

## PROPRIOCEPTION AS BASIC KNOWLEDGE OF THE BODY

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### ABSTRACT

Proprioception provides knowledge of bodily position and movement. This article offers a critique of representative and perceptual models, and proposes instead that proprioception yields direct, immediate knowledge of one's body. This account is analogous to a direct knowledge account of memory. The knowledge is non-inferential, and I do not have to do anything to acquire it. Indeed, I do not really "acquire" it at all; I "just know" that my legs are crossed. Proprioception seemingly involves knowledge of an object, yet that knowledge is groundless; it is intermediate between perceptual knowledge from the five senses, and sensations such as pain. This is basic knowledge of one's body in the same sense that one moves one's body basically - as in normal uses of "I am moving my arm". Proprioception must not be assimilated to propositional knowledge based on evidence. "He knows that his legs are crossed" is mostly as absurd as "He knows he's in pain". More generally, the case of proprioception suggests that basic knowledge, and not basic belief, is fundamental.

Proprioception is a faculty which is both familiar - of necessity, because it underlies the possibility of action - yet mysterious. It is the capacity which yields ordinary knowledge of bodily position and movement - what is often rather loosely termed "bodily awareness". In Philosophy it has until relatively recently been neglected; indeed, in my experience it still remains rather unfamiliar to general philosophical audiences. Proprioception has been called a "sixth sense" of bodily awareness and is still sometimes referred to as the "muscle sense". This article, however, challenges the ubiquity of the sensory model, and tries to pose an alternative to it. It argues that proprioception, like memory, is a kind of direct knowledge, and defends the claim that proprioception constitutes basic knowledge of one's body - immediate and nonperceptual.<sup>1</sup> I refer to "basic knowledge" rather than "basic belief" because, as will become clear, there is only a limited possibility of error in judgments based on proprioception.

Husserl was probably the first philosopher to recognise the importance of proprioception, and the physical-intentional ambiguity concerning the body which it suggests - although there are interesting precedents in Locke.<sup>2</sup> Husserl's account is a great advance on that of his post-Cartesian precursors, who almost universally regarded the body as a purely material and epistemically outer entity - one whose states, in contrast to those of the mind, are not known immediately and transparently. In *Ideas Book II* he argues that the human body is defined by intentional attributes of action and proprioception as well as by spatio-temporal material attributes:

...the Body is originally constituted in a double way: first, it is a physical thing, *matter*; it has extension, in which are included its real properties, its color, smoothness, hardness, warmth...Secondly, I find on it, and I *sense* "on" it and "in" it: warmth on the back of the hand,

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<sup>1</sup> Hamilton (2003) defends the claim that memory is also a kind a direct knowledge.

<sup>2</sup> These are discussed in Hamilton (forthcoming).

coldness in the feet, sensations of touch in the fingertips...

[The Body is] a material thing which, as localization field for sensations and for stirrings of feelings, as complex of sense organs, and as phenomenal partner and counter-part of all perceptions of things...makes up a fundamental component of the real givenness of the soul and the Ego.<sup>3</sup>

Husserl distinguishes two senses of "the body", *der Leib*, the "animated flesh of an animal or human being" - the "lived Body" or what may be referred to as "my body" - and *der Körper*, "inanimate physical matter", the "mere" body or body viewed purely as a physical object.<sup>4</sup> This contrast underlies the discussion in this article. The lived Body is sometimes referred to by commentators as the "mindful body"; a better alternative might be "the body-in-action".<sup>5</sup> But talk of the lived Body or body-in-action is useful chiefly as indicating essential features of, simply, my body. Despite the efforts of recent commentators to portray him in a thoroughgoing anti-Cartesian light, the metaphor of animation of my body, and reference to the "real givenness of the soul and the Ego", shows the residual Cartesian bias in Husserl's treatment.<sup>6</sup> It was not until Merleau-Ponty's investigation of the "body-subject" that Cartesian bias was eliminated completely.<sup>7</sup>

These writers in the phenomenological tradition influenced Gareth Evans' focus on the importance of bodily self-ascription in an account of self-consciousness. Their ideas, filtered through Evans' work, have achieved currency among some analytic philosophers, if not those of a naturalistic persuasion.<sup>8</sup> However, the work of the phenomenological tradition suggests an alternative to the sensory model which has not received much attention, and which this article is concerned to develop. A nonperceptual account undermines the view that proprioception is a capacity for tracking a fundamentally material entity. Indeed, on this view, proprioception should not be regarded as a conceptual superimposition on pre-identified and individuated living Bodies. Rather, I would argue, proprioceptive knowledge is part of the material from which the latter concepts are formed. In this article, however, I am not concerned to vindicate the larger claim, but simply to defend a non-perceptual treatment of proprioception.

My present concern with proprioception originates in a broader treatment of the nature of self-consciousness, and in particular of the phenomenon of immunity to error through misidentification (IEM) which Gareth Evans did much to clarify.<sup>9</sup> This concept lies in the background to the present article, but should be briefly outlined. IEM is exhibited by a range of self-ascriptions including those of sensation, perceptual experience, belief, intention, memory and proprioception. I argue elsewhere that proprioceptive judgments of bodily position, posture and movement are immune to error through misidentification of the subject, while judgments about one's body based on visual perception or touch are not.<sup>10</sup> That is, if I judge immediately that my legs are crossed, and then come reasonably to doubt that they are, it will be senseless for me to cite the original justification as a reason for believing that

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<sup>3</sup> Husserl (1989), sections 36 and 40, pp. 153, 165.

<sup>4</sup> Husserl (1989), for instance section 62, p. 297.

<sup>5</sup> It has also been termed the "Living Body" by Cassam (1997), p. 52, and by Bell (1990), p. 208; but I avoid this term because of its biological connotations. I am grateful for discussion on these points with Paul McDonald; they are treated in his (2000).

<sup>6</sup> It is discussed below.

<sup>7</sup> See B. Smith (1995), in B. Smith and D. Smith eds. (1995), pp. 406-7. D. Smith (1995, pp. 324-6) argues that the break with Cartesian dualism in Heidegger and in Merleau-Ponty is a development of insights found in Husserl.

<sup>8</sup> Evans (1982). Husserl and Merleau-Ponty do not rate a mention in Bermúdez (1998) or Baker (2000), for instance.

<sup>9</sup> The concept is treated at length in Hamilton (1995).

<sup>10</sup> Hamilton (1995), Hamilton (forthcoming).

nonetheless *someone's* legs are crossed. It will make no sense for me to say "Well, I at least just know that someone's legs are crossed". (Even the term "justification" sounds forced - since in the normal case I just know that my legs are crossed.) In contrast, when in unusual circumstances the subject judges that their legs are crossed on the basis of vision, there is no guarantee of IEM. "I just know" functions in the same way that the continuous-verb justification "I remember o-ing" does in the case of personal memory; indeed a direct knowledge account of proprioception is structurally analogous in important respects to the direct knowledge account of memory. Thus IEM extends to bodily as well as psychological self-ascription - a significant development of Wittgenstein's original contrast in *The Blue Book* between "I"-as-subject and "I"-as-object uses.<sup>11</sup> As in the case of memory, traditional accounts of proprioception militate against a proper understanding of the IEM – hence a further reason for the present discussion, in addition to its intrinsic significance.

The preceding considerations, I believe, support the anti-materialist view that "My body" is the body of which, when I am conscious, I have self-conscious knowledge, and which I can move basically sense – as in Danto's account of basic action. Distinctively self-conscious knowledge - that which necessarily yields knowledge only of the subject - is manifested in IEM-exhibiting judgments of posture, orientation, intention and action. "My body is the body of which I have self-conscious knowledge..." functions only as an elucidation of the concept of my body, and not as a criterion of identity, for there is no conceivable use for such a criterion. The phrase "my body" emphasises the subject's knowledge of and concern for their own (living) body, and was used in this sense by Carnap.<sup>12</sup> The IEM claim suggests that proprioception is not simply a mode of awareness of events that happen to occur within the body's boundaries, and this is the position I will defend. My claim is that proprioception does not just happen to yield knowledge only of one subject – like seeing oneself in the mirror or by looking down at one's body.

The elucidation "My body is the one of which I have self-conscious (IEM-exhibiting) proprioceptive knowledge and which I can move basically" suggests, rather, that proprioception and bodily identity form a circle of inter-defined concepts. Just as the concepts of personal identity and self-conscious, IEM-exhibiting capacities notably memory interlock, so do the concepts of bodily identity and self-conscious, IEM-exhibiting bodily awareness and movement.<sup>13</sup>

Underlying these claims is scepticism concerning the traditional mental-physical distinction. "I am not that hard up for categories" was Wittgenstein's justified riposte to the question of whether there is one substance or two.<sup>14</sup> The dichotomy of mental and physical is a crude one, and the ambiguous status of the body is the crucial illustration of its arbitrariness and inadequacy. It would be some advance on materialism to say, still using the terminology of the traditional distinction between mental and physical, that the body is a psychological as well as a material unity. But this remains an imperfect transitional position. Merleau-Ponty, in his account of bodily intentionality, was more radical and more correct when he wrote that "The experience of our own body...reveals to us an ambiguous mode of existing" - neither thing nor consciousness. He continues: "If I try to think of it as a cluster of third person processes...[these] are all obscurely drawn together and mutually implied in a single drama. Therefore the body is not an object...".<sup>15</sup> It follows, I believe, that materialism concerning self-consciousness - the view that I am conscious of myself as a material entity, defended by Cassam in *Self and World* - is a misguided way of opposing Cartesianism.<sup>16</sup> But these wider considerations concerning self-consciousness, and the concept of IEM itself, remain largely in the background in the rest of the article, the arguments of which are, I hope, independently intelligible and significant.

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<sup>11</sup> Wittgenstein (1969, 66-7). The claims in these paragraph are defended in Hamilton (1995), and (forthcoming).

<sup>12</sup> Carnap (1967, sections 129-131) - a discussion which shows the influence of Husserl.

<sup>13</sup> This general position was defended in Hamilton (1995).

<sup>14</sup> Wittgenstein (1980), II: para. 690.

<sup>15</sup> Merleau-Ponty (1962), p. 198.

<sup>16</sup> Cassam (1997).

## 1. Proprioception as direct, non-inferential knowledge: rejecting the image theory

### (i) varieties of proprioception, and proprio-blindness

First, a brief outline of the varieties of proprioception is necessary. The core capacity of proprioception yields knowledge of bodily position and movement. Kinaesthesia is knowledge of movement of parts of the body, as opposed to their posture or position. It is one of the main categories of proprioception, though confusingly it is sometimes used as an alternative term for proprioception itself - perhaps understandably since knowledge of movement requires knowledge of position.<sup>17</sup> Other varieties are knowledge of fatigue and warmth and cold (as opposed to merely feeling tired, hot or cold); the vestibular system in the inner ear that gives information about balance and posture; interoception (the visceral sense); and "visual proprioception", the term coined by J.J. Gibson to describe the kinaesthetic function of vision, which enables the subject to differentiate between a change of place by the observer and a change of state of an external object - changes that are reversible by movement of the observer (back to the original position of observation) and those which are not.<sup>18</sup> Interoception yields knowledge of the non-muscular organs, blood-vessels, and intestines, and is a function of the autonomic nervous system. (Some researchers maintain that one can learn to distinguish visceral events just as well as muscular ones.) Proprioception also embraces self-locating capacities which involve more than mere internal or surface bodily knowledge - such as knowledge of orientation in space, for instance that I am lying down or standing up. Indeed there is a case for arguing that knowledge of orientation relative to objects in the immediate environment - for instance, that I am standing in front of Marble Arch - is distinctively self-conscious because IEM, and thus on a continuum with proprioception. Its many varieties led the psychologist J.J. Gibson to reject the traditional idea of proprioception as a specific "body sense", referring instead to self-specifying information which cuts across the different sensory modalities.<sup>19</sup> I will return to his view towards the end of this article. First I will attempt to refute directly the view that proprioception is sensory, while arguing - as Gibson does not - that it is definable by the direct character of the knowledge that it yields.

One further preliminary issue. Considering cases of proprioceptive deficit assists the imaginative effort involved in trying to grasp a familiar yet apparently obscure capacity of proprioception. Anscombe's Sensory Deprivation Tank thought-experiment postulates radical if temporary proprioceptive deficit - what may be termed *proprio-blindness*.<sup>20</sup> Actual proprio-blindness is caused by conditions ranging from stroke to viral infection, and is more common, at least in a partial and mixed form, than is often imagined.<sup>21</sup> Devastating cases of proprio-blindness such as Ian Waterman's are rare.<sup>22</sup> Waterman's

<sup>17</sup> Cole (1991), pp. xix-xx, corrects this error.

<sup>18</sup> Gibson (1966), pp. 37-8. A more complete list of the varieties of proprioception is found in Bermúdez et al. (1995), p. 13, and Bermúdez (1998), pp. 132-3. An excellent discussion of Gibson's theoretical perspective is found in Reed (1988).

<sup>19</sup> Gibson (1966). Husserl had earlier commented on the interwovenness of perception and bodily movements, as discussed by B. Smith (1995) p. 403; .

<sup>20</sup> Anscombe (1981).

<sup>21</sup> The experiment is discussed in Hamilton (1991). Talk of "proprio-blindness" should not be taken to imply a perceptual model of proprioception.

<sup>22</sup> His heroic story is told in Cole (1991), and in a BBC2 TV programme, broadcast on 16.10.97. Cole writes

that "damage to his nerves was extraordinarily, perhaps uniquely, specific. It had affected some of the sensory fibres, but none of the motor nerves" (p. 2; further physiological details are found on pp. 24-34). For earlier discussion of a proprio-blind patient see Sacks (1985). I am indebted to CB for discussion of

profound proprio-blindness seems to have been caused by an immune reaction, devastating his nervous system from the neck down while leaving the vestibular system and visual proprioception still functioning. Unlike other severely proprio-blind patients, however, Waterman did not remain in a wheelchair but re-acquired mobility through the constant effort - the "daily marathon" - of a mostly visual tracking of his body. His knowledge of bodily position and posture is sustained by constant looking and checking. He retains a capacity to feel pain, temperature and muscle fatigue - presumably he has some knowledge of the location of pain, at least as expressed through primitive reactions of pain-response such as movement. Without this residual proprioception his extraordinary achievement in regaining bodily control and learning to walk again would have been impossible.

General ignorance of the prevalence of partial proprio-blindness is attributable in part to a failure to recognise the distinct neuropathies of the efferent and the afferent systems. Proprio-blind patients suffer from the latter but not necessarily the former. Stroke victims usually suffer from a complex mixture of damage to both efferent and afferent systems; some parts of a limb may be truly paralysed, while others exhibit loss of proprioception, temperature awareness or sensation of pain. Though regarded as paralysed, proprio-blind patients may be only effectively so because, as neurologists put it, the brain cannot tell a muscle what to do if it does know where it is. Ian Waterman found an unorthodox route to this knowledge by visually tracking his body and thereby overcome his effective paralysis.

(ii) proprioception as direct, immediate knowledge

The position defended here is that proprioception yields direct, immediate and spontaneous knowledge of the body - centrally its position, posture and movement. This knowledge is immediate not just in the sense that it is non-inferential but also in the sense that the subject never has to do anything to acquire it. Indeed, I do not really "acquire" it at all; immediate knowledge is knowledge which I do not have to do anything in order to have; I "just know", for instance, that my legs are crossed when they are. So proprioception differs both from knowledge based on bodily sensation, and from perception of the body by the five senses. Other varieties of proprioceptive knowledge such as awareness of fatigue and temperature must be distinguished from avowals of bodily sensation. However, the focus in the present discussion will be on the central cases of kinaesthetic knowledge, viz. position, posture and movement.

The characterisation of proprioceptive knowledge as direct, immediate and spontaneous is preferable to Anscombe's term "non-observational", which appears in her influential remarks on bodily awareness. Non-observational knowledge, she believes, includes knowledge of one's own intentional actions and of the causes of some involuntary movements, as well as knowledge of the position of one's limbs - that is, proprioceptive knowledge. Her justification for describing this knowledge as non-observational is that "nothing shows [someone] the position of his limbs; it is not as if he were going by a tingle in his knee...Where we can speak of separately describable sensations, having which is in some sense our criterion for saying something, then we can speak of observing that thing..."<sup>23</sup> Anscombe is right to doubt whether there is a separately describable basis for proprioceptive judgment - an issue picked up later. But her terminology is unsatisfactory, because the term "non-observational" implies a contrast with perceptual knowledge, while Anscombe's elucidation of the term seems to contrast it with inferential knowledge based on bodily sensation.

Anscombe is wrong to say that, in itself, observation implies "separately describable sensations", since this suggests that observation is inferential. If this were so, knowing that my legs are crossed by looking could also count as non-observational, since it does not seem to involve "separately describable sensations". This makes nonsense of her criterion. This error results in a conflation of two distinctions: between inferential and non-inferential knowledge, and between (self-) knowledge by the five senses and distinctively self-conscious self-knowledge (knowledge which necessarily concerns only the subject).

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the experience of proprio-blindness.

<sup>23</sup> Anscombe (1963), pp. 13. In common with many earlier writers, she refers to "bodily awareness" rather than "proprioception".

Both contrasts need to be made explicit and each, I will argue, involves a distinct challenge to the direct knowledge account. There are further problems with Anscombe's terminology, for it is not even the case that "non-observational" implies "non-perceptual". Despite the history of so-called observation sentences in the philosophy of science, there is something artificial about equating ordinary perception with observation, since "observation" implies attentive perception, usually visual. The characterisation of proprioceptive knowledge as "direct, immediate and spontaneous" is therefore greatly preferable to Anscombe's term "non-observational".

{iii} rejecting the image theory

My claim is that proprioception is not inferential knowledge, and that it should not be assimilated to knowledge by the five senses. Hence I reject both the image theory and the perceptual model. The image theory of proprioception, analogous to the image theory of memory, maintains that proprioceptive knowledge is inferential. It is a representative theory, and assumes that proprioception may be distinguished phenomenologically, by its feel - by the sensations associated with it. The presence of these sensations is the inferential basis of the proprioceptive judgment of bodily posture or position. Proponents of this view take the concept of a "body-image" rather literally; indeed many writers unsatisfactorily describe the subject's total proprioceptive knowledge as a body-image, when the term is more appropriately applied to the highly distorted self-image possessed, for instance, by anorexics.<sup>24</sup> The image theory may be regarded as a particular version of the perceptual model; but I criticise it directly first, before targeting the latter model. It is important for the treatment of self-consciousness that these theories should be discredited. For one reason, they make q-proprioeption appear more plausible, just as the image theory of memory makes q-memory more plausible. Q-proprioeption is meant to be a peculiar kind of proprioception, involving an information-link between the subject and someone else's body, such that the subject allegedly registers information from it, thus contravening the IEM of proprioception. The image theory makes it seem more imaginable that the proprioceptive "feel" could arise from the bodily state of a distinct subject. Interestingly, memory and proprioception are linked by Wittgenstein when he rejects the idea that kinaesthetic sensations advise me of the movement of my limbs: "It is the same with the idea that it must be some feature of our pain that advises us of the whereabouts of the pain in the body, and some feature of our memory image that tells us the time to which it belongs".<sup>25</sup>

The picture offered by the image theory is this. If my legs are crossed with one resting on the other, I will experience feelings of pressure, touch and so on. Even when my arm is by my side but not touching anything, there will be feelings of muscle tension or skin stretching, or tension in my shoulder. The image theory claims that such sensations "advise" me of the positions of my limbs, etc., presumably through inductive inference. For this account to be plausible, the sensations would have to be characterised independently of the state of whose occurrence they advise. This is possible when I infer from bodily sensations to the existence of a medical condition, having learned from experience that the feeling is associated with this condition – for instance when I infer from the recurrence of stomach pains that I have a gastric ulcer rather than indigestion. As Anscombe and Wittgenstein argue, in the proprioceptive case it is difficult to see how sensations could be characterised independently of the state of whose occurrence they advise. Wittgenstein's position is presented in the following passage:

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<sup>24</sup> Cole (1995) in Bermúdez et al eds. (1995) has further discussion of "body-image".

<sup>25</sup> Wittgenstein (1958) Part II, p. 185. A more obscure version of the image theory seems to be defended by O'Shaughnessy (1995), in Bermúdez et al. eds. (1995). The editors of that volume state that Anscombe's view of proprioception "is rejected, implicitly or explicitly, by all the contributors" (p. 19), as if it were an outdated scientific theory rather than an enduring philosophical position.

My lower arm is now lying horizontally and I should like to say I feel that; but not as if I had a feeling that always goes with this position (as one would feel ischaemia or congestion) - rather as if the "bodily feeling" of the arm were arranged or distributed horizontally, as e.g., a film of damp or of fine dust on the surface of my arm is distributed like that in space. So it isn't really as if I felt the position of my arm, but rather as if I felt my *arm*, and the feeling had such and such a *position*. But that only means: I simply *know* how it is lying - without knowing it *because*....As I also know where I feel pain - but don't know it *because*.....<sup>26</sup>

I will return to these elusive remarks later, because they suggest an interpretation of the sense of "feeling" involved in proprioception which undermines the perceptual model as well as the image theory. Here I will address some considerations which at first sight offer support to the image theory.

It should not be assumed that the acquisition of a learned capacity has to involve inference; or that information-processing amounts to inference. Children learn to control their movements, but an inferential model of this learning process is unconvincing; in particular, the suggestion of unconscious inference should be rejected.<sup>27</sup> However, there are adult learning processes where the claim of conscious inference may seem more plausible. In the practice of Alexander Technique, for instance, one learns to attend closely to one's bodily posture, aiming to release bodily tensions and direct bodily use efficiently, by "thinking" upwards for instance. The new habits which the Technique encourages one to acquire at first feel strange, but gradually become automatic. For instance, I may learn on the basis of close attention that I have a detrimental habitual use of stooping forwards, wrongly assuming that I was standing bolt upright. Alexander Technique attempts to make this knowledge immediate and habitual, by means of a process that is hard to describe, but which does not seem to involve a conscious inference; indeed the very elusiveness of the technique counts against the idea that inductive inference is involved.

There are other cases where knowledge of bodily posture and movement is not immediate and has to be learned. In many of these, visual perception or touch is essential in refining proprioceptive knowledge, which is usually rough and approximate. Figure skating, ballet, playing a musical instrument and singing are examples; for instance, one may learn complicated dance positions with the aid of mirrors. Proprioceptive knowledge is not always accurate enough for such specialised purposes. If I am instructed to close my eyes and put my arms out horizontally, the result will be close enough; knowledge that my arm is horizontal, based on proprioception, means "horizontal as opposed to vertical or at 45 degrees". In contrast, singing lessons or learning to speak a foreign language with a correct accent may involve more precise bodily knowledge; I may need to know where my tongue is when making certain sounds. Before the knowledge becomes automatic, the learning process involves exploratory touch; "my tongue is touching my upper teeth" is more like "My fingers are in the jelly" than "My fingers are curled up". (Exploratory touch occurs when I move my hand to feel part of my body or another object, passive or proprioceptive touch occurs when I feel the rain on my face; they are contrasted below.) Ian Waterman learned to control his body by a process of constantly looking which never became automatic or unconscious. His bodily knowledge must often involve inferences such as "When my body is at this angle, it's likely that I'm about to topple over".

## 2. Proprioception as direct, immediate knowledge: rejecting the perceptual model

### (i) The perceptual model

<sup>26</sup> Wittgenstein (1980) Vol I, para 786; the idea is also expressed in paras 784-5. See also Wittgenstein's discussion in his (1958) Part II, pp. 185-6; and Merleau-Ponty (1962) p. 93 on the localisation of pain.

<sup>27</sup> See Budd (1989), pp. 147-9. For other criticisms of an image theory, see Anscombe, "On Sensations of Position" in her (1981), and Candlish (1996).

While the image theory of proprioception has many proponents, the *perceptual model* - of which the image theory may be one variety - is almost ubiquitous.<sup>28</sup> As noted earlier, proprioception has been called a "sixth sense" of bodily awareness or the "muscle sense", and physiological affinities with touch seem to support the perceptual view. Indeed "proprioception" is a contraction of "proprio-perception", that is, "self-perception". The perceptual model is supported by physiological affinities between proprioception and touch. The proprioceptive nerve receptors in the muscles give feedback from joints, tendons and muscle spindles, while cutaneous receptors - those near the skin-surface - respond to touch. These receptors might be regarded as "organs of proprioception" and "organs of touch". If there is an organ of exploratory touch, one of the five senses, then it seems that there must be an organ of proprioception. However, I will argue that there are important differences between proprioception and the five senses in the character of the knowledge which they yield. This divergence is sufficient to undermine the standard conception of proprioception as a variety of perceptual knowledge which happens to be limited in its objects to the body and its surface.

In assessing the perceptual model, two questions must be considered: how does proprioception differ from the five senses, and is this difference sufficient to show that proprioception is not a variety of perception at all? My conclusion is that proprioception has a status intermediate between, on the one hand, the five senses which yield perceptual knowledge, and on the other hand, sensations such as pain which figure in avowals, and which are not objects of knowledge at all. Thus the epistemic status of "I am cold" is intermediate between "The ice is cold", and "I feel cold" (or "I have a headache") – though it is closer in certain respects to sensation. Now there are writers who assimilate proprioception to sensation by subsuming both under the perceptual model, thus neglecting the well-grounded distinction between sensation and observation. Their view updates the Cartesian model of sensations, which regarded them as objects of inner perception, mistakenly postulating a sensational object distinct from the awareness. The contemporary version regards pain not as an object of perception, but as a mode of perceiving one's body; thus pain has a physical object distinct from the awareness. Martin for instance claims that the object of pain is the body-part that feels painful, just as the object of visual experience is the physical object that one is perceiving: "...[O]ne perceives one's body through sensation, just as one perceives other objects through the five senses".<sup>29</sup>

Sensation is surely not, as this view has it, a mode of perception. The most that can be conceded to the perceptual model is that the self-ascription of pain assumes proprioceptive knowledge, and that, as noted earlier, the experience of pain may itself be the basis for inferential knowledge, for instance that I have a gastric ulcer. Aside from its innate implausibility, it is hard to see how the immunity to error exhibited by avowals of pain can be accounted for on a perceptual model. Their authority implies that if X truthfully, attentively and comprehendingly asserts or avows "I have a pain in my leg", and there is no relevant cognitive defect in the subject, then the truth of "X has a pain in their leg" is guaranteed.<sup>30</sup> I can be mistaken about the causal origin of the pain, but not about its phenomenal location; and it is the phenomenal location which determines the truth of the avowal. It follows that apparently mistaken self-ascriptions resulting from referred pain and phantom-limb phenomena, often cited as counterexamples to the authority of avowals, are not convincing as objections. An example of *referred pain* would be a sinus condition which causes a headache, a pain not phenomenally located in the sinus region; but the fact that the headache has its immediate causal origin elsewhere does not make the avowal that I have a headache a mistaken one. A similar point applies against objections that cite *phantom-limb phenomena*, where the subject is inclined to avow "I have a pain in my left leg" but has no left leg. Certainly the subject has a pain, and it is phenomenally located where the left leg would have been.

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<sup>28</sup> In fact it is a difficult question how the image theory and the perceptual model are related; Bermúdez et al eds. (1995), pp. 18-19, run the two together in their criticism of Anscombe.

<sup>29</sup> Martin (1995), p. 269.

<sup>30</sup> The implications of the authority of avowals are developed in Hamilton (2000) and (forthcoming).

(ii) the role of sensory orientation

Although the distinction between sensation and observation is, I believe, well-grounded, proprioception seems to belong to neither category. If proprioception is treated simply as a mode of knowledge of one's body, the perceptual model of proprioception seems inevitable. Nonetheless, it is possible to make a principled distinction between proprioception and sensory perception. An initial move is the suggestion that sensory knowledge involves reference to a possible action of looking, listening, tasting, smelling or touching, while no kind of action is required to gain proprioceptive knowledge. Only in the exceptional situation where the subject has to look or touch to find out - when they have partial proprio-blindness due to a stroke for instance - do they have to do something to acquire the knowledge that their legs are crossed. (My knee may also feel as if it has a bump on it - the skin feels stretched and so on, perhaps.) In the normal case, that is, where the knowledge is proprioceptive, it is not something that one gains or acquires. I "just know". One explanation for the lack of action in the proprioceptive case might be that sense-organs exhibit directionality - they pick up information from a certain direction and may need to be re-oriented. I may need to concentrate my gaze, or strain to catch what someone is whispering. There is no such directionality in the case of proprioception; no equivalent to the moving in or focussing found in exploratory touch and the other senses. For this reason, looking at one's legs, although it does not involve experiencing a sensation or applying a criterion - except in the sense of ownership perhaps - does not yield immediate knowledge. *Immediate knowledge* is knowledge which I do not have to do anything in order to have; I "just know".

To develop this contrast it is necessary to distinguish *exploratory* and *proprioceptive touch*. Exploratory touch occurs when I move my hand to feel part of my body or another object; passive or proprioceptive touch occurs when I feel the rain on my face, or someone treading on my toes, and is comparable to feeling bodily sensations such as pain. Exploratory touch and visual perception contrast with proprioception in that they are ways in which I can also gain knowledge of someone else's bodily position, and so the judgments to which they give rise do not exhibit IEM. Exploratory touch, when stationary, proves hard to distinguish from proprioceptive touch, as in what Merleau-Ponty describes as "double sensations": "When I press my two hands together, it is not a matter of two sensations felt together as one perceives two objects placed side by side, but of an ambiguous set-up in which both hands can alternate the roles of 'touching' and 'being touched'".<sup>31</sup> These double-sensations simultaneously yield knowledge of one's body and one's environment. When I feel by touch the stationary sphere in the palm of my hand, without moving my hand across its surface, both proprioceptive touch and exploratory touch - in this case stationary - seem to be involved. By means of proprioceptive touch I feel the pressure, the coldness and perhaps the smoothness or roughness of the sphere. By means of exploratory touch I feel the shape, the hardness, and the roughness of the sphere; but I do not feel these when my hand is quite stationary. (Feeling the shape of the box is not like feeling the edge of the box, because it involves inference.) Thus exploratory touch seems to be essentially active.

How significant is this lack of action and directionality? Does it really suggest that proprioception is not a mode of perception? A first response by proponents of the perceptual model might be to argue that gaining knowledge on the basis of proprioception often does involve an action of some sort. Perhaps I sometimes need to move my limbs about in order to activate or alert my proprioceptive capacity and get coordinated. This however is not a correlate of the particular action often required with the five senses, I would argue. It may also be argued that there is an action of paying attention, as there is in the case of pain. But while it is true that one may focus one's attention on particular sensations, as a means of gaining knowledge of one's bodily position this activity is simply a charade. I can often be said to know that my legs are crossed, just in the sense that I do not try to get up without uncrossing them, and thus falling over. This knowledge is immediate. Alexander Technique requires concentrating attention on one's posture, but the process is an elusive one which does not seem to

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<sup>31</sup> Merleau-Ponty (1962) p. 93.

involve an analogue of concentrating one's gaze, or straining to catch what someone is whispering.

An alternative approach for proponents of the perceptual model is to concede that no action is involved in the case of proprioception, but deny that this fact has any significance, arguing for instance that one should not expect directionality. Compare exploratory touch. If, as proponents of a perceptual model might maintain, there is a sense-organ for touch, then directionality would result from the sense-organ moving to remain in physical contact with the object – for instance I move my hand, and ensure that the cutaneous nerve-receptors continue to remain in contact with the object being tracked. In the case of proprioceptive touch, the response continues, the organs are already in the place which the information concerns, and so of course they do not need to be moved. However, "the place which the information concerns" is within the body-subject, and as will be argued below, this makes a vital difference.

The most persuasive line of objection finds exact parallels in the behaviour of perception and proprioception. If I can often be said to know that my legs are crossed, in the sense that I do not try to get up without uncrossing them, then in a similar way I might know through hearing it that there is a car behind me when I cycle along the road, in the sense that I do not try to turn right without indicating. In neither case, it may be argued, is attention required. On the other hand, the objection continues, forming the judgement "There is a car behind me" does require attention, and similarly for the judgement "My legs are crossed". There is a related objection to the distinction between exploratory and proprioceptive touch. Proprioceptive touch occurs when I feel the rain on my face, but surely, it may be argued, exploratory touch "occurs" at the same time, since I also find out about something in the world, viz. that it is raining. Why distinguish exploratory and passive touch, when for the other senses, active and passive do not mark distinct senses? Raindrops felt on my head are like a car coming into my field of vision; touching my head is like peering out of the window to catch sight of the car that has just disappeared up the road.

I would respond that the difference is that the judgement "My legs are crossed" is always – barring exceptional circumstances such as radical proprio-blindness - redundant. In contrast, even when seeing and feeling do not actually involve action, there is always a possible action of looking or touching. One could gain further knowledge of the surface of the sphere by means of active exploratory touch, or turn to look at the car as it disappears up the road. There is no parallel here with proprioceptive touch or with proprioception in general. I avoid objects in my path automatically, just as I know that my legs are crossed; but it would be wrong to say that I "just know" that there is a large tree in front of me, or I "just know" where the piano is when I can remember where it is. I know that it is in front of me because I can see it or because I can remember where it is. Knowledge of the immediate environment is not immediate knowledge.

There are further reasons for denying that proprioception is a sense. If it were, feedback about error would be required. However, there is no sense-specific feedback or correction in the case of proprioception - feedback comes entirely from the other senses. But there are more fundamental ways in which proprioception and the other senses are interdependent. For it is surely the case that sensory orientation *assumes* proprioception – in particular visual proprioception or visual kinaesthesia. One cannot orient one's sense-organs effectively without knowing, for instance, whether one is moving or stationary oneself – information derived from proprioception. This is an insight associated with the psychologist J.J. Gibson, who was responsible for familiarising us with the concept of visual proprioception. His work places a particular interpretation on the claim that proprioception is not one of the senses, but while endorsing aspects of his account, I will distinguish my own treatment from it.

### 3. The Gibsonian account and a distinct sense of "feel"

There is important common ground between the position of psychologist J.J. Gibson and the phenomenological tradition. Gestalt psychologists influenced Gibson as well as Merleau-Ponty, and a philosophical treatment of the body and self-consciousness should attempt to draw on each. Gibson formulated his view of proprioception in reaction to that of Sherrington and his contemporaries, who assumed that “each sense had to have its specialised receptors that could excite corresponding sensory nerves”<sup>32</sup> – a version of the perceptual model. In *The Senses Considered as Perceptual Systems*, Gibson sought to clear up a “deep theoretical muddle”: “The verb *to sense* can mean either *to have a sensation* or *to detect something* and the two meanings are radically different”, he argues, and he intends the latter meaning. To sense, whether ourselves or the objects around us, is to detect things.<sup>33</sup> In a discussion of the vestibular system, Gibson points out that there are “no introspectively clear impressions from this organ”, implying that neither perception nor proprioception need be founded on sensation.<sup>34</sup> Gibson treats proprioception as “a component of the functioning of all the perceptual systems”,<sup>35</sup> and claims that proprioception and perception are interdependent. They are distinguished in terms of their function, and not by the receptors, sensory nerves, or sensations it involves; a perceptual system is not to be identified with a sensory modality, a specific channel of input which is transmitted by specialised sensory nerves to the brain, where it is processed. According to Gibson, perceptual systems are the means by which we actively pick up meaningful information about the environment: “All the perceptual systems are propriosensitive as well as exterosensitive, for they all provide information in their various ways about the observers’ activities”<sup>36</sup>. These two functions are interdependent: “an environment implies something that is surrounded, and therefore awareness of the environment implies an awareness of the body existing in the environment. Equally, an awareness of the body entails some feeling of its relation to the surroundings”<sup>37</sup>.

Gibson regards vision as kinaesthetic in that it registers body movement as much as the muscle-joint-skin system and the inner ear; like these, “vision obtains information about both the environment and the self”.<sup>38</sup> He regards visual proprioception, the least automatic and “highest” variety of proprioception, as central to action-guidance, especially in any new task; the movement sensitivity of the visual system dominates that of the muscular and articular systems at least in manipulation and locomotion: “we see where we are going and the layout of the environment through which we are going at the same time...vision is kinaesthetic in that it registers movements of the body just as much as does the muscle joint system and the inner ear system”.<sup>39</sup> Visual kinaesthesia explains the perception of passive as well as active movement - how a passenger in a car, engaged in no overt activity, can perceive that it is they who are (passively) moving, and not the trees, buildings and road rushing past. Other senses too have a propriospecific component: “information about the self is multiple, and...all kinds are picked up concurrently...An individual not only sees himself, he hears his footsteps and his voice, he touches the floor and his tools, and when he touches his own skin he feels both his hand and his skin at the same time. He feels his head turning, his muscles flexing and

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<sup>32</sup> Gibson (1966), p. 33

<sup>33</sup> Gibson (1979), p. 115; Gibson (1972).

<sup>34</sup> Gibson (1966), p. 71

<sup>35</sup> Reed, (1988), p227

<sup>36</sup> Gibson (1979), p115

<sup>37</sup> Gibson (1968).

<sup>38</sup> Gibson (1979), p. 183.

<sup>39</sup> Gibson (1966), p. 36, (1979), p. 185. Gibson's interest in visual proprioception grew out of his wartime experiments in training pilots, where it was found that while the plane tilts, the pilot's horizon or “straight ahead” does not slope but remains at eye level; whilst non-visual proprioception is often unreliable, the pilot’s visual world remains stable – see Reed (1988), p. 78.

his joints bending. He has his own aches, the pressures of his own clothing, the look of his own eyeglasses - in fact, he lives within his own skin"<sup>40</sup>. Gibson believes that all these varieties of proprioception are to be distinguished from perception, which they nevertheless accompany, on the basis of their function of self-sensitivity or egoreceptivity.

A defence of a Gibsonian account of proprioception has recently been presented by Bermúdez in *The Paradox of Self-Consciousness*. Bermúdez maintains that perceptual experience does not only provide information about the external world, but is inextricably combined with self-specifying information without which the former would be of little use; he believes that Gibson's ecological approach to perception shows that perceptual experience is a source of first-person nonconceptual contents.<sup>41</sup> I am sympathetic to Bermúdez' view that proprioception counts as a "genuine form of self-consciousness" and indeed with his claim that there is a close connection between IEM and the essence of first-person judgments.<sup>42</sup> His Gibsonian picture leads to some persuasive arguments in favour of the view that knowledge of the position of one's own body is a continuous model based on continuous feedback from touch and sight and other sensations. However, I would argue against Bermúdez that Gibson's claim that proprioception is the product of other senses may equally be interpreted as a rejection of the perceptual model. Furthermore, there is at least a tension between Gibson's picture of proprioception as continuous with other perceptual modalities, and Bermúdez' claim that proprioception is a "form of self-consciousness". My suspicion is that the Gibsonian picture is too deflationary of self-consciousness, since it fails adequately to acknowledge the IEM status of proprioception, and does not allow a distinctive ground which generates the phenomenon. Nonetheless, my principal concern is to reject the perceptual model of proprioception, and it is possible that a development of Gibson's account will fulfil this requirement while acknowledging self-consciousness.

I will conclude by offering some final objections to the perceptual model. Although Gibson distinguishes two senses of "sense", it is also necessary to distinguish two senses of "feel". The denial that proprioceptive knowledge is immediate - I do not have to do anything in order to have it, I "just know", for instance, that my legs are crossed - arises, I will argue, from a misunderstanding of the concept of feeling characteristic of the image theory and perceptual model. Proponents of the perceptual model claim that in shifting my attention from the object being touched to the sensations which I enjoy while touching it, I am simply moving my attention from objects that lie outside one of my bodily boundaries, for instance the surface of a hand, to what is going on at or beneath that boundary. Hence according to Michael Martin our bodily experiences "have as part of their phenomenological content that the region felt falls within one's body".<sup>43</sup> Although I believe that content is essentially propositional and would therefore question the very notion of "phenomenological content", I wish to focus on Martin's assumption that the same sense of "feeling" is involved in both exploratory and proprioceptive touch. I would argue in contrast that "feel" has a quite different sense in the proprioceptive case. Exploratory touch aside, I do not "feel" my body in the same way that I feel other "regions". One can become aware of specific bodily feelings, but not in the way that an image or perceptual account requires. Feelings of pressure, proprioceptive touch, muscle tension or skin stretching do not involve feeling in the perceptual sense exhibited in exploratory touch. Normally - that is, when the subject is not suffering from proprio-

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<sup>40</sup> Gibson (1979), p. 115.

<sup>41</sup> Bermúdez (1998), p. 114.

<sup>42</sup> Bermúdez (1998), p. 144; and elsewhere. Bermúdez's discussion of proprioceptive content is fertile and suggests many questions for further discussion, especially concerning the dual criteria for location and the concept of a hinge ((1998), pp. 154-61).

<sup>43</sup> Martin (1995), pp. 270, 273. He denies that bodily awareness is a matter of "nonperceptual states immediately caused by action on the body". One target here may be the implausible Cartesian introspectionist view that bodily sensations are "nonperceptual sensory experiences"; another might be the direct knowledge position. A perceptual view is pervasive in Bermúdez et al eds. (1995), and also in Bermúdez (1998), for instance p. 135.

blindness - the question "How did you know that your legs were crossed?" is redundant. However, some attempts to answer it are misleading as well as otiose. "I felt that they were crossed" mistakenly implies an action of touching. (Compare "How did you know that there's a bump on your knee?" "Because I felt it".) "My legs felt (as if they were) crossed" is also wrong, since it implies a feeling distinct from the knowledge that my legs are crossed.

The only sensible answer to what in the normal case is the purely theoretical question "How do you know that your legs are crossed?" is "I just know". To return to the Wittgenstein passage quoted earlier, which defends this claim whilst apparently leaving space for a non-perceptual sense of "feel":

My lower arm is now lying horizontally and I should like to say I feel that; but not as if I had a feeling that always goes with this position...- rather as if the "bodily feeling" of the arm were arranged or distributed horizontally, as e.g., a film of damp or of fine dust on the surface of my arm is distributed like that in space. So it isn't really as if I felt the position of my arm, but rather as if I felt my *arm*, and the feeling had such and such a *position*. But that only means: I simply *know* how it is lying - without knowing it *because*....As I also know where I feel pain - but don't know it *because*.....<sup>44</sup>

Wittgenstein here assimilates knowledge of bodily position with knowledge of the location of pain in a quite different way to Michael Martin's proposal discussed earlier. But that assimilation constitutes a denial of the perceptual model also; for the claim that it is "as if the 'bodily feeling' of the arm were...distributed horizontally" suggests that I am not perceiving an object at all. Wittgenstein's implication might be that "I felt my arm" in the proprioceptive sense can only mean "My arm wasn't asleep/ frozen/ anaesthetised, and I just know how it is lying". It suggests that the *subject of proprioception* is not, properly speaking, simultaneously an *object of perception*, and that proponents of the perceptual model of proprioception are mistaken in claiming this.

It may be felt that nothing decisive depends on whether proprioception is regarded as a mode of perception. Certainly there is a case for claiming that "perception", like "self-consciousness", is a philosopher's term of art, and that intuition has a restricted role in deciding whether a faculty counts as perceptual. However, the perceptual model is not innocuous. Its claim that I am simply moving my attention from objects that lie outside one of my bodily boundaries to what is going on at or beneath that boundary, makes it seem contingent that I have proprioceptive knowledge only of my own body. Although proponents of the perceptual model often acknowledge that proprioception is unique among modes of perception in providing knowledge only of one object and its parts, they cannot give an adequate explanation of why this should be. Bermúdez does make a serious attempt at such an explanation, arguing that the perceptual model meets identification and multiple-object constraints; but satisfaction of the latter constraint, whilst allowing him to reject the possibility of q-proprioception, results in the implausibly broad extension to the concept of self-consciousness noted earlier.<sup>45</sup> The perceptual model denies the conceptual interdependence of proprioception and bodily identity and thus embodies the residue of a traditionally Cartesian picture of bodily awareness. In contrast, the direct knowledge account is consistent with the concept of a body-subject.<sup>46</sup>

The assumption that proprioception yields knowledge is the strongest reason for supporting a perceptual model, so it is important to qualify this assumption. It rests on the fairly remote possibility of error of such judgments as "My arms are folded"; though immediate, this judgment is not infallible. But

<sup>44</sup> Wittgenstein (1980) Vol I, para 786; the idea is also expressed in paras 784-5. See also Wittgenstein's discussion in his (1958) Part II, pp. 185-6; and Merleau-Ponty (1962) p. 93 on the localisation of pain.

<sup>45</sup> Bermúdez (1998) pp. 137-51, especially p. 144. Another example is Martin (1995), p. 267, who argues, I think inconsistently, that an account of "what ties the content of bodily awareness to a particular object...does not seem to be one that we can provide purely a priori" (p. 283).

<sup>46</sup> These issues are pursued in Hamilton (forthcoming).

the possibility of error should not be overstated. The subject's knowledge of their posture and position is mostly so reliable as to be almost certain. Except in pathological cases, errors involve inattention, and are limited to rather complex situations - intertwining one's hands for instance - or to the errors of detail that result from the imprecise nature of proprioceptive knowledge discussed earlier.<sup>47</sup> In contrast, it is hard to see how I could be mistaken that my legs are crossed, except where phantom-limb phenomena are involved. (Such phenomena often involve pain in the missing limb, but patients also (mis-) report its position too, for instance claiming that it feels as if it is buckled under them.<sup>48</sup>)

To adapt a well-known quotation, therefore, it seems that it cannot be said of me except perhaps as a joke, that I know that my legs are crossed. The joke, as with knowing that I am in pain, would be a feeble one – scarcely a joke at all. (One might also say "He knows that his legs are crossed" when the subject has just woken up from an anaesthetic and is becoming unconfused.) When one compares proprioception and memory, then arguably memory is also a faculty which yields direct, immediate and reliable knowledge, and is not a mode of perception. But the kind of knowledge which proprioceptive judgments express is of a curiously muted variety, the knowledge-claims oddly unconvincing. However, to deny that proprioception mostly does yield knowledge would be to make the unconvincing assimilation of judgments of bodily position to avowals of sensation. Proprioception has an ambiguous status, therefore. It involves knowledge of an object - one's body - yet that knowledge is groundless, at least in what are usually referred to as "internalist" terms. In that sense, one could say, proprioception constitutes basic knowledge of one's body.

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<sup>47</sup> The present writer once had the bizarre experience of resting his chin on his hands and thinking that the skin on his thumb was rough, when the roughness turned out to be the beard stubble he was rubbing. In "The Body-Body Problem" and other articles in his (1999), Danto several times suggests that immediate bodily knowledge might be indubitable - though like Anscombe he does not use the term "proprioception".

<sup>48</sup> A more extreme example is A.R Luria's patient Zasetsky, "The Man with a Shattered World", who received massive brain damage during World War II: "Sometimes when I'm sitting down I suddenly feel as though my head is the size of a table...When I close my eyes, I'm not even sure where my right leg is; for some reason I used to think (even sensed) it was somewhere above my shoulder" (Luria (1972), pp. 42-3).

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