

This scanned material has been brought to you by



Interlibrary Services  
The Ohio State University Libraries

*Thank you for using our service!*

**NOTICE**

**WARNING CONCERNING COPYRIGHT RESTRICTIONS**

The copyright law of the United States (Title 17, United States Code) governs the making of photocopies or other reproductions of copyrighted material.

Under certain conditions specified in the law, libraries and archives are authorized to furnish a photocopy or other reproduction. One of these specified conditions is that the photocopy or reproduction is not to be "used for any purpose other than private study, scholarship, or research." If a user makes a request for, or later uses, a photocopy or reproduction for purposes in excess of "fair use," that user may be liable for copyright infringement.

This institution reserves the right to refuse to accept a copying order if, in its judgment, fulfillment of the order would involve violation of copyright law.

**No further reproduction or distribution of this copy is permitted  
by electronic transmission or any other means.**



**Subject** DOCUMENT DELIVERY REQUEST 658411  
**From** OSU Interlibrary Services <liblend@osu.edu>  
**Date** Monday, February 8, 2010 8:56 am  
**To** libstx@osu.edu

DOCUMENT DELIVERY for Neil Tennant

ILLiad Transaction Number: 658411

Call Number: BD163 .I57 1982  
Location: OSU Book Depository

Journal Title: Epistemology and Philosophy of Science - Proceedings of the 7th International Wittgenstein Colloquium, edited by P. Weingartner and J. Czermak, Vienna

Journal Vol:

Journal Issue:

Journal Year: 1983

Article Pages: 168-173

Article Author: Neil Tennant

Article Title: Evolutionary epistemology

Notes:

If you need to contact us, please refer to this Document Delivery Transaction Number: 658411

E-Mail: liblend@osu.edu

Phone: 614-292-6211

NOTE TO SCANNING LIBRARY:

Send this Document Delivery article to patron via Odyssey. ILLiad locations should 'Mark Item as Not Found' if requested article is not available.

## EVOLUTIONARY EPISTEMOLGOY

Neil W. Tennant  
University of Stirling

Antidotes to skepticism can strike one as silly. Johnson kicked a stone; Moore held up a hand. Just as Monsieur Jourdain discovered that he had been speaking prose all his life, so the man in the street is told now that he is daily engaged in scientific theorising, with sensible concepts tailored to his needs and to the world around him. The untutored response to the skeptic is to leave him to his folly. It is this response which I believe is by and large developed by Wittgenstein in *On Certainty*. Let the skeptic live out his convictions, or absence of conviction. Let him walk into walls, or into the path of an oncoming car. In brief, let his theory of knowledge be his known theory, his guide to living. If he continues to behave in ways "rational", ways that enable him to satisfy his desires and achieve his goals, he is after all one of us. This challenge pierces the prison sphere of solipsism, and it collapses to the plane of public life. Evolution may be looked upon as a vast catalogue of Johnsonian encounters with stones. It has taught us appropriate intellectual responses to various contacts and collisions, by structuring the brain of the mind that responds.

This is the central claim of evolutionary epistemology. Other main claims may be summarised as follows.

1. Every successful advance in adaptation correspond to an increase of information about the domain for which it is significant.
2. Evolution is a knowledge or information increasing process.
3. Cognitive structures, like any other biological organs, evolve as a result of natural selection. Consequently one expects
  - (a) that these structures will be tolerably adapted to the "reality" that is of importance for the species concerned
  - (b) more recent structures must have brought a selective advantage
  - (c) certain items of knowledge, or forms of knowledge-gain, can be inborn.
4. Although inborn human knowledge is in the most immediate sense possessed by the brain (as the seat of mentality), it is also, in some recondite sense, somehow contained in the DNA of a cell nucleus.
5. Cognitive structures, both conscious and unconscious, are accessible to scientific investigation.
6. Our conscious cognitive faculties are the most recent overlay; they have perhaps been subjected to the least selection. There may still be fundamental limitations on what we can cognise, environmental boundaries to pure reason.

Lorenz has given a persuasive account of cognitive mechanisms that have been selected for particular domains, and has addressed himself to the question as to how those mechanisms developed that are the functional pre-conditions of our own reason. Every cognitive structure has a genetic base. Even the most abstract process of learning requires neuronal structures to make it at all possible. The empiricist conception of the mind as a "tabula rasa",

a clean slate, is simply untenable. If an empiricist imagines that all cognitive *differences* between human beings are attributable to environmental *differences*, the matter can only be put to empirical test. This is the residual interest still held by the proposition that our cognitive capacities are "innate". For it hardly merits argument that the "slate" must be endowed with requisite structure from the very beginning of ontogenesis, in order to be able to receive and process information at all.

Evolutionary epistemologists have drawn on the findings of comparative psychologists and ethologists, and have organised the behaviour patterns of many different species into a rough phylogenetic lineage. There is a crude continuum of behavioural patterns or "programmes" of varying complexity and flexibility (or "openness"), which Lorenz (1973) has used to bring human mentality within an evolutionary line of fire.

In general, one can discern in the evolution of species a trend from instinctual and inflexible programmes towards those of greater flexibility, less dependent on drives and more attuned to a wider range of environmental input. But this is not at all to say that man himself has been evolutionarily purified of instinctual behaviour, nor is it to play down the tremendous importance of the latter in his psychological make-up.

Knowledge, conceived as justified true belief, has remained an untarnished ideal despite intervening scientific revolutions sloughing off the false pictures painted in the past. But knowledge in the physical world at best comes in little nuggets in the here and now. That this fly is in this bottle, that the owl is there as dusk is gathering, that that T-shirt has NN printed on it, that this is a hand before me, are the sorts of things, barring crazy philosophical objections, that I can definitely know. But that there have never been and will never be any her-maphroditic dodos? That all metals expand when heated? That the sun will rise tomorrow? About such matters one can only hold beliefs, beliefs coming in different strengths or degrees, and depending for their strength in complex ways both on what we do know and on what else we believe. Moreover, once we begin to acknowledge how theory can influence perception and its reports, and how the description of experimental results (the supposedly singular items of genuine knowledge) involves theoretical terminology from the theory being tested; and especially if we also start heeding some of the crazier philosophical misgivings about impostor natural kinds: then we begin to surrender strict knowledge claims throughout, and cleave instead to belief. Something like a Popperian methodology would then be a filter for the rigorous screening of candidate beliefs, mainly in universal form. It would ensure the gradual promotion and possible sudden demotion of beliefs on the scale of degrees. Hume's problem for the Bayesian is simply a matter of never being able to bet at arbitrarily low odds. Induction may be a scandal for the apodeictic addict; but that we need and employ induction in the greatest gambling contest of all is no scandal whatsoever. The realist has faith in the existence of causal mechanisms, no matter how far removed from the surface these may be. The crude uniformity postulate of naive inductivism must give way to a variety of such mechanisms, competing, interacting and superposed. Their assumed existence is the missing premiss in all Bayesian inductions to strengthened general beliefs from the discovery of confirming instances.

My strengthening general belief that all emeralds are green is premised upon the existence of mechanisms for the refraction of light in crystalline structures with a certain chemical constitution (and perhaps also on the existence of complex neural mechanisms ensuring the association of the word "green" with light of the appropriate wavelength). Moreover Popperian testing is a matter of doing one's level best to engineer circumstances in which the underlying mechanism may be suspended, interfered with or thwarted without doing too much violence to the *ceteris paribus* clause implicit in *any* law that is to have applications, be it produced by a naive inductivist or sophisticated falsificationist.

Many a far fetched causal net may be cast by an overly spontaneous understanding. Kant established the need for some imposition of order, but not the need for any one rather than any other. How can we be confident that the order we impose is the right one?

The pragmatic Kantian can happily reply that we can't; we just get by as best we can. The

pragmatic Kantian is one who accepts Kant's account of intuition and understanding; of space and time as a priori forms of the former, and of causality, substance and so on as a priori concepts, or categories, of the latter; but so alters the account of the operations of the understanding that the categories must come into play not only to constitute experience that supposedly leads to *knowledge*, but rather to constitute experience that is to lead to any *beliefs* at all.

Causality for the pragmatic Kantian then becomes a condition for the very possibility of belief formation and conditionalisation. The latter is the Bayesian process whereby degrees of belief are altered in the light of incoming experience. For Hume induction, or the causal way of thinking, was a mere habit of mind; for the pragmatic Kantian, by contrast, it is absolutely constitutive of mind. For Hume the mind to causal thinking is as my finger to its habitual tapping. For the pragmatic Kantian, it is rather as my finger is to its muscles, tendons and bones. My finger can shed its habit of tapping on the table, without thereby ceasing to be my finger. But the mind cannot shed its habit of causal thinking, without thereby ceasing to be a mind. Mind, in other words, has as part of its "essence", the formation of beliefs and alteration of degrees of belief in the light of experience; experience which in turn consists in sensory intuitions' having been categorised in a causal fashion.

Kant had said the following about the concepts of time and space, as forms of intuition, and the categories, as concepts of the understanding:

To seek an empirical deduction of either of these types of concept would be labour entirely lost. For their distinguishing feature consists just in this, that they relate to their objects without having borrowed from experience anything that can serve in the representation of these objects. . . . in view of their subsequent employment, which has to be entirely independent of experience, they must be in a position to show a certificate of birth quite other than that of descent from experiences.

Now without an evolutionary perspective it might be objected that Kant's own "Geburtsbrief" simply attributes to the understanding a constitutive causal caprice. Kant may be right, at the level of philosophical analysis, about how a mind works in apprehending order in the world, and arriving at knowledge (or as we would prefer to say, beliefs) about the objects of sensory experience. But the main problem for the theory of knowledge is not to discover how the mind works (although that of course is important) but rather to explain how its working in the way it does produces knowledge (or reliable beliefs) about the world we inhabit. *That* is the "Geburtsbrief" one is after. Kant named the problem himself: how can subjective conditions of thought have objective validity?

i

The answer given by Lorenz, on which the whole of evolutionary epistemology is based, is that what is ontogenetically a priori is phylogenetically a posteriori. Life, says Lorenz is an "erkenntnisgewinnender Prozess". Now in the light of my recommended shift from concern with knowledge to concern about belief, it is time to replace this phrase. Life is not an *erkenntnisgewinnender Prozess*; it is a *glaubensgewinnender Prozess*. Not only is this truer, but it sounds better; and what is philosophy, after all, if not the beautification of hard truths? Successful cognisers enjoyed an evolutionary advantage. Those that saw, smelled, felt and heard aright were favoured; while the radically off-beam realists, along with the skeptics if ever there were any, were wiped out. This applies throughout the phylogenetic order. Every organism possesses a "Weltbildapparat", an apparatus serving up representations of the environment, at least in those respects that are important for reproduction and survival. The most fundamental and reliable features of the world were slowly "wired in" by natural selection, thereby producing more efficient processors of information and hence cognition. Those

most fundamental features are of course the Kantian a priori: space and time as forms of intuition, and the various categories of the understanding. The latter list might be updated since Kant's day; he was very much dependent on Aristotle, for the quaint reason that he thought that the categories had somehow to correspond to Aristotelian forms of judgment. A more modern list we would suggest is the following: the concept of substance, the notion of a continuant; concepts of identity by various sortal criteria; the notion of event and of cause.

ii

Another important category on Kant's original list, and one which surely must remain even though contemporary evolutionary epistemologists have hardly mentioned it, is that of "Community (reciprocity between agent and patient)". This is the category whereby a combination of things into a whole is made in thought:

. . . for one thing is not subordinated, as affect, to another, as cause of its existence, but, simultaneously and reciprocally, is co-ordinated with it, as cause of the determination of the other (as, for instance, in a body the parts of which reciprocally attract and repel each other). This is a quite different kind of connection from that which is found in the mere relation of cause to effect (of ground to consequence), for in the latter relation the consequence does not in its turn reciprocally determine the ground, and therefore does not constitute with it a whole. . . .

This category of *functioning aggregate* as opposed to haphazard collection of disparate parts, or as opposed to inert class of elements without unitary significance, is surely of the utmost importance in the recognitional capacities of an intelligent being. To recognise a functioning whole as such, be it an organism or a social unit, is of course not necessarily to espouse an holistic or anti-reductionist philosophy, nor to call for the latter in the explanation of the mechanisms underlying such recognitional powers.

Selective advantage no doubt accrues as much to genes that fashion brains that understand mental states as to genes that make brains that have them (cf. N. K. Humphrey (1979), p. 60: ". . . if a rat's knowledge of the behaviour of other rats were to be limited to everything which behaviourists have discovered about rats to date, the rat would show so little understanding of its fellows that it would bungle disastrously every social interaction it engaged in. . ."). For survival purposes it is as important to discern functional organisation of the whole as it is to decry the movement of parts within. Because ours is a world of purpose quite by chance, our only chance is to see purpose. Organismic and teleological thinking is as much a crutch as it is a shackle. As long as it is human brains that do science, there will be a special place within science for the human; and this in spite of the long drawn out cosmological fact that the physical brought forth the human and social.

Evolutionary epistemologists have concentrated most of their attention on the notion of cause, with Riedl (1980) and Wuketits (1981) prominent among them in enquiring after "die Ursachen des Ursache-Denkens". They seem however to have neglected the notions of space and time, as forms of intuition as opposed to concepts of the understanding; and not to have dealt very well with the other categories, such as *Gemeinschaft*. Some of them even call space and time categories, with no apparent exegetical qualms; others maintain straightaway that Kant was interested in *structures*, take these to be neurological structures, and immediately launch into their scientific stories of how we come to possess them today. The value of their own contributions is not to be underrated by these remarks of caution. One small contribution I would like to make is that of slightly re-focusing the evolutionary specialties through which one tries to view Kant. Behind the right lends his doctrines will emerge distorted almost beyond recognition.

First, some reasons why one might dismantle the strong distinction between space and time as forms of intuition and the categories as concepts of the understanding. We think some case can be made for running these together, by considering more closely how one perceives.

First, Kant's notion of space and time are too monistic or unitary. Kantian space incorporates all the mathematical properties of Euclidean space—infinity, isotropy, homogeneity, continuity, connectedness, along with the metrical properties that allow one to speak of angles and to think of a unique line parallel to any given line and passing through a given point off the latter. This is a vulnerable unity to hold up as an a priori form of intuition. The multiplicity of modern geometries enjoins us to make a more discriminate selection of basic spatial concepts such as betweenness and relative nearness that are shared by all geometries. No longer then is space an a priori form of intuition; rather, certain spatial concepts become a priori concepts of the understanding—that is, are reckoned to the categories.

Let us consider how we must change the Kantian account of sensory awareness and intellectual organisation. Kant considered an essentially two step process producing knowledge. First, the manifold of sensory intuition impinges on our awareness as spatially organised and as occurring at or enduring through a short moment of time. (Kant also speaks at one point of this manifold being synthesised by the imagination; whether to count this as a separate step, or as part of the first, is not clear.) The synthesis of the manifold, however, does not yet produce knowledge. That comes only when intuitions are united by concepts in the understanding.

This tandem process should now be welded into one. It is difficult to understand how a manifold of sensory intuition can be spatially organised without appealing to, or already appealing, certain sortal concepts. If sensory datum *A* is to be deemed at the first stage as lying further from the perceiver than sensory datum *B*, something more than two-dimensional spread and texture within the visual field must be involved. *A* will have to be taken, say, as a datum of a distant house rather than as a datum of a nearby architect's model of a house. The spatial organisation of sensory data within the manifold already requires an act of understanding, or of visual interpretation; concepts carving out objects must already be applied in bringing that spatial order to the manifold order which is a precondition for the very existence of the latter. Moreover, the spatial ordering proceeds by applying a small stock of spatial concepts, now on a par with the sortal concepts that must combine with them to effect that ordering. Thus interpretation begins at our sensory surfaces, at the very moment incoming stimuli begin to be filtered along neural pathways (to see matters in a neurological way for an intrusive moment).

This revision of Kantian doctrine breaks down the divide between forms of intuition and concepts of the understanding. Perception is conceived as a more unitary and interpretative process. The result is not always knowledge, but rather dispositional belief. The basic information in the manifold supports a set of linguistically coded beliefs, which is constrained both by logic and by rational processes of belief modification.

The revised Kantian account above of the phenomenology of perception and of judgment is one that should be congenial to anyone working in the tradition of cognitive psychology. The categorial basis of concept and belief formation, with the latter process itself, and the extent to which the categories and the constraints on those processes are innate and given, or innate but maturing, is a legitimate subject matter for the investigator interested first and foremost in the functional organisation of an intentional system like the human mind. But even the cognitivist acknowledges—or should acknowledge—that intelligence and sentence

do not reside in a programme, but only exist when the programme is run. Mind must find a body; it is only the embodied mind, or animated body, that is the proper seat of intelligence and sentience. Given this, it is not implausible that the given must be 'wired in': the innate must be laid down in cerebral circuitry, be it biological or electronic. Moreover, if the resulting cognitive capacities have given rise to successful behaviour favoured by natural selection, then these capacities became more widespread. For genes coded for the physical growth of the neurological structures embodying the innate givens. And they proliferated. Materialist convictions thus underlie the transition from a priori Kantian categories (and we would add, constraints) to underlying neural structures. Only if this is so can they be thought of as having evolved.

This now brings us to a further point of exegetical strain on the part of evolutionary epistemology as far as Kant is concerned. Kant was certainly agreeably relativistic about other species:

What objects may be in themselves, and apart from all this receptivity of our sensibility, remains completely unknown to us. We know nothing but our mode of perceiving them—a mode which is peculiar to us, and not necessarily shared in by every being, though, certainly, by every human being. With this alone have we any concern.

But evolutionary epistemologists are concerned with a lot more than just our own human cognitive capacities. Insofar as they wish to account also for human ones, they do of course try to bring their theory to bear on Kant's doctrines. But when mapping human understanding as an evolutionary product, and trying in their interesting fashion to ground individual a priori as phylogenetic a posterioris, they face a further problem in Kantian doctrine.

Once the Kantian categories have been naturalised by evolutionary epistemology, it will be all too easy to lose sight of Kant's transcendental delineation of the a priori. If, in this naturalised account, the a priori is to be regarded as what is innate in our cognitive inheritance through evolution, then it once more becomes an empirical question just *what* categories of thought and constraints on the process of forming and modifying concepts and beliefs are innate.

What the evolutionary epistemologist gains on the scientific swings, he loses on the analytical roundabout. We may sadly learn that more a priori has been embodied in our brains than is desirable in an ideally rational being. Or, if we maintain human rationality as the only kind of rationality there is, and match the richer innate repertoire of categories and constraints (or perhaps licenses) that evolutionary epistemology may uncover, with transcendental deductions that go through only because we are prisoners of our own perspective; *then* that will be a Pyrrhic victory indeed, a Selbstbestätigung of the purity of a possibly far from ideal form of rationality.

We know now that adaption is imperfect; that vestigial organs remain even when they can be encumbrances; that human embryos have gills, and that even adult organisms are lumbered with design features of the past. So why not the same in the case of mental organs and their operations? Evolutionary epistemology can be expected to render revealed reason as all the more vulnerable, all the less ideal, for being the product of our evolutionary past.

#### LITERATURE

- Humphrey, N. K., "Nature's Psychologists", in: Josephson, B. D. and Ramachandra, V. S. (eds.), *Consciousness and the Physical World* (Pergamon 1979), pp. 57–76.  
 Kant, I., *Critique of Pure Reason*, trans. N. Kemp Smith (London 1980).  
 Lorenz, K., *Die Rückseite des Spiegels* (Munich 1973).  
 Riedl, R., *Biologie der Erkenntnis* (Vienna 1979).  
 Wittgenstein, L., *On Certainty* (Oxford 1977).  
 Wuketits, F. M., *Biologie und Kausalität* (Berlin 1981).

\* \* \*