Empathy and the innate response to architectural forms and spatial arrangements: 
Matters of the body, of metaphor, ways of thinking, and the aesthetic experience of works of architecture

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Abstract
Geoffrey Scott’s reinterpretation of Theodor Lipps’s Einfühlung (an outcome of the human state of being embodied), implies the bringing together of disparate Ôthings in the head.’ This is examined in the light of current work on relationships between embodiment, language and thought; and in the light of evolutionary and cognitive psychology, and work in palæontology and archaeology. Outcomes of some research into the nature of cognitive operations are brought into play in the discussion

Introduction
“Our theory does not say that physical states enter largely into the spectator’s consciousness; it says that they, or the suggestion of them, are a necessary precondition of his pleasure”. (Scott, 1914, 218)

A notable proposition about the perception, appreciation and understanding of architectural forms was presented by Theodor Lipps (between 1839 and 1897). The key idea was about a form of ‘empathy’ (“Einfühlung”) that linked physical, felt bodily states to the intense feelings that can arise in response to the perception and experience of forms of art. Geoffrey Scott followed Lipps’s ideas in his (1914) The Architecture of Humanism. For the most part, their assumptions have rested upon intuitions about assumed faculties, common to everyone, which enable meaningful connections to be made about rather disparate ‘things in the head’æ between feelings stimulated by sensuous, bodily experience, and feelings stimulated by the experience of kinds of art.

Since then there has been little reliable argument or research on this from writers operating within the field of architecture -although the idea was touched upon relatively carefully by Arnheim (1959 and 1977). Bloomer and Moore (1977) and Jencks (1979 and 1981) mention it. But the latter sadly moved toward notions to do with language and to supposed meanings that might reside in architecture.
In fields, where research and theory are more robust, there is work of significance on relationships between bodily experience and feelings, and language and thought - especially by Johnson (1987). Support for the arguments arising from his work (and, by extension, for Einfühlung) can be found in other research by - e.g. Barkow, Cosmides and Tooby, et al. (1992) on evolutionary and cognitive psychology; Mithen (1996) on palæontology and archaeology; Pinker (1994 and 1997) on linguistics; Fodor (1983) on mental modules); and from research on cognitive fluidity and how operations of the mind work across the notional boundaries between domain-specific cognitive modules - Karmiloff-Smith (1992), Jackendoff (1990), and Sperber (1994).

The case will be made that it is these, to various degrees, that provide the basis for making credible assertions about responses - of the kinds hypothesised by Lipps and adopted by, e.g., Scott - to the manifold aspects of architecture.

EMPATHY / EINFÜHLUNG

The term ‘Einfühlung’ and what it entailed was elaborated by Theodor Lipps in the two large volumes of his Raumaesthetik (1893-1897). Something suggested by the term is analogous to an observation by Hume: “a very remarkable inclination in human nature [is] to bestow on external objects the same emotions which it observes in itself” (from the Treatise of Human Nature which Lipps helped translate to the German).

The term ‘Einfühlung’ was coined by Robert Vischer in the early 1870s, and made more widely accessible by Volkelt (1876) - from whom Vischer’s work became known to Wölfflin (whose own work on the philosophy of aesthetics was provoked by the question “how is it possible that architectural forms can express an emotion or a mood?”). Although he was not overly taken with the way in which Vischer correlated empathy with bodily stimuli, Wölfflin argued that “forms become meaningful … only because we recognize in them the expression of a sentient soul. … we animate each object. This is a primeval instinct of man” (1886).

Theodor Lipps gave wider currency to the term and its associated ideas in the short paper “Empathy and Aesthetic Pleasure” of 1905 which deals in condensed form with his conception of it and its meaning. An early definition came from a speculation about three kinds of pleasure. The first kind -like the pleasure taken in the direct experience of, say, the taste of fruit or of some particular sound or colour - comes from the enjoyment of some sensuous object distinct from one’s self. The second is a more direct pleasure taken from the experience of an attribute of the self, such as some particular personal power or skill. Then, there is a third, intermediate,
possibility “which combines the other two: I enjoy myself in a sensuous object distinct from myself. This type is that of aesthetic enjoyment. It is objectivated self-enjoyment” (p.403). Later this was put slightly differently: “I experience or feel myself in it.” It is here that he asserts the “remarkable fact” that there is ‘empathy’ (Einfühlung) in the sense that “what I can feel only within myself I can again find or feel in something other than myself” (p.405).3

These notions and what they could mean were taken up in earnest by Geoffrey Scott in his (1914) *The Architecture of Humanism* (which probably remains the most serious work in architectural critical literature to follow from them).

The key section in Scott is in Chapter VIII, “HUMANIST VALUES.” It comes at the end of the book -‡after the chapters in which he summarised and then rejected the several competing claims of what, in his time, were deemed to be the most important matters in architecture; matters such as standing as a symbol, telling a story, truth to nature, true expression of construction, and so on. They were roundly dismissed as “the Fallacies of Criticism” but continued to possess architectural belief all through the twentieth century. While Scott granted them some value they were all consigned to matters of secondary importance4. The matter of primary importance was to do with what constituted one’s immediate response.

Scott’s extended argument led to the two summary statements which encapsulate something of the essence of his interpretation of Einfühlung: “We have transcribed ourselves into terms of architecture” and “We transcribe architecture into terms of ourselves” (p.213, his italics5). And he then continued:

“"This is the humanism of architecture. The tendency to project the image of our functions into concrete forms is the basis, for architecture, of creative design. The tendency to recognize, in concrete forms, the image of those functions is the true basis, in its turn of critical appreciation".  (p.213)

It is here too that Scott appended a rare footnote (and a rare acknowledgement) pointing to the source of this aesthetic theory “first developed by Lipps twenty years ago.” He also explained that he would avoid purely psychological discussion; referring his reader to “the recent writings of Vernon Lee.”

The senses that accompany physical embodiment are what Scott means by the “ourselves” (of that two-way transcription) and what Lipps means by “the image of our functions ... the ... myself ... that is felt ... within ... or in ... something other.”
Arnheim (1977, 212) put it as “projections of the observer’s own muscular sensations” referring both to Wölfflin’s and to Lipps’s theories although Wölfflin explicitly rejected the muscular sensation theory.

Part of Scott’s argument rested upon the verbal associations that seemed to accompany responses to and descriptions of architectural perceptions and experiences. Terms such as ‘balance,’ ‘top heavy,’ ‘cramped,’ ‘free path’; and phrases like “these lines … might be our … gesture” (p.211) figured in his explanations. Always scrupulous, Scott first addressed a set of possible criticisms that could be levelled at the theory. They were (i) his descriptions could be dismissed as “mere metaphor, … mere metaphors of speech” from which no valid inference could be drawn; (ii) the “enjoyment of fine building is a simple and immediate experience, while this ‘dual transcription’ … is a complicated process”; (iii) the theory is “too physical … the body plays no part … in our enjoyment of architecture”; and (iv) “such a theory is too ‘far-fetched,’ … the great architects of the past [could not have been] guided by so sophisticated a principle of design” (p.214).

It might be just as well to give notice here of the significance of metaphor but not quite in the sense suggested by Scott nor in the sense used by those writers - especially the architectural semioticians - who have been so anxious to play up the notion of ‘meanings in architecture.’ More will follow in due course.

After those passages Scott gave a detailed, (naïve) psychological, partly descriptive account of the set of the four characteristics of architecture to which one responds by means of ‘transcription’ - lines, arrays of two-dimensional forms in two-dimensional space, three-dimensional voids for movement, solid volumes and masses as “essential instrument[s]” of support. Each may be an object of sensuous experience, separately perceived. Here his assertions echoed, albeit indirectly, some of Wölfflin’s phrases.

Finally Scott declared the necessity for “coherence,” or order in composition, as the paramount means by which ‘style’ may be effected. Coherence can, without straining the concept, be associated with the Kantian idea of ‘purposiveness’ (that view of art which calls upon the pleasurable interplay of our cognitive faculties) by which he makes a distinction between something being ‘agreeable’ and being ‘beautiful.’ The “Introduction” to The Critique of Judgement (sections V, VI, and, especially VII) rehearses the argument at length. ‘Being agreeable’ may be likened to the (pleasurable) sensation of just perceiving a single tone or single colour. (Or in Scott’s case just the ‘movement of a line’; or simply the disposition of a set of shapes within a two-dimensional frame; or the perception, as a feeling, of the effect
of gravity on a mass.) Sets of such single sensations need then to be ‘composed by the imaginative play of the mind’ in order to be judged beautiful. (Ernst Cassirer’s gloss captures the essentials of the concept: “a totality is called ‘purposive’ when in it there exists a structure such that every part not only stands adjacent to the next but its special import is dependent on the other” (1981, 287). See too, Mallgrave and Ikonomou (1994, 70.) Thus “coherence” (‘purposiveness’) would allow or prompt some enlargement of an immediate sensuous experience of some single, agreeable perception.

OTHER INSTANCES

It is, of course, the case that others have observed or followed some of these aspects separately, along quite limited lines of speculation fired by a compelling, shared intuition. Mentions abound at diverse times and places: from sixth century China through the Italian Renaissance to early and later twentieth century culture. A flavour of some might be gained from the brief notes below.8

What may be one of the earliest written examples of an insistence upon a ‘body sense’ come from the insights and practises of those such as the Tang calligrapher Ou-yang HsŸn (557-641), and the Ming dynasty scholar Li Ch’un, who held that sense to be essential to the art of Chinese writing (see Jean François Billeter (1990, pp.32-35)). The calligraphic rules of Li Ch’un include some that are particularly connected to ways in which one senses one’s own body in relation to a physical or social settings. They deal with the making (and the forms) of calligraphic marks, and with universal bodily experiences; the latter giving sense and aesthetic quality to the former. They emphasize too the importance of gesture, the pure physical movements that are rehearsed and endlessly practised as a way of learning both the shapes and the meanings of the thousands of characters that constitute Chinese writing (Billeter, op. cit., 85 et seq.).

The characters on the left are from the rules laid down by Li Ch’un “the Eighty-Four Ways of Shaping Large Characters” (1368-1644). The sense of the rules for 81 and 82 bear remarkable resemblances to certain of the observations made by Arnheim, especially in the passages in the section EMPTY AND FORLORN (1977, pp.20-22). The rules in turn are:

1. Heaven covers: upper covers lower
2. Earth bears: lower bears upper
31. The bar dominates
32. The axis dominates
81. Face to face: the two sides face each other, but without being too close at the extremities
82. Back to back: the two sides face away from each other, but without being backed against each other, so that the pulse may pass between them (see Billeter, 1990, 33)
In a letter to Sophie Holland (in 1762) Diderot gave an account of a report that “Michelangelo, intent on giving his dome the most beautiful and elegant shape, after much searching, … hit on the very one that would have been called for had he sought to give it the greatest resistance and solidity ….” Diderot then appears to say that Michelangelo’s instinct was the outcome of feelings inherent in his own body. Thus, according to Diderot, one draws from sensuous experience some appreciation of the laws of statics which enable one to compose (beautiful and elegant) forms that fulfil the requirements of these laws, through a sort of transposition of personal sensations.

One of the earlier, and more rigorous of the few proper research programmes into the implications of these ideas was carried out by C.W. Valentine and reported in his *Experimental Psychology of Beauty* (1913). It was “addressed to the novice” shortly before Scott’s *Architecture of Humanism* and is essentially a summary of the results of a series of experiments designed to shed light upon the experience of beauty. Chapter IV, “THE BEAUTY OF FORM,” deals with the relationship between a notional connection between the experience of beauty and various kinds of bodily movement. His experiments about “The Influence of Eye-movement” were intended to test the contention that certain lines or forms were pleasing (or displeasing) because of the ease (or difficulty) the eye had in tracing particular contours - even though this postulate had been discounted in earlier work by Lotze and by Wölfflin. The section “Aesthetic Illusions of Forms” is directly related to assertions made by Lipps. Although Valentine’s statistics may be thought rather slight by present standards, the report - especially on the tests based upon ‘verticality’ and proportions of parts of columns - does lend credence to Lipps’s suggestions. But Valentine didn’t go so far as to discuss the purported relationship between visual and bodily experience; nor did he deal with any presumed ‘meanings’ that might reside within or be ascribed to particular forms or visual arrays.

**ARNHEIM, BLOOMER and MOORE, JENCKS**

For decades after that, well into the late-twentieth century, architectural theorising remained bound to the “Literary,” the “Romantic,” the “Mechanical,” and to the “Ethical” fallacies that Scott (and Herbart) criticized. Presumptions about what appearances might ‘tell’ or ‘mean’ prevailed along with belief in the pre-eminence of those secondary matters that were held to lie at the heart of ‘good architecture.’ Then, in quick succession, from 1977 to 1979/81, Rudolf Arnheim published *The Dynamics of Architectural Form*; Kent Bloomer and Charles Moore published their *Body Memory and Architecture*; and Charles Jencks presented the Bossom Lectures at the RSA. They all referred to *Einfühlung* (variously, in some substance, or in passing). None added anything new about it but as they each followed their own
singular (and sometime mistaken) lines they did raise matters that, if followed afresh, can now be used to give theoretical weight to that idea of architectural experience and conceivably to all kinds of aesthetic experience.

Arnheim

In *The Dynamics of Architectural Form* (1977) Arnheim clearly followed much that had been proposed by Wölfflin. He drew explicitly upon Einfühlung in substantial sections of the arguments he mounted, especially in Chapters II (“VERTICAL and HORIZONTAL”), III (“SOLIDS AND HOLLOWES”), and VII (“SYMBOLS THROUGH DYNAMICS”). Right through to the closing sections of the book it seemed as if he might present convincing arguments, with evidence rather than intuitions, to sustain assertions such as “all genuine metaphors derive from expressive shapes and actions in the physical world” (p.208) - assertions that don’t go much beyond Scott’s about resemblances between words and architectural forms. But he didn’t, and only expressed his apparent regret that no further robust research had been done in this field: “since the pioneering work of Lipps, psychologists and philosophers have ignored the subject” (p.220).

His concluding passages are rather like an expression of what he believed *should* be done by architects: namely, to put Einfühlung to the service of a special kind of symbolism in architecture. Paradoxically, it is almost as if the “architecture of humanism” was to be put to the service of the “symbolic fallacy.” Thus, visual experience of the dynamics of architectural form was insufficient unless architecture was also endowed with some added, intentionally expressed ‘meaning’ (“coherence” in composition is never mentioned). He had it that the tangible, visible aspects of architecture should stand as symbols for things that may be considered to lie outside it - things that are to do with values that might be held to abide in society and in human feeling.

He took pains, however, to distinguish between two kinds of symbol: the very specific nature of the “conventional symbol” in language, as opposed to “an open symbol” that an architectural form might be. In the latter case “the spontaneously perceivable analogy between the visual character … of an object and a corresponding mental or spiritual character relies on very generic attributes such as height or depth, openness or enclosure, outgoingness or withdrawal” (pp.208-209). He argued against attempts to make building-form symbolic in a literal way: “the use of identifiable subject matter as a component of architectural shape may interfere with a building’s spontaneous symbolism because of the concessions its dynamics must make to the shape of that subject matter” (p.211). At issue was the balance between resemblance through the use of explicit (pictorial, literal, ‘closed’) symbols on the one hand, and the more ‘open’ symbol on the other.
Nonetheless, Arnheim did conjure up a set of general categories of architectural phenomena related to the nature of their visual dynamics. Categories such as ‘container,’ ‘concavity and convexity,’ ‘emptiness,’ ‘boundless ground,’ ‘fields between,’ ‘horizontality,’ ‘piercing the ground,’ and more.

Loose reading of his argument about symbols may then have opened the way to the conception that there are more than apparent similarities shared by architecture and language. Later writers in architectural ‘theory,’ especially those following Jencks, turned to the terminology of semiotics (but without its putative intellectual discipline) in order more forcefully to persuade one of the ‘language-like’ nature of architecture. For, as their argument would have it, architecture can suggest or ‘symbolize’ remembered or empathized experience and thus is supposedly just like natural, spoken, language.

**Bloomer and Moore**

The avowed purpose of Bloomer and Moore in their (1977) *Body, Memory and Architecture* was “to re-examine the significance of the human body in architecture.” This might seem to be related to *Einfühlung* and the term is raised now and again but in a perfunctory way and then dismissively. They don’t demonstrate much understanding of Vischer’s or Lipps’s conception of it nor do they present any considered review. For Bloomer and Moore the “significance” was to do with whatever lay beyond function. Their claim (and it does hold a certain authority) was that “until we begin to understand how buildings affect individuals and communities emotionally, how they provide people with a sense of joy, identity, and place there is no way to distinguish architecture from any everyday act of construction” (pp. ix, x). They do, however, employ the term “Body Image Theory” (derived from Gibson) which they claim can be used to open the way to a greater depth of understanding of the relationship between bodily experience and all kinds of thought (and feelings). They refer, in passing, to Schilder (1935), Fisher (1968), Fisher and Cleveland (1970) - see below. Gibson (1968) is given more attention. It should be noted that he differs from those other sources in some considerable measure: his work is firmly set in the field of experimental psychology while Schilder, Fisher, and Cleveland have their roots and terms of reference set as much, if not more, in psychoanalytic theory. It is mainly from Gibson’s work on the haptic sense and on basic orienteering (e.g., “the body percept or ‘body image’ is a set of possible dispositions or poses at standing or lying - relative to the substratum and to gravity” (Gibson, 1968, pp.112-113)) that Bloomer and Moore hold to and from which they derive certain of their conclusions. In the end they suggest that external things are given ‘meaning’ through some kind of resemblance they may have to the observer’s bodily feelings or the body itself (for example, the symmetry of the fronts of houses...
and the symmetry of human faces (1977, p.46)). They also suggest that ‘body image’ gives rise to meanings - of things such as light, space, paths, centre, and openings - through metaphor or by analogy, but they do not go into the manner in which that might happen. Further down more of this will be considered and examples, from Johnson 1987, offered to illustrate the transition from the physical and physical experience to (even) abstract, concepts. On reflection, their excursion through these fields seems to have been simply the means by which they might glean support for their choice of those works of architecture which they thought most worthy - a reasonable strategy were it not for the fact that Moore’s own work figured rather too prominently in that category.

**Jencks**

The theme of meaning in architecture was taken up in earnest (principally in the 1979 series of lectures at the RSA and the 1981 *Language of Post-Modern Architecture*) by Charles Jencks for whom this came down in the end to a rather banal matter of resemblances to the body or face.

In an aside he made the claim about “so much research” having been done about the projection of bodily states into architecture (ibid.) and, mistakenly, that “Bloomer and Moore … [have] … analysed these body images.” He made a singular reference to Lipps’s speculation in the 14 May lecture “the Pluralism of Recent Japanese Architecture,” (1979, pp.742-755). He dealt with the explicit and exaggerated anthropomorphism prevailing in that “recent” work, and offered it as evidence in support of the notion of *Einfühlung*.

Body imagery is mentioned again in the lecture: “America’s New Architectural Culture” (delivered 21 May 1979). But had it as something that should be quite explicit (and thus committed the error of which Arnheim was so careful to warn). His references to Pelli’s “Blue Whale” and Tigerman’s “Daisy House” (p.759, col.1) was followed, by speaking of an ‘empathetic’ anthropomorphism, and: “it is widely shared now that we project bodily states into architectural forms.” The use of “project” is misleading (at best not altogether clear); for it is both similar to and really very different from Scott’s “transpose.” It seems loosely derived from the psychoanalytic use of the term from which it might wish to seek authority. There is also a significant difference between Jencks’s use of ‘body image’ and the basic idea of *Einfühlung*. For Jencks, especially within the movement called ‘Post-Modern,’ there is a call for an overlay of some kind of explicit of symbolic, anthropomorphic decoration - notionally to make the putative ‘meaning,’ the symbolism of the building, more generally accessible. The spectre of language was raised and the whole enterprise of architectural semiology reinforced.
Despite the various theoretical shortcomings that can be seen in the works so far reviewed, neither ‘body image’ nor ‘metaphor’ nor the connections between them should be ignored. Recent and better informed work compels renewed study but only if the terms are regarded differently: ‘body image’ differently from the limited way chosen by Bloomer and Moore; ‘metaphor’ differently from the usage of Arnheim and of Jencks who regard it simply as a figure of speech. Looked at afresh they will add much to Lipps’s work and shed new light on the aesthetic experience generally.

The key things are (i) the connection between bodily experience and language and the rôle played by metaphor (necessarily regarded in a fresh way), (ii) the purposive and coherent bringing together of several seemingly disparate things (bodily experience, perception of a work of art, and ideas about what may be felt or seen) resultanting in a ‘higher order’ subjective response.

**BODY AND THOUGHT**

It is important to remember that *Einfühlung* as a conception has it that response to architecture is a function of a general (an inherent, not a culture-bound) human attribute, by means of which the perceived work *in itself* may be experienced affectively *without* the need for some explicit, suggestive imagery, without a ‘meaning’ having to be laid upon its forms.

Such a direct response to architecture may be considered to be a function of ‘connections’ as the essence of metaphor in ways that will be elaborated shortly as being made between ‘disparate things in the head’: different kinds of things in distinct, even separate, parts of the mind. To put it in a simplified way first, connections would have to be made between (i) those ‘things’ coded within those parts of the mind/brain which ‘hold’ some ‘inner sense’ of what arises from embodiment, (ii) those held within the parts that deal with perceptions of external reality, and (iii) those parts in which conceptual content may reside.

This is, of course predicated upon the premise that there are, indeed, such distinct parts to the mind and that it is ‘modular’ in ways that go beyond and transcend the anatomical structure of the brain. Such a view stands in contrast to the model of a relatively single, domain-general, mind what has been termed the Standard Social Science Model (SSSM), the blank slate enriched by development in which all experiences and perceptions may ‘connect’ in a fairly straightforward way. The modular view, which will be elaborated in part further down, is adopted in this paper.
There are two lines of research that are currently being followed with some theoretical force supported by persuasive evidence: (i) the making of meaningful connections suggested in the simple sketch above, and (ii) modularity of mind and this in turn raises questions about the existence of a system for the making of connections between modules. It is through such work that Einfühlung as a theory may be seen to be wholly credible and allow it to be taken well beyond its founding intuitions. Mark Johnson’s The Body in the Mind (1987) goes directly to the first line through his analysis of the ways in which the formation of conceptions directly arising from embodiment are the necessary precursors of language and its meanings, and of the faculty of reason itself15. It developed ideas from Metaphors We Live By (Lakoff and Johnson, 1980) in which it is held that bodily experience is what gives sense and meaning to metaphor. The second line mind as an evolved, content-rich, domain-specific modular structure, with necessarily innate capacities is the subject of current philosophical and psychological debate (in which key figures are Jerry Fodor, Annette Karmiloff-Smith, Ray Jackendoff, and Dan Sperber); and of empirical archaeological and palæontological scrutiny (especially by Steven Mithen).

Johnson’s 1987 preface elaborates the entailments of embodiment what separately arises from it and how emergent phenomena are related to each other. He speaks of

"forms of imagination that grow out of bodily experience as it contributes to our understanding and guides our reasoning. ... [Embodiment gives rise to] two types of imaginative structure ... image schemata and metaphorical projections. An image schema is a recurring, dynamic pattern of our perceptual interactions and motor programs that gives coherence and structure to our experience". (1987, p.xiv)

Johnson (1987) doesn’t refer specifically to Gibson’s discussion of what arises from embodiment, nor do Lakoff and Johnson (1980)16. However, their Chapter 12 (“How Is Our Conceptual System Grounded?”) echoes (while going beyond) a number of matters that Gibson (1968) covered. This is particularly the case with metaphors that are rooted in the fundamental spatial experiences of up-down, front-back, in-out, near-far, etc. (see Lakoff and Johnson, 1980, p.56). Insofar as ‘image schemata’ is concerned, it must be observed that despite similarities between that term and ‘body image’ (as used for example by Gibson in “the ... ‘body image’ is a set of possible dispositions or poses, standing or lying, relative to the substratum and to gravity” (1968, pp.112-113)) Johnson’s conception embraces more and with greater subtlety.
Body Image/Image Schemata

To get a feeling of the sense of Johnson’s “image schemata” it can be set against ways in which related or similar terms had been conceived in earlier research that dealt with or stemmed from the presumption of an objective existence of ‘body image’ (various kinds of bodily awareness, internal, subjective images of the self, and consequences of its presence or absence). After that one can consider his “image schemata”; “metaphorical projections” and “extensions” of “schema”; and “embodied schema” (1987, p.23). It should be noted that ‘body image’ is not unambiguously defined by those cited below; it is, rather, taken by them as a given.

Schilder’s (1935) *The Image and Appearance of the Human Body* “takes its starting point from a … realistic attitude and is not concerned with doubts about the reality of the external world.” He explains: “the body schema is the tri-dimensional image everybody has about himself. We may call it ‘body-image’” (p.11). And in elaboration (quoting Head) “the sensory cortex is also the storeroom of past impressions. These may rise into consciousness as images, but more often, … remain outside of central consciousness. Here they may form organized models of ourselves, which may be termed ‘schemata’.” In Part III: Sociology of the Body Image (Section 1: “Space and the body-image”) Schilder has it that “the body-image incorporates objects or spreads itself into space.”

Schilder’s “body image” is not static; it includes all kinds of perceptual experiences as a kind of history against which current states can be compared. It incorporates everything of which the subject is aware or experiences in the sense that one internalizes all objects of perception which thus become one with the body-image. This would preclude the notion of making connections between different kinds of things in different parts of the mind because, in Schilder’s view, in the mind all experience is as one. In many ways, however, Johnson’s “image schema” resembles Schilder’s ‘body image.’

Humphrey’s *Thinking* (1951) deals with and surveys conclusions that have been drawn about the relationship between muscular action, relaxation, and thinking, with reference to experiments and conclusions by, among others, Jacobson (1929), Freeman (1930, 1931), Washburn (1916). The conclusion in general is that there is both an awareness of the body and, indeed, an intimate link between that awareness and certain kinds of thinking.

“When they have become expert [in relaxation after training] Jacobson’s subjects report that mental activity in general diminishes as muscular relaxation progresses” (Humphrey, 1951, pp.189-190). “With progressive muscular relaxation
... attention to thought processes, and emotion gradually diminishes” (Jacobson, 1929, p.181). Freeman, similarly, concluded that there is a direct relationship between thought and muscular tension. “Freeman recognizes the probable existence of patterns specifically facilitative of special mental tasks.... Thus mental arithmetic may be favoured by a postural pattern involving the leg muscles” (Humphrey, op. cit., p.193). Washburn, in her *Movement and Mental Imagery* (1916), said “the whole play of conscious processes depends on the interaction of movement systems, and the connections between ideas are based on the connections between kinesthetic pathways and motor pathways” (Washburn, 1916, pp.196-7). “For her the meaning of an idea is an associated movement system” (Humphrey, op. cit., p.199).

In their (1968) *Body Image and Personality* Fisher and Cleveland are with Freeman about the apparent relationship between fingers and arithmetic. And in their discussion about ‘unique finger agnosia’ suggest that there is some connection between body image and other (mental) activities. This conclusion is drawn from an hypnosis study by Teitelbaum (1941) in which the subjects were instructed to “forget everything about your body.” The effect was to result “mainly in errors of differentiation of right and left sides of the body, difficulty in arithmetical calculations, [a] breakdown in the ability to draw figures, and faulty recognition of objects.” The suggestion is that “various basic skills and capacities may be dependent upon a well organized body image” (p.8).

The conclusions drawn from the results of Teitelbaum’s experiment lend support to the proposition that “a relatively intact body image is an anchor point or foundation necessary for the performance of certain judgments and skills”; for example, naming objects or drawing geometric figures. They are not, however, altogether specific about just what kinds of judgments and skills. They have it that "primitive terms for spatial relations suggest that the body itself with its “personal dimensions” of above-below, before-behind, and right-left is the source of a psychophysical system of coordinates. ... Cassirer says: ‘Where the more highly developed languages, in order to designate spatial relations, normally use prepositions, particles, and post-positions, there are nominative expressions in the aboriginal languages which either stand for, or refer directly to, parts of the body ....’” (Fisher and Cleveland quoting Werner, 1948, p.21)

And, referring to Head (1920) they concluded “that each individual constructs a picture or model of himself which becomes a standard against which all bodily movements and postures are judged” (Fisher and Cleveland, 1948, p.4).
Seymour Fisher (referring to Freud) brought body and metaphor together, and at first had it that metaphor might play a rôle in giving symbolic meaning to body parts (1970, p.573). Further on, however, he appears to reverse that idea with: “considerable evidence has been uncovered that bodily activation and bodily sensory information may influence thought processes” (op. cit., p.588). So he seems to anticipate Johnson who has it that the thoughts that accompany an utterance attain meaning by virtue of body experience18.

Ulric Neisser (directly referred to by Johnson, 1987, p.20) writes of an embodied schema tied to perception and motor programmes:

'A schema is that portion of the entire perceptual cycle which is internal to the perceiver, modifiable by experience, and somehow specific to what is being perceived. The schema accepts information as it becomes available at sensory surfaces and is changed by that information; it directs movements and exploratory activities that make more information available, by which it is further modified.

From the biological point of view, a schema is a part of the nervous system. It is some active array of physiological structures and processes; not a center in the brain, but an entire system that includes receptors and afferents and feed forward units and efferents'.

(Neisser, 1976, p.54)

Against that background, an argument begins to emerge to suggest that the entire body of propositions related to Einfühlung is more than a set of persuasive intuitions. It can be understood as a system in which some subjectively meaningful experience (but one that may be shared with others) arises (i) from cerebral operations that connect perceptions to the schemata, and (ii) from the conceptual content that arises from embodiment.

**Examples Of Schemata**

The thesis is that there is a distinctive image-schematic “level of cognitive processing” (Johnson, 1987, p.24); and that ‘image schemata’ operate at “a level of mental organization between abstract propositional structure ... and particular mental images” (op. cit., p.29). “A schema consists of a small number of parts and relations by virtue of which it can structure indefinitely many perceptions, images, and events” (ibid.). They need to be understood then as that which arise from a series of recurring and dynamic interactions that involve motor programmes and perceptions which
together give coherence and structure to experience. It should be noted, importantly, that ‘image schemata’ have “a level of generality that raises them a level above the specificity of particular rich images” or ‘mental picture.’

Among the many examples given by Johnson are: ‘IN-OUT’ together with ‘CONTAINMENT’; ‘BALANCE,’ ‘PATH’; and the ‘FORCE’ schema (as well as other schemata, associated with ‘FORCE,’ such as ‘COMPULSION,’ ‘BLOCKAGE,’ ‘COUNTERFORCE’). In themselves, of course, they may not immediately appear to be particularly rich in conceptual content, especially in the initial form derived from particular physical experiences. Image schemata do, however, have “entailments” with the implication that they have preconceptual internal structures that go beyond initial states. For example, “... physical in-out orientation [entails]: separation, differentiation, and enclosure, which implies restriction and limitation” (Johnson, 1987, p.22). The ‘CONTAINMENT’ schema (physical in-out orientation) is consequent upon the embodied experience of being in some enclosure for example (a womb, a crib, a room, being held) in entails: (i) protection from or resistance to external forces; (ii) the restraint of forceful movements; (iii) relative fixity of location which, in turn entails (iv) being accessible or inaccessible and, significantly (v) transitivity: if B is in A then all X in B are also in A (ibid.).

The following inescapably lengthy extract is offered as a single illustration to get a flavour of just how a schema with its small number of parts and relations, together with the superimposition of other schemata, may structure “indefinitely many perceptions, images and events.” Naturally, Johnson properly covers a much larger array that encompasses all kinds of experience (see especially his 1987, CHAPTER FIVE “How Schemata Constrain Meanings, Understanding and Rationality”).

Center-Periphery
The fact of our physical embodiment gives a very definite character to our perceptual experience. Our world radiates out from our bodies as perceptual centers from which we see, hear, touch, taste, and smell our world. Our perceptual space defines a domain of macroscopic objects that reside at varying distances from us. From our central vantage point we can focus our attention on one object or perceptual field after another as we scan our world. What is “figure” or “foreground” at one moment may become “background” at another, as we move perceptually through our world. At a certain distance from this perceptual center our world “fades
off” into a perceptual horizon which no longer presents us with discrete objects. We may move in one direction toward the horizon, thus opening up new perceptual territory, but this only establishes new horizons presently beyond our grasp.

What I have described is the contour of the CENTER-PERIPHERY schema, which can be represented by [the] figure [below]. The center-point represents my perceptual and experiential center which defines my experiential space and fades off into my horizon (wavy line).

So far we have spoken of the CENTER-PERIPHERY schema as though it were totally a matter of perceptual space. But, obviously, the schema is a recurrent structure in my experiential space. In my “world” some things, events, and persons are more important than others & they loom larger in my experience and are more central to my interactions. Others are relatively peripheral at a given point in time. One’s spouse, lover, or friend are more central forces in my interactional world. Understood in this way, we have already moved metaphorically to a more abstract interpretation of the CENTER-PERIPHERY schema. It shows itself not only in the structure of my perceptual field but equally important as a structure of my social, economic, political religious, and philosophical world. Those “objects” that stand forth as significant in my experiential field are both concrete and abstract entities toward which my interest is directed. Even more abstractly, we can say that all of our understanding exhibits a horizontal contour. For our purposes, the key point is that the nature of our bodies, the constraints on our perception, and the structure of our consciousness give prominence to the CENTER-PERIPHERY organization of our experienced reality.
The CENTER-PERIPHERY schema is almost never experienced in an isolated or self-contained fashion; instead, a number of other schemata are superimposed upon it to define my orientation toward my world. To name just a few: (i) given a center and periphery we will experience the NEAR-FAR schema as stretching out along our perceptual or conceptual perspective. What is considered near will depend upon the context, but, once that is established, a SCALE is defined for determining relative nearness to the center. (ii) We almost always superimpose a CONTAINER schema on our CENTER-PERIPHERY orientation. Where we draw the bounding container will depend upon our purposes, interests, perceptual capacities, conceptual system, and values. But we tend to define both our physical and mental identities by virtue of their containment (within “bodies” and “minds”). (iii) When such a CONTAINER schema is superimposed we experience the center as inner and define the outer relative to it. Likewise, we perceive this same INNER-OUTER orientation for objects existing in our perceptual field, and, by extension, to certain abstract objects (e.g., models, theories, geometrical figures). (iv) The INNER-OUTER pattern also supports the imposition of a SUBJECT-OBJECT orientation, in which our subjectivity is defined in terms of that which is inmost or central to our conscious being. (v) This “inmost” dimension gives rise, in turn to a SELF-OTHER distinction, which can have the MINE-THINE valuation imposed upon it.

In this way, by superimposition of schematic structures, which can be metaphorically understood at a number of different levels, we develop a host of complex meaning structures central to our experience and understanding. (Johnson, 1987, pp.124-125)

Other schemata arising from embodiment -selected here from Johnson’s admittedly “highly selective” list (op. cit., pp.126) as held to be “pervasive, well-defined, and full of sufficient internal structure to constrain our understanding and reasoning” (his italics, ibid.) are: PART-WHOLE, LINK, OBJECT, SURFACE, ATTRACTION, MERGING, BLOCKAGE, COUNTERFORCE, RESTRAINT REMOVAL, EXTENSION, and ENABLEMENT. On their own they may be enough to persuade one of the essential correctness of the intuitions that underlie Einfühlung, especially when set against Arnheim’s categories of ‘dynamics of architectural
form.’ They may be seen together, in the Appendix. However, these ã singly or as superimposed clusters ã are further and necessarily enriched by ‘metaphorical extension.’

The OUT schema - with its close relation to the CONTAINER/CONTAINMENT schema (in-out orientation) entailed by CENTER-PERIPHERY ã will be used below to illustrate the nature of metaphorical projection (and extension).

Metaphorical Projection.

It has to be said at the outset that ‘metaphorical’ certainly implies more than ‘metaphor’ ã that figure of speech “in which a name or descriptive term is transferred to some object different from, but analogous to, that to which it is properly applicable” (OED, 1999).

A sense of the richness and complexity of Johnson’s concept can be gained from Nelson Goodman’s (1976) analysis of ‘metaphor’ in his “approach to a theory of symbols.”

Within his treatment of representation, description, denotation, and classification he elaborates upon the nature of labels. In condensed form: labels are applied as predicates and as such have extensions ã the things to which they are applied. The set of extensions of a label is termed its range (for example, a range of ‘red’ comprises all red things). Further, a label is not confined to a single range nor is a range exclusive to a single label; there can be families of labels and of ranges to which a label might be applied. The aggregate of all ranges to which a label can be applied is its realm (a realm over which ‘red’ may operate comprises all coloured things, and for that matter ‘yellow’ also operates over that realm). A set of objects may be sorted or denoted by a set or collection of alternative labels; that set of alternatives is a schema (not in Johnson’s sense).

And then he comes to metaphor:

"Now metaphor typically involves a change not merely of range but also of realm. A label along with others constituting a schema is in effect detached from the home realm of that schema and applied for the sorting and organizing of an alien realm.... The native and foreign realms may be sense realms; or may be wider, as when a poem is said to be touching, or an instrument to be sensitive.... The shifts in range that occur in metaphor,
Similar ideas will occur again, especially in the sections on work by Mithen and by Sperber that will be considered in a little more detail further on.

Furthermore, “metaphorical application of a label to an object defies an explicit or tacit prior denial of that label to that object. Where there is metaphor, there is conflict.... Application of a term is metaphorical only if to some extent contra-indicated.” (op. cit., p.69). For a metaphor to be really telling it needs to be fresh, not hitherto used so that a new and unlikely connection can be made.

Johnson takes on all of that in his conception of “metaphorical projection" as “a pervasive mode of understanding by which we project patterns from one domain of experience in order to structure another domain of a different kind. So conceived, it is not merely a linguistic mode of expression.” Like ‘image schemata,’ metaphor and metaphorical projection/extension is a complex cerebral operation giving rise to essential cognitive structures by which “we are able to have coherent, ordered experiences that we can reason about and make sense of” (1987, pp.xiv-xv and 15).

The nub of Johnson’s argument is that the process of metaphorical extension is an essential prerequisite to (rational) thought. Whilst entailments of image schemata give rise to further schemata and enrich their conceptual potential, it is by metaphorical extension whereby image schemata are transformed to new conceptual structures, to new complex, abstract forms of understanding and conceptualisation that one may conceive of, apparently, quite disparate things as belonging together. And, in that way one may create and realize that coherence (that purpose or order also spoken of by Scott).

It needs to be stated, however, that here are a number of objections to metaphor (from an ‘objectivist’ perspective). Johnson rehearses a number of these especially by Searle (1979) who nonetheless did assert that metaphors work “because there are non-propositional connections in the background ... it is a fact about our sensibility, whether culturally or naturally determined, that we just do perceive a connection.” (in Johnson op.cit., p.73). He goes on to summarizes the evidence for the reality of image schemata and their metaphorical extension largely from empirical work on natural language, linguistic studies, and patterns of usage (p.104, ff.).
Metaphorical Extension

There is both “projection” and “metaphorical extension.” The first is used to designate a basic operation in which a schema is ‘projected’ “beyond the prototypical case,” derived from some personal bodily experience, onto inanimate objects. The second is to do with extending a schema from the physical to the non-physical.

“Projection” can be illustrated by the schema ‘OUT’ ñ related to ‘CONTAINMENT’ and in-out orientation mentioned above. The figures below are variants of the basic schema.

Each represents a projection of the prototypical case (one’s physical experience of being contained) onto inanimate physical things. For example, OUT 1 could represent “the ball was kicked out of the arena” or “the dog went out of the kennel” (arena or kennel as container); OUT 2 “serve out the vegetables” (projection of in-out orientation onto a dish and what it contains); OUT 3 “set out for town.”

Metaphorical extensions take the schemata significantly further, into a more abstract realm, one removed from immediate physical experience. For example, the metaphorical extension ARGUMENT IS A CONTAINER gives “make sure you don’t leave out any relevant data from your argument” or “leave out the unimportant issues.”

The further elaborated examples of metaphorical extensions of the BALANCE schema are particularly revealing (see Johnson, 1987, pp.86-87). The entire range of meanings given to ‘balance’ come from that gradual, and finally triumphant, experience of the physical activity of learning to balance one’s own body. It is from this that one begins to appreciate and understand the axis of upright posture (of the idea of a vertical axis), and then more abstract concepts such as ideas of equilibrium (‘too much,’ ‘not quite enough’) and of ‘things being out of balance.’ The basic BALANCE schema when extended - to AXIS BALANCE, TWIN-PAN BALANCE,
POINT BALANCE, and EQUILIBRIUM - allows sense to be made *whatever the mode of perception*: visual (balanced or unbalanced forms in a frame, the balance of forces in a work of sculpture, the sense of balance of forms in a work of architecture), auditory (the balance of instruments in an ensemble), gustatory (the balance of spices in a curry), and the balance of natural forces, say, in an ecological system. Then beyond the tangible and physical to quite abstract contexts (the balance of evidence, the balancing of a mathematical equation around the ‘equals’ (=) sign, moral and legal balance). Arnheim (1956, Chapter 1, “Balance,” pp.1-31), referred to in some detail by Johnson (op.cit., pp.76-79), treats extensively of the metaphorical extension of BALANCE through the example of the phenomenon of weight in visual perception21.

In all this, one can see analogies. To Goodman’s “transfer of a scheme, a migration of concepts, an alienation of categories” whereby disparate things are brought together, and new and unlikely connections are created. And to “the greater [articulated] entity we call a composition [whose] internal structure is given to our perception” (Langer, 1953, p.31).

Questions remain, however, as to the nature of a mind in which this may happen.

**DISPARATE THINGS IN THE HEAD: COGNITIVE MODULARITY**

It was suggested earlier that there are things held in parts of the mind that deal with senses of *embodiment*; that there are also those things held in the parts that deal with perceptions of external reality; and that, separately, there is *conceptual* content. This raises questions about the structure of the mind - whether it is singular, in which perceptions, thoughts, and understandings are all together. Or whether it has a structure of parts, a modular structure - with separate modules each dedicated to some particular sense or to particular kinds of cognition with the potential for multiple interconnections to other modules. Current work provides evidence that not only are there such distinct parts but that they and the ability to make and to recognize connections exist, of necessity, as evolutionary adaptations.

The several lines that lead to this are based upon: (i) the arguments put forward by Fodor (1983) following Chomsky’s (and other’s) empirical work on vision and speech processing; (ii) physical evidence in the archaeological and palaeontological record presented by Mithen (1996); (iii) the psychological and philosophical arguments by, e.g., Gardner (1983); Barkow, Cosmides, and Tooby, et al.(1992); and Hirschfeld and Gelman, et al. (1994).
And there is the work - by, for example, Jackendoff (1990), Karmiloff-Smith (1992), and Sperber (1994) - about the ways in which inter-module connections are effected. All subscribe to that kind of ‘modularity’ in which the mind has a multiple, content-rich, domain-specific structure.

The competing, previously dominant construction, the ‘Standard Social Science Model’ - which assumes, a priori, the existence of a blank-slate, general-purpose, uncompartmentalized mind with a content-independent system of processes (like Piaget’s model of a single-domain mind with a general capacity for problem solving and conceptualization) - will not be dwelt on here. A full account of the arguments against the SSSM may be seen, for example, in “The psychological foundations of culture” by Cosmides and Tooby (1992, pp.22-136) who conclude that it is necessary to “abandon the idea that the mind is free of content-specialized machinery” (op.cit., p.97). They further argue that the alternative, modularity, is necessarily determined by evolution. Hirschfeld and Gelman provide an overview of the shortcomings of the view that that “human beings are endowed with a general set of reasoning abilities that they bring to bear on any cognitive task, whatever its specific content” (op.cit., p.3) and they outline the many arguments formed across several disciplines and traditions that lead to the theory of “domain specificity” as a corollary of modularisation of mind. See too Gardner (op. cit.) on the theory of “multiple intelligences.” Gardner, in opposition to aspects of Fodor’s position, argues that mind has to be composed of components, of numerous distinct functions.

**Fodor:**

In his 1983 *The Modularity of Mind* Fodor seeks an answer to the question “whereof does the structure of mind consist?” He keeps his analysis within the boundaries of the psychology of cognitive processes - to which the matter of ‘connections between disparate things in the head’ belongs. He starts from four different accounts of mental structure, all of which he finds only partially satisfactory:

(i) Neocartesianism: an “intrinsically structured” mind, i.e. with innately specified propositional contents, in which there is an unfolding of deductive consequences of innate beliefs interacting with a body of perceptual data. For example, the ‘Neocartesian’ version, has it that Chomsky’s account of language learning makes use of hypothesised interactions between “innate endowment and perceptual experience ... in virtue of their respective contents” (1983, p.5, italics in the original).

(ii) A functional architecture of ‘horizontal’ faculties (such as, e.g., memory, imagination, sensibility, perception) that are called into play, to interact, in various kinds of mix depending upon the object of the cognitive process. Faculties are
taken to be invariant whatever the topic of thought. So, for example, the faculty of judgement would be the same right across such different matters, say, as music, morality, science, etc.

(iii) A functional architecture of ‘vertical faculties’ (following certain lines previously due to Franz Joseph Gall) of the likes of: aptitudes, propensities, dispositions. Certain of these would need to be qualified according to certain particular cognitive domains. Thus *aptitude* in the case of music is to be distinguished from *aptitude* in the case of mathematics, say, or watch-making (a case of manual dexterity). Gall’s vertical faculties are *domain specific*, are *genetically determined*, are associated with *distinct neural structures*, and are *computationally autonomous* (1983, p.21). And he goes on to argue that ‘vertical’ faculty structure is a plausible but not altogether sufficient answer to his question (although it does in the end contribute to his conception of ‘modularity of mind’).

(iv) Associationism which denies the existence of faculties other than as “constructs out of some more fundamental sort of entity” (1983, p.23) is reviewed as the fourth candidate.

In the end he concludes that the mind has (crudely speaking) a dual structure. On the one hand there are modular input systems to which modes of perception belong (a ‘vertical’ structure as it were). He suggests (1983, p.47) there are six - one for each of the traditional sensory/perceptual ‘modes’ (hearing, sight, touch, taste, smell) and one more for language. To this one might add a seventh, an input system for that sense of a bodily self, independent of the perception of external things. The modules of perception are hard-wired, encapsulated, automatic. In contrast, there is a central cognitive (‘horizontal’) system which is unencapsulated (1983, p.103), can’t be considered to be modular, and runs quite separately from the modules of perception. He has it that cognitive processes cannot be modular. This view is robustly challenged by, for example, Karmiloff-Smith and Sperber (see below).

**Mithen**

In *The Prehistory of the Mind* (1996) Steven Mithen uses palæontological evidence to support conceptions about the existence and the evolution of a modular structure of mind.

Fossil data indicate that initially the mind could well have been a ‘simple’ singular intelligence (of a sort of ‘Piagetian’ general-purpose learning and decision-making structure). Over evolutionary time this was supplemented by a set of specialized behavioural domains (skills, or intelligences) each separate and
unconnected to the others, each devoted to a particular kind of skill (e.g., tool making, intuitive biology). The archaeological record shows that these several, initial ‘proto-human,’ intelligences were independent of each other so that, for example, the flint tool-making ability (a precursor of ‘technical intelligence’) was not initially linked to others such as linguistic intelligence, social intelligence, natural history intelligence (cf. Gardner’s “Multiple Intelligences”). Eventually these evolved - together with the development of the potential for the creation of links between them - allowing a rich flow of knowledge and ideas between all parts of the mind. From about the times of H. erectus there was an evolution of increasing modularization and an acceleration of the growth of technical and biological intelligences. This was followed by the evolution of linguistic abilities in H. neanderthalensis (archaic H. sapiens) and increasing cognitive fluidity (see Mithen, 1996, pp.69 and 242 for summary illustrations). Thus one has a pair of linked developments: of cognitive domain specificity (in an elaborate modular structure), and the fluidity of connections between modules.

A way of putting the argument is that it was desirable in evolutionary terms to have some facility whereby connections that were made (or nascent) would be recognized as good. Such facility would of necessity have been selected as a biological adaptation. It would have been necessary too for there to have developed some particular ‘module’ that was especially alert to the formation of a new and potentially valuable connection - the making of a metaphor of sorts, a metaphorical extension. The ability to seize upon, to be alert to a potential ‘connection,’ to appreciate a metaphor, or to grasp the relevance of some metaphorical extension would be a biological adaptation, selected for survival. As “experience gained in one behavioural domain can ... influence that in another ... the mind acquires not only the ability but a positive passion for metaphor and analogy” (Mithen, op. cit., p.77).

But first one must deal with how it may operate. What happens when by ‘metaphorical projection’ disparate things - held and coded (‘represented’) in distinct, separate parts of mind - are brought together, and articulated (given, at the same time, to our perception and understanding)? What might *Einfühlung*, as ‘metaphorical projection,’ as a making of connections, actually be like in operational terms?

**MAKING CONNECTIONS: REPRESENTATIONS AND COGNITIVE DOMAINS**

Problems about the nature of cognitive traffic, about the ways in which connections may be formed in the mind, have been addressed by those who are concerned about, and continue to explore, the nature and the extent of modularity.
In the most general terms - as for example for Fodor for whom mind is both modular (the input systems) and non-modular (cognition) - the means may be ‘mentalese’ (as in his 1976 and 1995). Pinker offers a pithy definition of ‘mentalese’ as “the language of thought in which our conceptual knowledge is couched ... the mind’s lingua franca, the traffic of information among mental modules .... This traffic can actually be seen in the anatomy of the brain” (see Pinker, 1997, p.90 for more). He has it, for example, that the ‘gist’ - what one remembers on putting down a book, having forgotten details like words, sentences, etc. - is captured in or by ‘mentalese.’

But this is far too general; for such a language would need to be capable of dealing with the multiplicity of forms in which the content of various modules and cognitive domains are held. Pinker cites evidence to show that “we have several kinds of data representation inside our heads” (emphasis added) which is revealed “in our everyday ease in generalizing knowledge”; and that “it is possible to catch a mind in the act of flipping” from one representation to another (op. cit., p.89).

The significance of multiplicity of representation is one of the factors that has reinforced the view that cognitive processes must be related to a modular structure of cognitive domains. It is this that stimulated work on cognitive fluidity and the means by which connections can be made between the different kinds of representations of perceptual inputs and the kinds of representations within cognitive modules. There are three lines that appear most relevant: (i) by Karmiloff-Smith (1992) who approaches the matter from considerations of child development, (ii) by Jackendoff (1992 and 1996) who deals with the kinds of interface between modules, and (iii) by Sperber (1994) who (a) reveals significantly different kinds of operations within different kinds of cognitive domains and (b) sheds light upon the cultural ‘evolution’ and transformation of cognitive domains.

Karmiloff-Smith takes on the matter of modularization vs. non-modularization with a model of a reiterative process she calls Representational Redescription (RR). This accounts for the way in which representations become “more manipulable and flexible” (1992, pp.17-26). She posits a developmental path through four representational levels as children gradually reconcile internal representations with external data. The initial level is “bracketed” (rather like Fodor’s ‘encapsulated’) - so that encoded representations are not (cannot be) linked. Maturation and development, however, lead to the formation of higher level representations. They are not bracketed and by redescription allow the making of various kinds of metaphorical and analogical connections. (For example, RR allows the analogy: “striped animal” / “zebra crossing”). The process gradually allows the transformation
of “implicit information in the mind ... [into] explicit knowledge to the mind” (op.
cit., p.18). It is the “internal process of representational redescription which abstracts
knowledge the child has already gained from interacting with the environment” (op.
cit, p.78).

The details of experimental evidence she cites and the hypothesized model
she thence constructs deal with ways in which perceptions and sensations (of external
stimuli and bodily experiences) are transformed to representations. And this explains
(to some interesting degree) how it is that image schemata and their metaphorical
extensions (following Johnson) may occur in the first instance.

Jackendoff is concerned with the way(s) in which connections can be formed between
separate mental modules and uses the term ‘Representational Modularity’ to enlarge
modularity theory. He introduces the idea of “interface modules” to deal with ways
in which input representations may link with each other and with cognition. This
recognizes the fact that there are particular distinguishing (representational) features
that characterize separate input modes. It is these distinctive representational features
(as well as their ‘encapsulation’ / ‘bracketing’) that require some complex means to
allow a connection across the interface and so to enable cognitive connections. In
his 1996 “The architecture of the Linguistic-Spatial Interface” he considers language
and vision in particular. There he deals in detail with an interface module that can
bring the contents of the modules of language (conceptual, cognitive, structures
arising from extensions of image schemata) together with spatial representations
arising from sight (inputs encoded automatically and ‘encapsulated’). This provides
a tentative explanation of the way in which image schemata can give rise to
metaphorical extensions.

The matter of distinctive representational features is also considered by
Sperber (see below) in relation to the integration of information that arises, and is
differently represented, in the various (encapsulated) perceptual modules.

Much of the work on modularity, and its operations, is related to the way it
has been selected as an evolutionary adaptation. But art and architecture (or chess,
say, or music, or mathematics, or landscape, or anything else to which one may
respond with (aesthetic) feelings) are cultural phenomena. Their development is
too recent and so their various effects upon us cannot be the product of or subject to
the forces of natural selection. One therefore needs to understand how the
transmission and reception of such phenomena could be related to responsive
capacities of the mind that had their origin in human evolution.
Sperber

In “The modularity of thought and the epidemiology of representations” (1994) Sperber tackles this head-on. Paradoxically, he follows two lines suggested by “commonsense arguments against the modularity of thought” (p.40 24). The first is about the problems posed by the integration of information in some “modality-independent medium,” - for example the sight and scent of a particular flower may both give rise to the single concept ‘a rose’; such cognition would need to be represented in a manner independent of the sensory input mode. The second is about cultural diversity and novelty. This was prompted, paradoxically, by Fodor’s insistence (having chosen modern science as an example) that there couldn’t possibly be an “ad hoc preparedness for culturally developed conceptual domains” (1983); and that there are too many recent, variable, social, cultural inventions to be correlated with evolutionary change in human genome. Hence the cognitive domain could not be modular.

Sperber challenges the belief that conceptual thought can’t be modular and mounts an evolutionary argument for the existence of cognitive modules which are domain-specific but do not have to be biological adaptations. The explanation lies in the existence of and distinction between three kinds of domain: ‘proper,’ ‘actual,’ and ‘cultural’ (p.50).

Proper: is to do with environmental conditions. This is the cognitive domain that satisfied some module’s input conditions and which contributed to reproductive success so ensuring an enduring species. In simple terms: by figuring out what was what in the immediate environment and what could be done about it a species could add to its chances of continued survival.

Actual: is what is present in an environment that satisfies the input conditions of some cognitive module(s) whether the same as or different from the ‘proper’ (environmental) domain that prevailed during the species’ evolution. A cognitive module will processes information found in its actual domain whether it does or doesn’t belongs to its proper domain. Hence, the actual domain of human cognitive modules is far larger than their proper domain.

Cultural: A cognitive module stimulates in every culture the production and distribution of a wide array of information that meets its input conditions. This information, being artifactually produced or organized by the people themselves, is from the start conceptualized and therefore belongs to conceptual domains that I propose to call the module’s cultural domain(s). In other terms, cultural transmission causes, in the actual domain of any cognitive module, a proliferation of parasitic information that mimics the module’s proper domain (p.55).
The environment of humans differs from that of other animals in that it includes their output as massive producers and transmitters of information which can be avidly consumed - cognitively taken up and processed and then re-introduced for others to consume and process again. Although these new cognitive domains are not in themselves adaptations, the ability to manipulate, to communicate, and to deal cognitively with them is or is derived from a selected adaptation.

Expertise in, say, one of these new domains (chess, music, or architecture, for example) arise in those who, individually, may have ‘seen’ (appreciated and understood) its structure and find that they can deal with and manipulate it cognitively, and experientially and sensuously. And, moreover, as well as constructing their own individual mental representations of information are able to construct “public representations (e.g. utterances, written texts, pictures) … or in the form of other informative behaviors and artifacts” (p.54).

Such enrichment by various means of communication, be they explicit and public or simply for the self, needs a higher level structure that deals with representations of cognitive representations. Sperber calls this a “module of metarepresentation” (MMR). “Whereas other conceptual modules process concepts and representations of things perceived, the metarepresentational module processes concepts of concepts and represents representations of representations” (p.60). The actual domain of the MMR “is teeming with representations made manifest by communicative behaviors” (p.61). The possession of MMRs allows for communication, critical dealing with theories and beliefs and allows cultural transmission through ‘epidemics’ of representations.

A sketch (paralleling Sperber’s notes on music, see his pp.55-57) follows as an illustration of architecture as a cultural domain. Johnson’s terms are {bracketed thus} .

**IN OUTLINE**

From Sperber: Music

The cultural domain (e.g. of music) is parasitic upon a cognitive module ‘the proper domain of which pre-existed music and had nothing to do with it’,

namely: auditory experience taken up by and represented / coded in acoustic sensory input module.

Input representation accessible to / taken up by domain-specific cognitive module(s).

Proper domain: acoustic awareness and understanding of discriminable vocalizations.

Architecture as an analogy:

The cultural domain (e.g. of architecture) is parasitic upon a cognitive module, the proper domain of which pre-existed architecture and had nothing to do with it,

namely: experiences of embodiment as input taken up by and represented / coded in, say, a ‘haptic/tactile’ sensory input module as (image schemata).

Input representation accessible to / taken up by domain-specific cognitive module(s) as [metaphorical projections] and [extensions].

Proper domain: embodiment/haptic/basic orienteering as awareness and understanding of, say, being contained, in a place, on a path.
CONNECTIONS AND CONCLUSIONS

In the light of the foregoing one can’t escape the congruence between the intuitions of Lipps and Scott, on the one hand, and Johnson’s conception of “the body in the mind,” on the other. The evidence is there that the systematic cognitive structures, derived from the universal experiences of embodiment exist and that it is they that lay the bases for the responses of *Einfühlung*. The connections that are made between metaphorical extensions of image schemata, and between different cognitive modules, enable that kind of particular, ‘empathetic,’ recognition of aspects of the self in objects of perception.

Embodiment, modularity, and evolutionary arguments lead, in outline, to the following:

(i) The ability to form relations between image schemata, their metaphorical extensions, and domain-specific cognitive modules is a biological adaptation.

(ii) The ability to sense metaphorical extensions is also a biological adaptation. That is, although the formation of particular metaphorical extensions (or of associated domain-specific modules) does not in itself have to be an adaptation the processes by which they are formed would be one. For, the ability to ‘see,’ to sense or to
somehow grasp metaphorical extensions and to be able to process them cognitively
gives an evolutionary advantage. It is indeed of (Wölfflin’s, 1886) “infinite antiquity
in the race.”

(iii) The ability to develop and work with cognitive modules that deal with new
cultural domains is derived from that which was selected for working with proper
and actual domains, and is an adaptation.

(iv) (a) the formation of metaphorical projections and extensions and the
connections that are made between them and image schemata are linked to the
operation of metarepresentational abilities, as are

(b) the functions of communication and transmission, and critical evaluation.
More specifically, what happens is:

(i) Some particular sense derived from embodiment (‘E’) for example
a sense of weight (of self), of containment (of the self being held, holding), enclosure,
and confinement as is registered in, say, ‘input module E’ and would give rise to
some image schema, say ‘schema E.’

(ii) Metaphorical extensions and projections of that schema may be subject
to cognition within ‘conceptual module E.’

(iii) Similarly, visual perception (‘V’) of some real architectural array is
registered in ‘input module V’ and made available to cognition within ‘conceptual
module V.’

(iv) Interface modules - which enable connections between (the distinctive
representational features of) metaphorical extensions and between cognitive domains
- bridge ‘cognition E’ and ‘cognition V.’ For example, a combination of some
embodied (‘E’) sense with visual (‘V’) sense would allow knowing weight (heavy
or light) from appearance.

(v) Metarepresentational modules give rise to complex structures which
go to construct the cultural domain, architecture, within which further elaborations
of kinds of ‘knowing’ or ‘sensing’ from vision can take place. So it then becomes
possible to ‘feel’ the upward movement of a tower or the balance of two dimensional
forms within a frame, the emptiness (or tightness) of the space between enclosing
objects, the weight of a supported form suggested by the mass of the base below it,
and so on. The “reward mechanism” initially tuned to experiences of actual physical
embodiment is then ‘immediately’ stimulated both by either being in or by the visual
experience of architectural forms and spaces.

(vi) The stimulation of the reward - the ‘seeing’ or ‘making’ a connection
within the modular structure of mind - is the aesthetic response.

Empathy and the innate response to architectural forms and spatial arrangements
**Beyond immediacy and *Einfühlung***

Such ‘immediacy’ of response to architecture is then enriched - the “passion for metaphor” and “journeys to alien realms” are seemingly irresistible. New cultural domains of ‘secondary matters’ can and would follow as “epidemics of representations,” fired by and responded to by MMRs, through the medium of public language and, especially, private, professional terminology. They would include ‘meanings’ that might be deemed to exist in some perceived array. Immediate feelings are complemented by responses to further elaborations that would include the ‘literary,’ ‘social,’ ‘technical,’ ‘academic’ and ‘moral’(fallacies) and responses to resemblances between that array and various organic or even machine-like forms. These, their criticism, and ‘epidemics’ of their communication to others add to the ever growing cultural domain.

One may go further and suggest that the entirety of all that is deemed aesthetic - as a response and as a characteristic resident in all artefacts be they tangible or intangible (see Wollheim (1980) for a discussion about works of art that are not objects) - is an outcome both of the making of connections and of the recognition that there are connections to be made. Connections that are made and recognized between the self and ‘cultural’ cognitive domains may indeed constitute aesthetic response of all kinds.
APPENDIX

[NOTE: very much in draft/sketch form Æ still to be thoroughly revised/completed]

A random pairing of some of the categories of the dynamics of architectural form from Arnheim with some of the image schemata and their metaphorical extensions from Johnson.

<table>
<thead>
<tr>
<th>Schemata</th>
<th>page</th>
<th>Metaphorical ext’n/proj’n</th>
<th>page</th>
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<td>Order is coercion</td>
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<td>Visual Field is a Container</td>
<td></td>
<td>Space, an empty boundless container, as a setting.</td>
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</tr>
<tr>
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<td>Story Event as Container</td>
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<tr>
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<td>orphism between perceived objects.</td>
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<tr>
<td>SURFACE</td>
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</tbody>
</table>
Notes

1 There are problems associated with giving a very precise definition. These arise, in part, from Vischer’s attempt to make a three-part distinction between Zufühlung (immediate feeling), Nachfühlung (responsive feeling) and Einfühlung (empathy). And there is also Lipps’s use of zumuten to suggest such as ‘summon,’ ‘evoke,’ ‘elicit,’ ‘stimulate,’ and ‘impute.’ (See Aschenbrenner, 1965, 401-402.)

2 Page references are to the English translation by Karl Aschenbrenner (1965).

3 A similar proposition was offered by Otto Baensch (1923) in his “Kunst und Gefühl” which was later quoted at length and then elaborated by Susan Langer as one of the bases for her conception of the nature of art and the idea of ‘feelings objectified’ (Langer, 1953, 19-22).

4 One might wonder at the extent to which Scott might have been influenced in this by Johannes Herbart who seemed to have anticipated Scott’s ‘fallacies of criticism.’ Of especial note may be the way he dealt with “the specter of content” and his consignment to “secondary ideas” of matters such as all ethical, emotional, intellectual, and sentimental intrusions into the matter of aesthetic perception. (Herbart, 1884, 2: sec.72, pp.112-13).

5 All page numbers refer to Scott, 1914.

6 Wölfflin too drew attention to the use of certain terms that one uses to describe the objects of perception, thus making a link between embodiment and ascriptions of meaning.

7 In the early part of his Prolegomena Wölfflin has “… our respiration harmonizes with the expansive or narrow nature of the space. … we breathe as deeply and fully as if our chest were as wide as the hall.” His treatment of inhabited spaces æ where he talks of breathing which is “not only profound in every individual, but obviously of infinite antiquity in the race” (228-9) æ can be compared to Scott’s.

8 A conjecture about the relationship between architecture and the body that will not be considered in this paper is the one so often referred to in this context æ that by Vitruvius in which comparisons are drawn between proportions of columns and proportions of male and female bodies. For example Doric, supposedly ‘male’ because both share a height to width ratio of, say 6:1, or Ionic (female; 9:1) and Corinthian (young girl).

9 He did this too in parts of his earlier Art and Visual Perception (1956) in which he rehearsed certain assertions about, for example, the characteristics of the curvature of the dome of Michelangelo’s Basilica of St. Peter in Rome. Compare his Art and Visual Perception (pp. 429 to 431) and the Dynamics of Architectural Form (pp. 245 to 247).

10 This capacity, however, doesn’t begin to define language. See Walker Percy (1993) especially Chapters 8, 11 and 12. Langer (1953, 27) also deals with this in a discussion that includes a fine distinction between the symbol and what is symbolized.

11 In this one is reminded of Podro (1972) who raised a question for architecture if it is to be deemed art æ hence, as he has it, viewed (viewable) in a different way from the way it is viewed (experienced) in ordinary life. His question is “what is or what might be depicted?” (In this he recalls Langer’s 1953 questions about the “subject matter” of the various arts.) It is as if to say that if architecture is art then it (the artistic work of architecture) should surely depict something in a way such that it, the depicted ‘thing,’ can be seen or contemplated differently from the thing itself seen simply as an (a utilitarian?) object. The whole issue of meaning in architecture could be thought to arise from that kind of distinction.

12 For Jencks the importance of notions of the body in architecture may just boil down to ways in which a work of architecture can illustrate anatomy æ e.g. an elevation made to look rather like a face, a plan made to resemble a body with head, limbs, etc., or as with Stanley Tigerman, not too disguised forms of genitals. This seems to be what he means by “anthropomorphic metaphor” (Jencks, 1981, 113).

13 The problem seems to lie in the desire to conflate an interpretation of symbol with some of the functions of natural language. One is well aware of the pitfalls that lie in the path of those who have tried to update Quatremère de Quincy by applying the terminology of semiotics to architecture in the hope of explaining what various architectural forms might possibly be made to mean were architecture to be a language.

For a limited but characteristic sample of architectural semioticians at work see Educating Architects (Academy, 1995) æ especially the unintelligible and near meaningless contributions by the august such as Deleuze and Guattari, and by Pellegrini; and by some newer wordsmiths such as Bencova and Zervan, and Delage and Marda. See Shoul (1996) for a more extended discussion of those writings.

14 One should not consider ‘disparate things in the head’ to be the same as Koestler’s “bisociation” nor
should one suppose his use of ‘empathy’ to be an equivalent of Einfühlung although similarities do exist (see Koestler, 1964). An analysis of the similarities and differences is necessary but can’t be undertaken here.

15 Mundt too (1959, p.297), had it that “language ... must be seen as ... the creation of thought out of the bodily function of an interaction with reality.”


17 It is worth noting that Schilder touches upon the notion of Einfühlung, in passing (pp. 218, 227, 248), in a particular way that Bloomer and Moore mistakenly take to be a “sharp rejection” of Lipps’s usage. Schilder restricts Einfühlung to the realm of ‘understanding’ or ‘appreciating’ the emotions of others that might (or might not) be directed to the self. In other words he seems to regard Einfühlung as ‘empathy’ in the more colloquial sense of feeling or sharing the emotions of other people. Schilder’s view is that Einfühlung in that sense requires a cycle of perception, initiation, and projection with respect to those feelings. His discussion ought to be taken in the context of his other remarks about feelings as part of a growing curiosity about others as one develops a sense of individual identity. Where he does deal with the idea of ‘beauty’ he carefully restricts the discussion to senses of beauty found in another person, not as a discussion of a broader aesthetic response to artefacts. This has a quite different meaning from Lipps’s “I enjoy myself in a sensuous object distinct from myself” (italics added).

18 It may be noted too that Susan Langer also acknowledges the importance of certain bodily movements and sensations in the formation of both spoken language and mathematics (1988, pp.396-397).

19 For more recent experimental evidence Johnson refers to a summary, by John Anderson (1980), of research which identifies important differences between “image schemata (which he calls ‘images’) and my ‘rich’ images (which he calls ‘mental pictures’)” (Johnson, 1987, p.24). He draws attention to Kant who made the distinction between an image of a particular instance (of, say, a triangle) and the abstract concept ‘triangle’ and concludes that the “schema of the triangle can exist nowhere but in thought” (ibid.).


21 Jackendoff also adds to these ideas in his contribution to Levin’s, and Pinker’s Lexical and Conceptual Semantics (1992). He finds, for example, that ‘boundary’ as an experience α of terminations, limits of actions and the sense of reaching an edge α is necessary to properly construe the notion, the meaning of certain utterances. Such can be incorporated into one’s understanding of the external world (as well as with spoken descriptions of the world). Conceptual features such as boundedness, plurality, whole, part lie at the root of the conceptual system needed to make sense of certain kinds of phrases. They also serve as the fundamentals of appreciation of physical (architectural) entities that constitute the stage for human behaviour and action.

22 Best known as the founding father of phrenology, “a man who appears to have had an unfairly rotten press” (Fodor, op. cit, p.14).

23 While Pinker subscribes to the concept of ‘modularity’ he is careful to make a distinction between the apparent functional clarity of brain anatomy and the nature of cognitive modules which are much more like “roadkill” all spread about, “not anatomically discrete” (op. cit., p.30). (Mithen also makes a distinction between mind/behaviour and cerebral anatomy.)

24 All page numbers refer to Sperber, 1994.

25 One must here note that the entailments and the whole set of metaphorical projections and extensions of the PATH schema shed further light upon the syntax of spatial arrangements that have been developed in such detail by Bill Hillier and Julienne Hanson (1984) and Bill Hillier (1996). There is no space here for a full discussion which is reserved for a further paper that is to be developed in the future.
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