics. Instead we would need a definition of life that applies only to certain forms of organized matter simultaneously excluding non-living forms—by looking for such a definition we would obviously assume that only some forms of matter are alive. If that assumption can be supported by empirical observations, we would have a ground to look for explanations of life-phenomena in a distinct domain of life sciences, biology.

In psychology the definitions of psychological phenomena, if they exist and are relied upon at all, are not exclusive; the definitions do not distinguish life from psyche and different aspects of psyche one from another. This, as I have suggested already some time ago, is one of the main reasons why psychology as a science cannot proceed without general or unifying theory (cf. Toomela 2007c). From that

[4]Roots of this idea go back at least to Hegel's philosophy. Hegel attributed the idea—*omnis determinatio est negatio* (all determination is negation)—to Spinoza (Hegel 1969, p. 113). This attribution is, however, incorrect. Spinoza actually wrote "So since figure is nothing but determination, and determination is negation, figure can be nothing other than negation" (Spinoza 2002, p. 892); he did not suggest that *all* determination is negation. Actually Spinoza had in mind only abstract determination; for him determination of figure was not the same as the determination of the being of an object (see Duffy 2006). Anyway, Hegel, and following him Engels (1987, Part I, Ch. XIII), were discussing being and suggested that being is always determined by negation. Thus defining any being X always implies negation, non-X. Indeed, if whatever thing or phenomenon X would turn out to be also everything else, i.e. X would be everything existing, then X could not be determined or defined.

perspective, the unifying theory is not a theory of particular aspects or subfields of psyche but rather a second-order theory about how different aspects of the same phenomenon, psyche, are related one to another (Vygotsky 1982). Among other things, such unifying theory should define all aspects of the psyche both positively —what they are—as well as negatively—what they are not.

Now the reader may feel that we have went astray from what this text is supposed to achieve—some comment or critique of the Engelsted's general psychology. I agreed that the general theory is needed and then turned into discussion of the ideas that seem not to be related to his theory. In fact, I have already suggested the direction of my comment. Even though I agree with Engelsted in the most important—psychology will never become able to explain psyche without general theory—I do not agree that what Engelsted proposes is sufficient. It is necessary to go further. What is missing in my opinion is not some details. I think Engelsted has not given answers to some fundamental questions; even more, those questions are not asked without answers to which, I suggest, no true general theory of any science can be achieved.

It is not answers that make good science. Science begins with questions. If the questions are wrong, the answers will be meaningless however elegant they might seem to be. Chemists studied properties of phlogiston long time. They discovered, among other things that plants do not grow in the dark because there are no phlogistons needed for growth (Cavendish 1893). All such explanations made sense until it turned out that there can be no such substance as phlogiston. Then all answers to questions about phlogistons turned out to be meaningless—because the questions were wrong. Mendel (1865) proposed that hereditary traits are determined by cellular elements. Without postulating material entities that can be combined to explain hereditary traits, there would be no modern biology. So Mendel's question answered by him was right. Yet he actually left no trace to the history of biology; his principles had to be rediscovered decades later. We see that it is not only psychology that may have troubles in finding right questions, the "true" sciences—physics and biology—have struggled with the same problems and very likely still have not asked all of them.

The examples above also demonstrate that it is not easy to find the right questions to ask. Sometimes scholars agree to answer questions that turn out to be completely wrong later and other times they do not accept long time questions that later turn out to be vitally important to answer. The complexity of the issue is also reflected in the fact that important questions seem to emerge only from individuals; teamwork or collaboration so valued today by science bureaucrats may turn out to be the most effective way to avoid any discovery of the questions that ground the future of a science (Toomela 2007b).

In the following I propose a few fundamental questions that in my opinion must be answered by a general theory needed for psychology. These questions either were not asked by Engelsted or were answered in my opinion questionably. If nothing else, we will discover weaknesses—if my questions and answers are accepted, or strengths—if they are not accepted, of Engelsted's theory.

What Is Scientific Explanation?

Psychology has a special place among other sciences; it is the only science where the observer and the object of observation, the psyche, are at least partly overlapping. Thus psychology is the only science that actually should be self-reflectory by its essence: when answering, what psyche is and how it can be explained, it has to ask and answer also a particular question—how to explain psychic activity of a researcher, who asks and answers these questions. All other sciences (and "psychology" that studies behavior and not psyche[5]) ask about things and phenomena they study without constantly being pushed to realize that who studies and how the researcher interprets the world is always important in reaching scientific knowledge.

Engelsted actually introduces the problem to be solved, the question I think any general theory of science must ask and answer—What is scientific explanation? According to Engelsted, "Psychology is the special science of *epistemics*; that is, the ways the world can be known to beings to which the world can be known" (p. 24). He proposes, following Aristotle, that the domain of psychology should be distinguished into four epistemic subdomains: sentience, intentionality, mind, and human consciousness. Thus there are at least four different ways, corresponding to these subdomains, how an organism relates to and makes sense of its environment. Engelsted's own theory is also epistemic. Yet his theory does not help us to explain, in which way we actually do understand the world in general and psyche in particular. One important idea is missing in his theory, he does not make an important distinction between more and less developed forms of human consciousness.

Let me introduce the problem. Certainly the first levels of his psycho-genetic sequence contain a mismatch between what the world is and how it seems to be to the organism; each organism at the lower levels of development lives in a limited by senses and actions of that particular organism world, called *Umwelt* (von Uexküll 1909, 1926). Thus world as it seems to be is different from the world as it is. This distinction does not apply to lower forms of development only. Koffka distinguished what he called 'geographic' environment—the world as it is, from 'behavioral' environment, the world as it is perceived psychically (Koffka 1935). Again, these two forms of environment do not overlap. Koffka shows among other things that mismatch between the world as it is and the world as it seems to be characterizes also humans—thus the mismatch does not disappear at the level Engelsted calls human consciousness.

[5]Majority of psychologists today are not according to this criterion psychologists: they assume that by studying regularities in the behaviors of observed organisms, human or not, it is possible to understand psyche. Thus they behave like representatives of other sciences who assume that what is needed to understand is the external to them reality. This assumption, however, is not correct, as I am going to show next. It is not possible to understand the external to us world without understanding ourselves as psychic beings. This conclusion emerges from the principle I proposed above: in order to understand X, we must distinguish it from non-X. The same here: in order to understand the world "as it is" we must distinguish it from the world "as it seems to be to us."

So, there are different ways to make sense of the world. If it is so, we must ask, which of the ways of psyche allows to make (better) sense of the world as it is. And what reasons we have to choose one way of thinking over the others. Engelsted's theory does not give us the answer we need. It is because none of the psycho-genetic levels of mind, including the most advanced according to Engelsted human consciousness, does not define how to distinguish the *Umwelt* or behavioral environment from the world as it is.

One possibility is that there is actually no way to define the principles of psyche that may underlie understanding of the world as it is. Even if it were so, we cannot accept is. Otherwise all theories, all results of the sensemaking of the world should be equally acceptable. If anything goes, there is no point to create another possible view of the world that just expands the list of views on how the world might be. Philosophy has done (and overdone) it many times already. Maybe we need general theory, but maybe not. Both approaches would be equally good. Maybe psyche is different from bios, maybe not. Maybe life can be explained by principles of physics and actually there is no life; just material universe. Or maybe there is no matter at all, just immaterial spirit. All goes.

When trying to understand the world, we assume the opposite; we assume that there is the world that is organized according to certain principles. Thus all possible statements about the world cannot be equally correct. We also know that we do not have direct access to understanding all the principles of the world, we need to discover them. Further, we have reasons to suggest that some ways of knowing the world are better than the others. Particularly, we believe that science with its methodology and methods is the best way to know the world as it is. There are so many practical applications possible only because of science that the special position of science as a way of explaining the world cannot be denied. But it is not enough for a general theory of psyche. This theory must, among other things, define what characterizes scientific explanation and what distinguishes it from other, less efficient ways of understanding and explaining the world.

I have asked and answered this question elsewhere, so I am going to bring only summary here (see for discussion, Toomela 2009, 2010c, 2012, 2014b, 2016). First it is important to understand that human consciousness does not operate in the same way in all humans. Rather, it is possible to distinguish qualitatively distinct developmentally ordered stages of psychic development, each next being more complex and grounding better correspondence to the world than the previous.[6] Vygotsky suggested that human mind becomes qualitatively different from the minds of all other organisms because only humans can achieve semiotically mediated thought (see on this also Toomela 1996a, b). Further he suggested that human mind in its most developed form does not emerge in one step. Rather, human mind develops over a hierarchy of qualitatively distinct stages that can be best understood as stages of word meaning development. He distinguished three

[6]Thus Engelsted did not go far enough; we must distinguish more than four steps in the psycho-genetic sequence. I am coming back to it below.

stages of development (syncrets, everyday concepts, and so called scientific concepts[7]). There are reasons to distinguish not three or four but five stages of the development of semiotically mediated thought (cf. Toomela 2003). Last three of them are relevant in this context. Namely, thought based on everyday concepts, logical concepts, and structural-systemic concepts[8] corresponds to three qualitatively different ways of understanding what science is.

Before going further it is necessary to define scientific knowledge. Scientific knowledge is knowledge of the causes of things and phenomena. It is important that there are different theories of causality. These different theories ground different approaches to science and scientific knowledge. First, everyday conceptual thought grounds science that is not fully able to define what the essence of scientific knowledge is and how it is distinguished from nonscientific knowledge. For example, so-called qualitative research grounded theoretically around late 1960s and later, is based on this kind of epistemology. I call this science modern qualitative research to distinguish it from advanced qualitative science I call structural-systemic. Modern qualitative science creates many stories and interpretations, which relationship to the world as it is questionable at the very best (see also Toomela 2011, 2014a).

The science based on logical concepts defines causality as a linear cause → effect relationship. Scientific knowledge is thus defined as knowledge of causes that lead to effects. Today, logical-concept cause-effect science in psychology is based on quantitative methodology. Even though reliable ways to predict emergence of certain events can be achieved in this way, it is still not possible to understand the world as it is. The weakness of this science is revealed immediately when we encounter situations where the prediction does not work. Then we are actually clueless; calling such cases a measurement error or whatever prediction mistake does not help (see for limits of quantitative methodology also Toomela 2008, 2010d).

Finally, thinking in structural-systemic concepts grounds a science that aims at revealing structural-systemic causality. Here it is interesting to notice that this structural-systemic theory of causality is very close to Aristotle's theory (Aristotle 1984a, b, c), who suggested that there are four complementary kinds of causes: later these were called material, formal, efficient, and final cause, respectively. Structural-systemic causality is understood when three complementary questions are answered: What are the elements of the studied whole? In which relationships these elements are? What novel qualities emerge when the elements are synthesized into higher-order whole? Science at this level of development achieves knowledge

[7]Actually fourth stage after the scientific concepts, that of "true" concepts, can be found in his works; yet he did not develop the theory of that stage far enough to be easily distinguished in his works as a separate stage.

[8]In earlier works I used other terms for the same stages. The most recent version of the theory together with discussion of the relationships between these stages of development and different forms of science is provided in Toomela (2016).

that allows to understand, what the studied thing or phenomenon *is*, not only what makes it to emerge or how it may be interpreted or perceived.

Engelsted's theory—for good reasons—transcends the theories of causality. Perhaps there is not much of the everyday conceptual (non)causality, but a lot of cause → effect thinking is mixed with some structural-systemic. Perhaps this comment is not the place to discuss all the examples of different kinds of causality underlying different statements. Let us look at the way how the statements of Engelsted's theory could be analyzed. For example we can look at the definitions of the concepts of the theory. General theory would require to define all the main concepts—beginning from what is life and what is psyche. If all necessary concepts are not defined, then the theory is not consistently structural-systemic, the studied wholes are not defined. Further, it is not enough to define the distinguishing qualities of the whole; also parts of the whole and the relationships between them should be defined. There are several very important concepts not defined in Engelsted's theory (among them the scientific explanation). Structural-systemic definitions, which include elements and relationships, are practically missing.

On the other hand, structural-systemic science needs also to explicate the mechanism of development; the way how less developed forms are transformed into more developed forms through change in the nature of elements and their relationships in the whole. Engelsted at times suggests some efficient causes of development, but there is no structural-systemic account of development in the theory. Statements, such as "Labour did create the human being" (p. 52) or "female surplus labour created the human society" (p. 72), Engelsted proposes as explanations, actually contain little if anything explanatory. If labour created humans then from where did the labour come? Labour is actually a process of a certain form of change; process cannot be a cause of a change in principle because process is a change itself. Perhaps Leontiev did not get it right, after all?

What I am suggesting is that there are different ways to define scientific explanation and choice of the way constrains the result, the theory that is created. It is not even important whether I have got all correctly and found the best form of scientific explanation. Perhaps there is another even better. Nevertheless, immediately after we recognize that there are different theories of explanation, general theory must be posited in relation to them; one theory of science should be explicitly taken as a ground for the theory together with justification as to why this and not some other was chosen. If nothing else, the general theory consistently framed with the theory of scientific explanation would become more coherent.

Synthesis Is Needed. But What Exactly Needs to be Synthesized and Why?

The second big issue to be solved by a general theory is—what exactly needs to be covered by the unifying theory and why. I think general theory of psyche must achieve two complementary aims. On the one hand, it should be a theory of psyche —what it is, how it emerges and develops, which forms it may have, and how it functions. On the other hand, general theory should give ground to synthesis of the fragmented without it different branches of psychology. The first, the theory of psyche, grounds the second, the understanding how different branches of

psychology complement one another in the achievement of the better explanation of the psyche.

Engelsted begins from the right question, his general theory aims at understanding of "what psychology is the science of" (p. 13)—when theory of psyche is formulated, the second of the aims I proposed could be logically deduced from the first. Yet there are ways to continue from where Engelsted arrived at.

There are perhaps two directions to go further. First concerns understanding the psyche as a whole. The most important point of departure in my opinion would be to define what it is what the general theory aims at explaining—What is psyche? For Engelsted this question seems to have been of secondary importance. Instead of defining the domain of his theory—telling us from the beginning what psyche or mind is—he provides a lot of history and theory before proposing the definition.

As I already mentioned above, to define psyche, we need to define life—otherwise it will not be clear, whether psychology has its own domain at all. Engelsted defines both, but these definitions seem not to form the core of his theory but rather are brought bypassing, almost as self-evident. I do not see (can be my limitation, of course), how Engelsted's definition of life—"Life can therefore be defined as the investment of energy to gain more energy" (p. 35)—would help to understand psyche and also the general theory of it. The definition is also a little problematic as such. I would agree that at some abstract level this definition might hold, but it does not distinguish all living organisms from nonliving material world. Trees in winter, for instance, do not invest any energy and yet they are alive. Also I doubt whether there is any living organism who would continuously invest energy to gain more energy. Thus, by that definition all living organisms would not be alive all the time but only in cycles of energy investment. Another definition would be needed, the definition that really grounds understanding of how life without mind is different from life with mind.

The psyche is seen as a relation with the world:

The *psycho-logical is* first and always *a relation in the world*, the intentionality corollary to the second law of thermodynamics described above. With mind, however, the psycho-logical becomes *internalized*. The psycho-logical is still a relation-in-the-world, but this relation can now be represented as an *internalized relation-in-the-world* also; bits and pieces of real life can be played out in the mind, as our nocturnal dreams vividly show (p. 41).

Maybe the formulation is a little too philosophical for me, too much Hegelian, perhaps. But what follows from it? Maybe further elaboration of the definition might help? We learn:

It is mind that enables the animal to pause instead of immediately jump to conclusion. This allows time for consultation with past experiences stored in limbic and other brain centres, and thereby enables anticipatory future planning (p. 42).

The time cannot be the defining characteristic of mind because all processes in the material world take time. No "conclusion" also emerges immediately in the world. Even more, I think Anokhin proved it both empirically and theoretically beyond doubt that *every* living organism must anticipate future states of the world

in order to stay alive and this anticipatory activity involves past experiences (cf. Anokhin 1975; Konstantinov et al. 1978; see also Toomela 2010a, 2015)

Altogether, we learn from Engelsted's theory about different forms of mind but it is not fully clear, what the mind actually is, which is distinguished into domains. Thus his theory seems not to be fully integrated into a coherent whole yet.

I mentioned also that there might be another direction to go beyond Engelsted's theory. Psychology today is fragmented and full of isolated and partly mutually exclusive schools of thought. General theory should bring order to this … disorder ("Chaos" feels to be too fancy word to characterize the state of psychology today). General theory should achieve two aims from this perspective. First it should define, what fields or branches of psychology there should be. Perhaps some are unnecessary as they seem to study something that either does not exist or does not belong to the realm of psychology.

What is conventionally circumscribed as "personality psychology" might be an example. Today many scholars in this field suggest that personality traits are inborn, thus they belong to the realm of biology and not psychology. Others, such as humanistic psychology or feminist psychology, should perhaps be abandoned because these have methodologically (not to be confused with "methodically"!) turned things upside down. These and similar branches of psychology first define the perspective, the way how to search for understanding of mind and only after that study it from that predefined perspective. If science aims at explaining the world as it is, the perspective must grow together and follow from understanding already achieved. In other words, the research methods must correspond to the thing or phenomenon studied and not to the researcher's perspective on things before it is studied and understood.

There is also a possibility that some branches of psychology are missing. In cognitive psychology, for instance, we find branches, which aim at studying memory, perception, thinking, judgment and decision making among other areas. But planning of activities, so clearly another element of mind (cf. Luria 1969, 1973), seems not to be a branch of cognitive psychology. If at all, aspects of planning are studied under the weird term "executive functions", which covers in addition to planning also problem solving, working memory and whatever else.

In creating order in the disorder of psychology, the general theory, secondly, should define how different branches of psychology are related one to another. In essence, general theory defines what psyche is and what the elements of psyche are. Branches of psychology should correspond to different aspects of the psyche as a whole on the one hand and to different elements of psyche on the other. In this way it would be clear, what is studied in each of the branches, how these complement one another in elaborating the theory of psyche as a whole.[9]

In sum, Engelsted's theory seems not to define clearly and coherently enough, what should be synthesized and why. Thus it cannot be also understood, how Engelsted's theory really synthesizes psychology into a coherent whole.

[9]Some first steps in this direction I proposed a decade ago (Toomela 2007c).

Elaboration of the Empirical Ground. Stages of Development: Aristotle, Vygotsky, and Beyond

I mentioned above, when discussing different forms of scientific explanation, that Engelsted's account of developmental stages—for him at the same time domains of psychology—is incomplete. When he distinguishes 4 stages (sentience of the living being, intentionality of the animal being, the mind of the mammalian being, and the consciousness of the human being), there seems to be more. Aristotle had four. Why to limit theory with these, if Vygotsky (also cited by Engelsted) distinguished six or seven (three for the development of animal mind and further three or four of the human)? Why not to go further from Vygotsky; perhaps there are three qualitative steps in the development of animal mind (Toomela 2000) and more five steps in the development of the specifically human mind (Toomela 2003)?

Why it is important? It might seem that the number of stages proposed by a general theory of psyche is not so important. If someone, like me, would like to distinguish more stages and therefore also more domains of psychology—so do it, you just need to elaborate the existing theory, add some distinctions more and nothing truly important has happened. Well, one of the principles of the structural-systemic theory is that when an element or the relationship of it with other elements changes, the whole also changes. If we add new elements, the whole certainly becomes different; it is a qualitatively novel theory. To add something to the theory is also very complicated. If we choose to add some new components, we need to make sure that the whole still holds. Possibly we would also redefine some elements of the old theory and quite likely would abandon parts of the old theory that do not fit into the new at all.

Here it must be mentioned that there is also another possibility. It is not necessarily so that adding any new bit of information necessarily ends up with a new theory. If the general theory is constructed hierarchically and we just add elements at a detailed level of analysis, the general theory might still hold. For instance, Darwin's theory has not changed in essence with the discoveries of missing links in the evolution of the human being. We know today much more about chronology and geography of the evolution of the *Homo sapiens* compared to Darwin's time, yet the big picture, his general theory of biology, does not change because of such discoveries.[10]

[10]It does not follow that Darwin's, or any other, theory can be declared to be fixed forever. Science is based on four assumptions (cf. Toomela 2007a, 2010b): (1) There is a world beyond our minds; (2) This world is organized in some way, it is not completely chaotic; (3) In principle it is possible for us to describe and understand this world; and (4) Theories may accurately represent the reality beyond our minds even though there can be no absolute proof that the theory is correct because assumptions 1, 2, and 3 cannot be empirically proven. Thus, already at that level of analysis, it is clear that no theory can be taken as final truth—even, if it actually correct, there is no way to have absolute certainty. Further, any theory that can be validated at all, must posit certain states of the world that are impossible according to that theory. Darwin's theory would collapse even if only one (!) 3 billion years old human skeleton would be discovered. With my example I only demonstrate that not all novel information necessarily forces to revise the general theory.

We already have evidence that Engelsted's theory would not hold if we would add new elements, new domains of psychology. Psychology is by necessity a self-reflectory science,[11] and a general theory that does not contain, as a part, a theory of scientific explanation has an essential part missing. I suggested above that scientific explanation is a complex concept, which can be defined in different ways. Today, three different approaches can be distinguished to what is scientific explanation and therefore what science aims to achieve. These three approaches fit well with a little bit elaborated form of Vygotsky's theory of word meaning development; approaches to science reflect developmentally different levels of thought. It has to be so: world is more complex than our senses allow to sense. We need to organize the sensory-based information—to think (thinking was defined as an internal organization of experiences by Vygotsky 1926)—in order to make sense of the senses. In other words, sensed world does not correspond to the world as it is. The whole development of the living organisms, both phylogenetic and ontogenetic —can be conceptualized as development towards emergence of psychic mechanisms for knowing the world as it is. I think there is too much evidence to deny that emergence of human consciousness is not the last step in the development of humans and humanity. Human consciousness must be distinguished into a developmental hierarchy of stages. The higher the stage achieved, the closer is human understanding of the world to the world as it is.

Engelsted's theory in the current form is in need for scientific self-reflection in the direction of adding to it an elaborated theory of development. There is another aspect to the same question of which and how many developmental levels should be distinguished. Engelsted's central line of theory does not hold here on two grounds. On the one hand, his two first steps perhaps should be united; life would be impossible without goal-oriented activities. In that sense reaction is not an act that emerges as a response to a stimulus. Rather, "stimulus", certain physical or chemical event in the environment, informs the organism about future change of the environment; the organism acts to adjust to this future state (cf. Anokhin 1975; Konstantinov et al. 1978). To be sentient means to be alive, but it also means to act in order to prevent emergence of mismatch between environmental conditions and the integrity of the living organism. Thus certain form of intentionality must be present already together with sentience. On the other hand, as I have repeatedly said, more stages must be distinguished.

[11]This is a nice example of how change of a definition may have unexpected consequences. Here I propose to change the definition of psychology; to include in the definition of psychology self-reflection as essential characteristic of it. Kuhn defined 'paradigm' in two ways, as a 'puzzle-solving' and as a scientific world-view (Kuhn 1970, p. 175). Puzzle-solving scholars in psychology would not qualify as scientists by this definition; their way of research does not contain scientific self-reflection. Further, those psychologists, who have developed a certain scientific world-view, which does not include self-reflection, reflection of one's own psychic processes involved in sciencing (this nice term comes from White 1949), would also not qualify as scientists. The point I am making here is not about *who* can be considered a "true" scientist but rather *what* task we must accomplish: we must create a theory of science as part of general psychology. It is the task of psychology as the science of psyche to create such a theory.

We should ask now: Why Engelsted's theory of exactly those domains, he distinguishes, does not hold? His theory is in the first place a philosophical theory supported here and there with some selected empirical data. Yet I think any general theory of psychology cannot be sufficient unless it establishes the relationships between most general and abstract theoretical principles on the one hand, and pertinent empirical evidence, on the other. It is not accidental that Darwin, who essentially created a general theory of biology, considered extensive empirical data when building his theoretical arguments (cf. Darwin 1872). Even more, after travelling around the world and settling down in his country house, he carefully sieved through very large amount of empirical data in order to create his theory, which, at the same time—it is important!—was not created inductively. Thus facts are not only for induction; no scientific deduction can be accepted without empirical facts.

We humans, as philosophers, can propose endlessly many theories about the world; contact with the world as it is, however, constrains us. It is the experiences of the world—scientific experiences that emerge when we interact with the world in our scientific studies—that must ground our choice of the particular theory among the potentially endless number of philosophical accounts.

Conclusions

Engelsted calls for a general theory of psychology. It is true that psychology really needs such a theory; otherwise it will remain a science without domain, fragmented, disordered, contradictory. Engelsted has also taken developmental approach to building his theory. This is really good choice; without studying development, nothing can be scientifically explained. From this point forward, however, questions emerge. I suggested that it might be justified to go further in three directions.

First, general theory of psychology is the theory that must define, as a part of the whole, what is scientific explanation; general theory must coherently constructed following the theory of what understanding and explanation are.

Second, the main domain of psychology could be defined better: general theory must define life and psyche as well as elements of psyche. This theory of psyche, in turn, would ground next step, branches of psychology could be integrated so that each of them begins to complement others in the development of the theory as a whole.

And—thirdly, even though Engelsted proposed a developmental theory, this theory could be developed further. In the current form, it seems, Engelsted kept only four qualitative leaps in the evolution of the human mind on the basis of philosophical arguments. If vast amount of empirical knowledge human kind has gathered after Aristotle would have been taken into account, the developmental dimension of the theory—and the theory as a whole—would very likely be different. General theory must come down to empirical data. Thus, it seems to me that the general theory is not ready yet. But now, after Engelsted's theory, we have much better understanding how to create it.

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