Chapter IV

Mind-body identity thesis

How could mental and bodily processes be numerically identical?

1. History of the mind-body identity thesis

The mind-body identity thesis considers that any mental state is *numerically identical* (section III.9) to a body state; what remains is to explain why their properties are apparently different. It is basically an ontological thesis, although it is sometimes stated in epistemological terms, as in Schlick and in Feigl's first theory (double language thesis, section IV.4). In the 19th and 20th centuries, the mind-body identity thesis derived from psychophysical parallelism (section II.6), when the correlation between mind and body was amplified to a numerical identity between mind and at least a part of the body.

The oldest statement of the soul-body identity thesis seems to have been the materialist view of the Greek atomists Leucippus and Democritus, expressed by Aristotle when he wrote that, for them, "the spherical atoms [of fire] are identified with soul" (see section A1.2).

We also mentioned that Gustav Fechner, influenced by the aspect dualism of Spinoza (which is a form of monism), named his theory the "identity view". When one comes to think of it, one would expect that any *monist* view will identify mind with some part of the body (as in materialism or in the aspect dualism of Fechner), or matter with some part of the mind (in the case of idealism), but we will see in the next paragraph an exception to this. If the aspect dualist is a panpsychist, s/he may identify all parts of matter with mentality, if s/he is a panprotopsychist, s/he will identify every element of matter with (protomental) elements of mentality (as in Clifford's *mind-stuff*).

However, for the traditional neutral monist[46], there isn't exactly a mind-body identity. What one has is an identity between the *elements* that constitute the mind and the elements that constitute the body. These elements are the "sensa" or "sense data" (section III.4). The body is constituted by a certain order of coextension and succession of these elements, which is different from the way in which the elements are ordered to constitute the conscious mind. Thus, there isn't an identity between consciousness and body.

Let us mention some of the views that reject mind-brain identity. First of all, of course, any substance dualism or spiritualism rejects the identity. Emergentist materialists also tend to reject the identity thesis, especially the views that consider the body physical and the mind non-physical (like David Chalmers). A materialist monist may eliminate the concept of mind, as in Paul Feyerabend's eliminativism, so in this case one wouldn't have the identity thesis (since one of the terms was eliminated).[47] A reductionist materialist would tend to accept the identity thesis, but if the ontological status of consciousness is downplayed (eliminativism),

[46] Doctrine that reality consists of a single type of entity, which is neither mental nor material. (1) Traditionally, such a term was applied to *phenomenalist* views, according to which the neutral elements would be sensations (Hume, Mach, James, Schlick, and Russell). Russell defended such a position during the 1920s, calling the neutral entities "sensibilia". (2) More recently, the term has been broadened to encompass any conception concerning neutral elements, which may not be sensations. There is a confluence with aspect dualism, and the distinction between the two becomes subtle. See STUBENBERG, L., "Neutral Monism," *Stanford Encyclopedia of Philosophy*, online. (This entry is taken from the Lexicographic Archives of this course, available in Portuguese on the website. The plan for these Class Notes involves a chapter to be put before this one, which would give a presentation of traditional conceptions of the mind-body problem.)

[47] FEYERABEND, P. K. (1963), "Comment: mental events and the brain", *Journal of Philosophy 60*: 295-96.

one would not have identity, properly speaking. An epiphenomenalist surely does not accept the identity thesis, because if mental states were identical to body states, they would also have causal powers, denying the epiphenomenalist thesis.

Here and there we find statements of the identity thesis, as in the end of this excerpt from the English philosopher and "philobiologist" George Henry Lewes, in which psychophysical parallelism leads to an identity:

> A spiritualist may here object that we have no right to exclude from the group of conditions that spiritual agent which he regards as the chief among them. But the answer is twofold: first, there is no evidence whatever for the existence of such an agent; secondly, there is overwhelming evidence that the function varies with the variations in the physical conditions, in other words, that the sentient phenomenon is a nervous phenomenon.[48]

In 1918, SCHLICK (1974, p. 299) formulated the identity thesis, in the materialist context, in the following manner:

> But all these complications in the world picture are quite unnecessary. They can easily be avoided if in place of the dualistic assumption we introduce the much simpler hypothesis that the concepts of the natural sciences are suited for designating every reality including that which is immediately experienced. The resulting relation between immediately experienced reality and the physical brain processes is then no longer one of causal dependency but of simple *identity*. What we have is one and the same reality, not "viewed from two different sides" or "manifesting itself in two different forms", but designated by two different conceptual systems, the psychological and the physical.

Every defender of the identity thesis must explain why mind and body appear in different ways, i.e. has to account for the explanatory gap. We see that Schlick's explanation replaces the doctrine of the two perspectives of Fechner by "two different conceptual systems". We will return to this, when examining Feigl's "double language thesis" in section IV.5.

The American neorealist Durand Drake presented, in 1933, three views on the mind-body problem. Interactionism, which is a version of substance dualism, epiphenomenalism, which he called materialism, and the "identity theory", which claims that "mind and brain are identical" (DRAKE, 1933, p. 379). This latter is Drake's position, emphasizing however the reality of the "*mind-stuff*", which by continuity would be present not only in brains but also in everything. In spite of adopting the term "panpsychism", he stresses that he does not believe that thaere are minds in inanimate things, because to have a mind the *mind-stuff* must be appropriately organized (p. 384). This view falls clearly within panprotopsychism.

There are many identity theories that are panpsychist. The historian of panpsychism David SKRBINA (2005, p. 9) suggests that Spinoza was the first to propose a mind-body identity theory, interpreting him as a panpsychist.[49] He mentions Bernard Rensch (1971) as another proponent of "panpsychist identism". SKRBINA (2005, p. 9) also stresses that "functionalism can be seen as a kind of generalization of identity theory: not just a brain, not

[48] LEWES, G.H. (1875), *Problems of life and mind*, First series, vol. 2, J. Osgood, Boston, p. 412. SCHLICK, M. (1974). *General theory of knowledge*, transl. A.E. Blumberg, Springer, New York; transl. of the 2nd German ed. of 1925; 1st ed.: 1918.

[49] We've seen, however, that this thesis had already been expressed in ancient Greek materialism. SKRBINA, D. (2005), *Panpsychism in the West*, MIT Press, Cambridge (MA). DRAKE, D. (1933), *Invitation to philosophy*, Houghton Mifflin, Boston.

just a nervous system, but any physical system is capable of giving rise [being identical] to a mental state".

2. The colored brain thesis

The *colored-brain thesis* is the name given by Leopold STUBENBERG (1998, p. 169) to the view that phenomenal qualities, or qualia, are "properties of the brain".[50] H.H. PRICE (1932, p. 127) referred to this thesis as the "hypothesis that sense data are cerebral":

> To say that when a man looks at a tomato he is acquainted with a reddened portion of his own brain, or with a sounding tract of it when he hears a noise, is very singular. And others besides Bradley find it hard to believe that 'when I smell a smell I am aware of the stinking state of my own nervous system'.

Price points out, in the above quotation, that the Hegelian philosopher Francis Herbert Bradley is criticizing the theory proposed by the Oxford philosopher Thomas CASE (1888, p. 33), who characterized sense perception as the "the immediate apprehension of an internal physical object inside the nervous system of a sentient being".

Case was led to this view by an application of the ancient principle of attraction of like to like (cf. Empédocles, fragment B109): "The similar can be inferred only from the similar, therefore the physical can be inferred only from the physical" (p. 23).

> If, then, natural science requires that the object of sense must be within my nervous system in order to be sensible, and logic that it must be physical in order to infer physical objects of science in the external world, how can the sensible object be at once physical and internal? I answer, it is the nervous system itself sensible affected. The hot felt is the tactile nerves heated, the white seen is the optic nerves so coloured. (CASE, 1888, p. 24)

Case's position, however, is not materialist or physicalist, since he considers that God created and rules the world (p. 20). Moreover, the internal object of sensation, which he postulates as being physical, is taken to be distinct from the "internal operation" that grasps it, which would be of the order of the "psychical": "There is some plausibility in saying that the act of consciously touching is psychical, there is none at all in saying that the heat felt is psychical" (p. 24).

Notwithstanding, this view can be interpreted as an expression of the the mind-brain identity thesis, claiming that the parts of the brain, which are physical, are also qualitative, as are the mental states. Sense-data, or qualia, are considered real and physical: some part of the brain is in fact colored, for example.

The usual reaction to this thesis is to consider it absurd, as did Bradley, in the sense that it is an obvious mistake to suppose that "to see red, there must be red neurons in the brain" (O'REGAN & NOË, 2001, pp. 947, 1010, 1018). However, the answer to this objection is simple, involving a subtle Gestalt shift. The view associated with the colored brain thesis is "internalist" in relation to colors and other qualia: the subjective greenness we experience as we look at an avocado is not in the fruit, but in our brain. The avocado is the *cause* of the greenness produced in us, and this cause is associated to the electronic properties of the

[50] CASE, T. (1888). *Physical realism*, Longmans, Green & Co, London. DENNETT, D. (1992), *Consciousness explained*, Little, Brown & Co., New York. O'REGAN, J.K. & NOË, A. (2001), "A sensorimotor account of vision and visual consciousness", *Behavioral and Brain Sciences 24*: 939-1031. PRICE, H.H. (1932), *Perception*, Methuen, London. STUBENBERG, L. (1998), *Consciousness and qualia*, John Benjamins, Amsterdam.

pigment molecules in the skin of the avocado, that modulate the reflection of incident light. The brain in the state of greenness does not have the electronic properties that might, after being illuminated, selectively absorb light and cause in the observer the appearance of the quale of greenness. Subjective color has nothing to do with light (except for the meticulous causal connection between the two): our brains are dark (DENNETT, 1992, p. 28).

The Gestalt shift involved is the change from common sense externalism ("greenness is in the avocado") to the internalism of views such as sense-data theory or the thesis of the reality of qualia ("greenness is in the mind"). Adding to this the mind-brain identity thesis, one arrives at: "greenness is in the brain".

It seems that the colored brain thesis was not explicitly advocated by anyone else, although PRICE (1932, p. 127) wrote that "philosophers have been accustomed to discuss the question whether sense-data are physical or mental". In fact, in the interwar period, when sense-data theories and materialism coexisted in English speaking philosophy, the American psychologist and historian of psychology Edwin Boring came close to the colored brain thesis.[51] It was his work that influenced U.T. Place (1956) to develop his version of the mind-brain identity thesis (cf. PLACE, 2000).

The mind-brain identity thesis was put forward by BORING (1933, p. 16) in the following statement, quoted by Place, which shows the amplification of parallelism to identity (mentioned previously): "To the author a perfect correlation is identity. Two events that always occur together at the same time in the same place, without any temporal or spatial differentiation at all, are not two events but the same event". Place next ponders on why Boring was ignored by the philosophers:

> Boring moreover, was himself apparently committed to combining the identity theory with a phenomenalist account of sensory qualities which on Leibniz's principle of the Identity of Indiscernibles would commit him to the view that certain brain events are literally green, high pitched, warm, sour or putrid, which for a philosopher would constitute an immediate knockdown reductio ad absurdum of his position (PLACE, 2000, p. 1).

We see therefore that Boring got close to the colored brain thesis, in spite of not having mentioned it explicitly.

3. Place and the identity thesis

The mind-brain identity thesis, as formulated by the English psychologist U.T. Place,[52] does not put mind and brain on an equal footing, but rather privileges the theoretical-scientific description of the brain, placing the subjective experience of consciousness as a kind of epiphenomenon – in the sense that its ontological status is lower – or, in other words, constituting a form of eliminativism (since the sense data are eliminated). This is expressed by his description of what he calls the "phenomenological fallacy", which would be to identify in a green after-image the quale of greenness (such after-image can be generated by looking closely into a red watermelon and then directing one's gaze to a white wall). For Place, educated in the behaviorist tradition, it would be correct only to say that a green after-image

[51] BORING, E.G. (1933), *The physical dimensions of consciousness*, Century, New York. PLACE, U.T. (2000). "Identity theories", unfinished manuscript by Place and edited by S. Schneider, available at: *A field guide to the philosophy of mind*: http://host.uniroma3.it/progetti/kant/field/mbit.htm .

[52] PLACE, U.T. (1956), "Is consciousness a brain process? *British Journal of Psychology 47*: 44-50.

evokes the same brain processes as the vision of grass, and not that there is a reality at the phenomenal level that corresponds to the quale of greenness.

In a later text, quoted above, Place explains that he did not view the identity thesis in the same sense as Frege identified numerically the morning star and the evening star with the planet Venus (see section III.9). Feigl and Smart would take this approach, but Place defended the use of "is of composition", that is, the claim that the mind is *composed* of brain processes, and nothing more. Referring to himself in the third person, PLACE (2000) writes:

> Place's contention was not that consciousness is identical with or the very same thing as the brain processes with which it is correlated, but that consciousness consists entirely in or is entirely composed of brain processes. In other words he construed the relationship of experiences to brain processes in terms of the substantial microreduction of a substance into its constituent parts at a lower or more microscopic level of analysis [...].

In addition, it points out that:

> The identity thesis applies only to certain aspects of mental life consciousness (Place), the raw feels of experience (Feigl), sensations (Smart). The cognitive and volitional (intentional) aspects of mental life are not reducible to brain states or processes; but are (conceptually) reducible to some kind of semantic, logical or verbal competence or propensity.

Place suggested the famous analogy between mind-brain identity and the identity between lightning and a massive discharge of atmospheric electricity. There is one important difference, however: both lightning and "a motion of electrical charges" are *theoretical descriptions* of a physical process, whereas in the discussion of the relationship between mind and brain, "mind" is supposed to denote the set of subjective states, experienced by acquaintance, and not a propositional knowledge, as those involved in the theoretical descriptions of the everyday world and science. In the lightning example, there is of course an associated subjective experience that occurs after the event, which we call the terms "flash of lightning" and "thunder". But the analogy drawn by Place is between the physical event "lightning" and the event "motion of electrical charges", not between the "flash" and the "motion of charges". Nor should one say that a flash, as an observed phenomenon, is identical to an atmospheric electric discharge, since the proximal cause of the first observation is the *light* emitted by the discharge.

The point, then, is that there is a difference between the identity of lightning and discharge, on the one hand, and the putative identity between mind and brain, on the other.

4. Struturalism in physics

The thesis that physics only has access to the relational properties of things is called *structuralism in physics*, where "structure" refers to the set of relations (causal and of other kinds) involving an object. This thesis is also called "structural realism". It is associated with Kant's conception, in the *Critique of pure reason*, that science does not have access to the things in themselves ("noumena"), but only to observed phenomena. It appears more or less explicitly in later German philosophy, in the philosopher William Hamilton (1833), in Ernst Mach (1886), Henri Poincaré (1902), Moritz Schlick (1918), Bertrand Russell (1927), and more recently in John Worrall (1989).

In his doctoral dissertation, mentioned above in section IV.1, Schlick distinguished between two types of physical properties.[53] The first type is the properties *described by physical theories*, such as relative position, velocity, mass, magnetic moment, Reynolds number, which can be quantified and computationally simulated, and which correspond to relational aspects of reality (proportions between real quantities), but not to intrinsic properties. The second type is *the real properties of physical objects*, which are intrinsic or essential properties (noumena, "inscrutables" or "quiddities"), which Schlick called "qualities".

This is similar to Stoljar's (2001) distinction between "t-physical properties" (theoretical) and "o-physical properties" (within the object). Russell expressed structuralism in physics as follows:

> Except where mental phenomena are concerned, the inferences that I can make as to the external causes of my experiences are only as to structure, not as to quality. The inferences that are warranted are those to be found in theoretical physics; they are abstract and mathematical and give no indication whatever as to the intrinsic character of physical objects. (RUSSELL, 1956, pp. 162)

5. Feigl and Stephen Pepper

In an article[54] published in 1963, Feigl discussed a "familiar objection" to the mind-body identity theory, which is precisely the question of the explanatory gap that will be discussed in the following section: "how could directly experienced qualities such as colors, sounds, smells, pains, emotions, or the like, be identical with neural processes whose properties are so fundamentally different?" (FEIGL, 1963, pp. 328-9). Feigl accepts the thesis that qualia are real, unlike Place and Smart, who tend to reject it. Feigl also explicitly adopts "structuralism in physics", following Schlick and Russell.

However, he does not interpret the theoretical results of physics in a realist way. That is, he claims that the intuitive models we form of the brain, in a spatiotemporal background, cannot be considered real, but only heuristic and didactic models. "The geometry employed in the description of physical space is a conceptual system which, though based upon the evidence of the sensory kind of spatiality, is itself not adequately intuitable (visualizable, etc.)" (p. 331). This is an anti-realistic stance on physics (in this case, classical physics).

In contrast, the qualitative physicalism presented in section IV.2 takes a *realist* view of the picture of the physical world, at least within the limits of validity of classical physics. Both versions of materialism take seriously the location in physical space of mental properties, but such physical space is considered abstract by Feigl, and he attributes reality only to perceptual space. "Hence there is no conflict and no incompatibility in regard to the 'location' of, e.g., a directly experienced patch of color. It is where we 'see' it in phenomenal

[53] SCHLICK ([1918] 1974), op. cit. (note 48), pp. 294-95. STOLJAR, D. (2001), "Two conceptions of the physical", *Philosophy and Phenomenological Research 62*, pp. 253-81. The view has received a lot of attention lately in the philosophy of mind, under the name of "Russellian monisms"; see ALTER, T. & NAGASAWA, Y. (eds.) (2015), *Consciousness in the physical world*, Oxford U. Press.

[54] FEIGL, H. (1963), "Physicalism, the unity of science, and the foundations of psychology", in SCHILPP. P.A (ed.), *The philosophy of Carnap*, Open Court, La Salle (IL), pp. 227-68; reprinted in FEIGL, H. (1981), *Inquiries and provocations: selected writings 1929-1974*, ed. R.S. Cohen, Vienna Circle Collection v. 14, Reidel, Dordrecht, pp. 302-41.

space. The systemically identical cerebral process is assigned a place in the abstract 3-dimensional manifold of physical space [...]" (FEIGL, 1963, p. 331).

Stephen Pepper, a thinker close to Feigl, in his book *Concept and quality* (1967),[55] developed a "*qualitative* neural identity theory" (p. 76), closer to qualitative physicalism. In discussing the identity thesis, he starts from a version previously developed by Feigl (1958) but later abandoned, the "double language theory". According to this view, there are two languages usually employed in psychology, the physical and the phenomenal, which can be *translated* into each other. Physical language can refer to various scales, such as the macroscopic or "molar" scale, which describes overt behaviors, or the microscopic scale, which describes cells, or even the nanoscopic one, which refers to molecular processes. The phenomenal language does not seem to encompass such a wide range of scales. An example of translation between the two languages is as follows (adapted from PEPPER, 1967, pp. 76-77): a subjective visual flash (phenomenal language) can also be described as the reflection of light into the retina, followed by a winking reflex (physical language). Such a "linguistic version" of the identity thesis (i.e., the double language theory) thus assumes that the two utterances have the same referent, but one does not ask what is this referent (p. 84). Feigl ended up abandoning this version because the referents of the utterances would not be the same after all. The direct referent of the phenomenal language would be "raw feels" or qualia. And how about the physical language? In the new Feiglian version we saw above, it refers to "descriptive symbols" (not, as a realist might expect, to physical reality). Pepper inherits this version of the identity thesis that combines realism of qualia with structuralism in physics interpreted antirealistically. However, unlike Feigl, as we have already mentioned, he adopts the "panprotopsychist inference" and considers that there are qualities outside the mind (panqualityism).

Pepper gave an example involving neurosurgeon Wilder Penfield, who directly stimulated with a pair of electrodes a certain region of a patient's cortex, at a certain point 14, and the patient reported a "sensation in face". If Penfield were to give a detailed account of the neural processes involved (something we do not yet have the ability to do fully), "what is the event pointed at by all the indirect evidence?" Pepper's answer is that it would be the "qualitative experience of the patient" (p. 85).

This position is very close to the neutral monism of Mach and others, in that it attributes reality only to the sense data, and considers that the scientific account is a theoretical construction (which Mach always stressed is built on the qualitative elements of experience, which are extrapolated to involve the system of relations between them). But the mind-brain identity thesis plays a central role for Feigl and Pepper, whereas for Mach and Russell there are only elements or events that can be causally connected either in a material order, or in a mental order. In this case, identity applies to the element or event (traditional neutral monism), not to the distinct configurations that receive the names of mind and body.

Pepper transforms the mind-body problem into the quality-concept (or quality-structure) problem, "a problem of qualitative actuality and various symbolic descriptions of it" (p. 92). One step that makes Pepper's description more realistic than Mach's and perhaps Russell's is that he has experienced the impact that neuroscience has had on postwar philosophical thinking, by concluding that the qualitative process is located in the brain:

> Just how do physical terms make contact with an actual qualitative process? The identity theory brings this question to focus. Taking expert physiological and observational results seriously, it shows just where actual quality and physical concept

[55] PEPPER, S.C. (1967), *Concept and quality: a world hypothesis*. La Salle (IL): Open Court.

> meet. They meet in what is physiologically indicated as áreas of man's brain, or, perhaps more narrowly, of his cerebral cortex. (PEPPER, 1967, p. 93).

6. Identity and the explanatory gap

The notion that there is a "gap" between the mechanical description of the system of the molecules that make up the body and the qualitative aspect of consciousness is quite old, having been expressed for example by Emil du Bois-Reymond in 1872[56]:

> Astronomical [mechanical] knowledge of the brain – the highest grade of knowledge we can expect ever to have – discloses to us nothing but matter in motion. But we cannot, by means of any imaginable movement of material particles, bridge over the chasm between the conscious and the unconscious.

Joseph Levine (1983) has argued that there is an explanatory gap between feeling the "sensation of pain" and its immediate brain correlate, which is in a simplified and mistaken way taken to be the "firing of C-fibers" (a classic example from Smart). It is not worth analyzing his argument here, for its conclusion seems far more intuitive than its argument, which is based on the logician Saul Kripke's notion of "necessity". At one point he compares his conception with Locke's view:[57]

> The point I am trying to make was captured by Locke in his discussion of the relation between primary and secondary qualities. He states that the simple ideas which we experience in response to impingements from the external world bear no intelligible relation to the corpuscular processes underlying impingement and response. Rather, the two sets of phenomena – corpuscular processes and simple ideas – are stuck together in na arbitrary manner. The simple ideas go with their respective corpuscular configurations because God chose to so attach them. He could have chosen to do it differently. (LEVINE, 1983, p. 359)

The point of the explanatory gap, to be highlighted here, is that the explanans (antecedents) and the explanadum (conclusion) of a scientific explanation are linguistic propositions of the same category. The explanation for the spectrum of electromagnetic radiation from the sun is based on nuclear theory, and both explanans and explanandum, as well as physical measurements, are expressed in terms of mathematical, *quantitative* language. But the mental state of yellowness that results from observing the sun is not directly expressible in linguistic-mathematical terms, but is a *qualitative* subjective experience. This is what the explanatory gap consists of, in a sense closely related to the Mary's room thought experiment (section III.6).

In ontic terms, however, it is possible to have an identity between neurological and mental description as long as both descriptions have equal weight, as in property dualism or the colored brain thesis. For example, it can be concluded that a certain material region of the brain ω, under the influence of certain internal organization and nerve spikes Σ, *is redness*, as a real property of the physical state. Such a real world situation deos not involve gaps. The gap arises from our limitation of doing science and philosophy with language, which in its

[56] DU BOIS-REYMOND, E.H. (1872), "Über die Grenzen des Naturerkennens", English translation by J. Fitzgerald, "Limits of our knowledge of nature", *Popular Science Monthly 5* (1874), pp. 17-32, quote from p. 28.

[57] LOCKE (1694), op. cit. (note 17), Bk. II, Ch. VIII, § 13; Bk. IV, Ch. III, § 12 and 13. LEVINE, J. (1983), "Materialism and the explanatory gap", *Pacific Philosophical Quarterly 64*: 354-61.

intersubjective dimension captures only the relations between things, not the things in themselves.

In the future, we will know the immediate brain correlate of yellowness, and have a theory that will articulate in a simplified form all the psychophysical laws involved in the consciousness of human beings. These laws will be discovered from empirical investigation, and will be theoretically codified from a number of *principles*. Such principles, however, *will not be explained*, in the same way as the principle of the constancy of the speed of light is not explained by the theory of Special Relativity, but used as one of its fundamental principles.

This additional aspect of the psychophysical bridge laws is different from the explanatory gap, as presented above. The use of unexplained principles is common in any scientific theory of a broad scope. The explanatory gap of the mind-body problem, in the version presented here, is an additional problem, a result of the different categories between explanans and explanandum in a psychophysical explanation.

In his critique of identity theory, Sergio Moravia (p. 115) presents two quotations[58] that express the explanatory gap between the physical description of the brain and mental experiences. The first is from C.D. Broad (1925, pp. 622-3):

> About a molecular movement it is perfectly reasonable to raise the question: "Is it swift or slow, straight or circular, and so on?" About the awareness of a red patch it is nonsensical to ask whether it is swift or a slow awareness, a straight or circular awareness, and so on. Conversely, it is reasonable to ask about an awareness of a red patch whether it is clear or a confused awareness; but it is nonsense to ask of a molecular movement whether it is a clear or a confused movement.

The second is from James Corman (1962, p. 490):

> We can talk about intense, unbearable, nagging, or throbbing pains. And yellow, dim, fading, or circular after-images. And dogmatic, false, profound, or unconscious beliefs. On the other hand we can also discuss publicly observable, spatially located, swift, irreversible physical processes. Thus if the Identity Theory is correct, it seems that we should sometimes be able to say truthfully that physical processes such as brain processes are dim or fading or nagging or false [or yellow], and that mental phenomena such as after-images are publicly observable or physical or spatially located or swift.

How are we to deal with these problems? There are three problems to be considered. (i) How to deal with qualia, such as yellowness? (ii) How to deal with mental properties such as naggingness and dimness? (iii) What to say about truth values, such as false?

7. A mistaken exemple of mind-brain identity

To trace the identity of two theoretical-scientific descriptions is not very problematic, as in Paul Churchland's[59] (1995, p. 207) favorite example, that heat (i.e. thermal energy) is

[58] BROAD, C.D. (1925), *The mind and its place in nature*, Kegan Paul, Trench, Trubner & Co., London. CORNMAN, J. (1962), "The identity of mind and body", *Journal of Philosophy 59*: 486-92.

[59] CHURCHLAND, P.M. (1995), *The engine of reason, the seat of the soul*, MIT Press, Cambridge (MA). CHURCHLAND, P.M. (2007a), "On the reality (and diversity) of objective colors: how color-qualia space is a map of reflectance-profile space", *Philosophy of Science 74*: 119-149; reprinted in: CHURCHLAND, P.M. (2007b), *Neurophilosophy at work*, Cambridge University Press, pp. 198-231. Another paper quoted is: CHURCHLAND,

identical to the disordered motion of molecules, and not *caused* by this. Similarly, lightning can be theoretically reduced to a microscopic description (in terms of electrons) by a deduction accompanied by approximations (which emergentists consider *ad hoc*). But the situation involving a experienced *qualitative* state and a linguistically described *quantitative* state is different, constituting an "explanatory gap", as we argued in the previous section.

As we have already pointed out, Place's mind-brain identity actually privileges the description of the brain, and downplays the ontological import of the mind. Such an attitude is also present in Paul Churchland, when he defends an externalist view of chromatic qualities.

> At least since Locke, color scientists and philosophers have been inclined to deny any objective reality to the familiar ontology of perceivable colors, on grounds that physical science has revealed to us that material objects have no qualitative features at their surfaces that genuinely resemble the qualitative features of our subjective color experiences. Objective colors are therefore dismissed as being, at most, "a power in an object to produce in us an experience with a certain qualitative character." Accordingly, colors proper are often demoted from being 'primary properties' (i.e., objective properties of external physical objects) to the lesser status of being merely 'secondary properties' (i.e., properties of our subjective experiences only). (CHURCHLAND, 2007b, pp. 198-99)

We thus see that Churchland disagrees with the doctrine of primary and secondary properties (section III.3), curiously defining "secondary properties" as synonymous with "qualitative sensations" (unlike Locke's use, as seen in Table III.1). His argumentative strategy will be to use the identity principle to identify subjective sensations with physical properties of the external world:

> More specifically, we might try to identify each external color with a specific electromagnetic reflectance profile had by any object that displays that color. The objective reality of colors would then emerge as being no more problematic than is the objective reality of the temperature of an object (which is identical to the mean kinetic energy of its molecules), or of the pitch of a sound (which is identical to the dominant oscillatory frequency of an atmospheric compression wave), or of the sourness of a spoonful of lemon juice (which is identical with the relative concentration of hydrogen ions in that liquid). (p. 199)

However, for the internalist conception of qualia, of the doctrine of primary properties, the M-sourness triggered in us by lemon juice bears no resemblance to V-sourness, which is identical to the relative concentration of protons (hydrogen ions). This argument is certainly not invoking the mind-brain identity thesis, since M-sourness should be identical with a property of the immediate brain correlate of the sensation of taste, and not a property of the outside world.

In another paper, Churchland ([2005] 2007b, p. 191) presents his opinion on mind-brain identity in relation to colors, "in support of the strict identity of human visual color qualia on the one hand and human opponent-cell coding triplets". Now we have a more interesting use of the identity thesis, but it is also wrongly applied (just as identifying pain with the C-fiber stimulation is erroneous) because the ganglion opponent cells are located at a stage prior to the primary visual cortex.

P.M. (2005), "Chimerical colors: some phenomenological predictions from cognitive neuroscience", *Philosophical Psychology 18*: 527-60 (reprinted in CHURCHLAND, 2007b, pp. 161-97).