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PLATO'S κήρινον ἔκμαγεῖον AND MEMORY MODELS IN CURRENT PSYCHOLOGY

INTRODUCTION

Section 1

The metaphor by which learning is compared to the stamping of impressions on a wax tablet is fascinating for a number of reasons. In one or another closely related manifestation it has been so extensively used as to demonstrate a deep-rooted appeal to thinkers and writers widely separated in time, interest, and orientation. It has a limited application to a specific psychological topic yet is often used to represent the common theme of all forms of Empiricism. A vast compilation might be made of its uses and adaptations. Its pervasiveness and longevity, however, while probably the most evident, are not necessarily its most remarkable features. An examination of its origin will display anomalies and paradoxes which have given rise to interpretations difficult to reconcile. It may be possible to show that for illuminating some achievements of Ancient Psychology these problematic and little-considered aspects are more significant than the obvious ones.

It would be attractive and probably very rewarding to trace the transmission through the centuries of this memorymetaphor; and anyone interested in ideas would have every reason to feel dissatisfied with a discussion that neglected to offer some historical account. However, my concern is to give as much prominence as possible to psychological considerations and I am far from refusing to recognise the claims of other closely-interwoven concerns in declining to attempt a synoptic view. By adopting a "then-and - now" approach I shall be backing my conviction that the most striking features of this metaphor are not what they have conventionally been assumed to be, and that they may well be related to underlying affinities between parts of ancient Greek thought and current cognitive psychology. For the present, however, I will have to leave out of account, except where it is quite unavoidable, the many other conceptualisations which have their origins among the Greeks and their counterparts in modern psychology.

The kind of potted history that often appears in the first chapter of introductory textbooks of psychology is apt to make reference to the *tabula rasa* image in acknowledgment of its influence as a root metaphor in Psychology. In some it is linked with Locke and Aristotle, rarely with Plato. Perhaps the nodding acquaintance with Greek thought that psychological authors are expected to have more readily leads them to link the metaphor with Aristotle's cast of thought. Other writers, needless to say, are sufficiently captivated by the metaphor to trace it to its source in Plato's *Theatetus* but, as far as I have seen, do not remark on the incongruity of its deriving from Plato while

seeming much Aristotelian in spirit. (NOTE I). Thus Anderson and Bower, to whom several references will be made, comment on Plato's being an 'extreme rationalist in contrast to the 'extreme sensationalism' of the Sophists, without remarking that the wax-tablet analogy Plato offers is as sensationalist as any Sophist could wish. Marshall and Fryer, also taken up later, devote some pages to discussing the passage in the *Theaetetus*, commending it very warmly, itemising anticipations of modern theories of forgetting, but unfortunately neither following then very far nor relating the passage in question to the rest of the *Theaetetus*, let alone to the rest of Plato. Posner (p3) briefly comments that Plato found the wax tablet inadequate and leaves it at that, citing the standard work of Beare as his authority. Beare, however, as befits an Aristotelian, is actually enthusiastic about the wax-tablet, "nowhere else does Plato so closely approach the Aristotelian conception" (p 267). Another standard work, Brett, is uncharacteristically terse on this subject, offering no more than a very oblique hint of how Plato's apparent encouragement of anti-Platonic theorising might be understood. (p 85).

This kind of sampling would be prolonged quite unbearably and would, I am fairly sure, support the contention that the strong appeal of the wax tablet metaphor to psychologists is somewhat at odds with their disinclination to attempt a detailed interpretation. This is in no way crucial to the argument I want to pursue but will serve quite well to foreshadow it.

Section 2

The Wax Tablet in Context

The next stage is to place the origin of the impression - metaphor in its context. The *Theaetetus* is from first to last a succession of attempts to define knowledge. None of these attempts is successful, but a number of important points are made on the way. The first series of attempts aims at equating knowledge with sense-perception, the second with correct opinion, the third with correct opinion which includes understanding of underlying rationale. The wax-tablet passage comes early in the second section, after Socrates has raised again a set of logical problems discussed in the first, which concern the origin of incorrect judgments. In keeping with the tone of the first section, where Theaetetus puts forward the sensationalistic and relativistic line adopted by the Sophists, he encourages Theaetetus to defend the thesis and incorrect judgment cannot be thinking what-is-not, since on the assumptions being made this would be a logical contradiction (NOTE 2), but can only be interchanging correct judgments or mistaking one thing for another. Theaetetus takes this up enthusiastically, but, as often happens in this dialogue soon runs out of arguments and has to be primed by Socrates. To help him out of his difficulty (NOTE 3) Socrates suggests he takes account of the distinctively psychological factors so far neglected, in particular that of learning.

191 c 2 ἄρα ἔστιν μὴ εἰδότα τι πρότερον ὕστερον μαθεῖν;

191 c 2 "Can't a person get to know something he didn't know previously?"

191 c 8 Θεὸς δὴ μοι λόγου ἕνεκα ἐν ταῖς ψυχαῖς ἡμῶν ἐνὸν κήρινον ἐκμαγεῖον, τῷ

191 c 8 ...to help our discussion suppose there's a wax-tablet in our minds, larger, in
μὲν μείζον, τῷ δ' ἔλαττον, καὶ τῷ μὲν καθαρωτέρου κηροῦ, τῷ δὲ

one person, smaller in another, and, as the case may be, made of purer, or less κοπρωδεστέρου, και σκληροτέρου, ένίοις δέ ύγροτέρου, εστι δ' οίς μετρίως έχοντος

pure and harder wax, sometimes of too soft, sometimes just right...

191 d 4 και εις τουτο δι τι αν βουληθωμεν μνημονευσαι ων αν ιδωμεν η ακουσωμεν η
191 d 4 and whenever we want to remember something of what we see or hear or αυτοι έννοησωμεν, υπέχοντας αυτο ταίς αισθήσεσι και έννοιαις, think of in our own minds we hold the tablet under the perceptions and the αποτυποϋσθαι ωσπερ δακτυλίων σημεϊα ένσημαιομένους· και ο μέν αν thoughts and stamp them on it, just like stamping impressions of seal, rings, έκμαγῆ, μνημονεϋειν τε και επίστασθαι εως αν ένῆ το ειδωλον αυτοϋ· ο δ' αν and whatever is stamped in we remember and know as long as the likeness εξαλειφθῆ η μη οίόν τε γένηται εκμαγῆναι, επιλελησθαι τε και μη lasts; but, whatever is rubbed out or could not leave an impression we've επίστασθαι.
forgotten and do not know..."

This is followed by a long and intricate discussion of the logical difficulties previously encountered of making mistakes about things we *know* (in the sense of certain knowledge). Later (193c) Socrates, when Theaetetus is quite judgments, suggests as an explanation the example of his seeing two acquaintances a long way off, not very clearly, and fitting together the sensory experience of one to the wax imprint of the other, and vice versa. (This is psychologically plausible, of course, but it's not clear how this solves the logical problem they have struggling with). In quick succession in this paragraph three subsidiary metaphors are brought in to illustrate the point, putting one's shoes on the wrong feet, the right-left transposition that occurs in mirror images, and making a comparison with a footprint either of a foot or another footprint (the sense seems to require one, the text to suggest the other). A few lines later, at 194a, another metaphor, common among the Greeks and almost not a shooting wide of the mark, is brought in either to underline the point (if one believes Plato is being serious) or to underline the irony (if one doesn't).

From 194c-195a Socrates goes on to relate some of what he has been saying to individual differences (NOTE 4) again using some peculiar expressions and an amount of minor detail that suggests irony.

Every time Theaetetus gets a chance to speak he expresses his enthusiasm and admiration for the job Socrates is doing, Socrates plays up to this, then suddenly (195b) tells Theaetetus it's all no good; the model he's spent so much time elaborating won't work. If a person has an imprint of two numbers (and hence really *knows* them both in the terms of the model and the problems under discussion) he would never be able to add them together and get the wrong answer. Theaetetus quickly sees the logic of this and is again quite at a loss. Up to this point Socrates has not referred to the capacity for forming impressions not of sensory qualities but actually from what "we think in our own minds". When the wax-tablet's adequacy is considered in regard to abstractions like number-concepts Theaetetus doesn't need much persuasion of its shortcomings.

Two things at least are left quite unclear, perhaps deliberately - how do abstract thoughts form impressions in terms of the model? Does Socrates really agree with Theaetetus that the model's explanatory weakness lies only in the field of abstract mental operations?

Their discussion moves on to consider the other well-known memory model of the *Theaetetus*, the Aviary. Before Socrates begins to propose this, however, he speaks a few sentences in the course of which he refers to "knowing" and "knowledge" more than a dozen times, emphasising how they have so far failed to get to grips with this. Precisely the same point is made after the Aviary passage as well.

Section 3

The "Empiricist" interpretation of the Theaetetus

According to this, which probably is the majority view among philosophers, the *Theaetetus* represents a significant change of direction on Plato's part. In brief it is assumed that Plato turned from the contemplation of ultimates and universals, which so militated against his becoming a good scientist like Aristotle, and started attending to the problems of ordinary knowledge of the ordinary world.

He was attracted in some ways to the relativism and sensationalism of some of his predecessors and found it disconcertingly persuasive. But instead of retreating into another realm of transcendental and eternal "Forms", where his dream of certain knowledge might be realised, he grew to overcome his distrust of ordinary experience and to adopt the kind of attitude that is a necessary condition of scientific development.

In this view the wax-tablet is a serious psychological model which has an important bearing on the answering of some epistemological problems. Yet, despite its appeal to antiquity and to the twentieth century, Plato found it deficient and immediately had recourse to the more psychologically authentic Aviary model (NOTE 5) which distinguishes degrees of accessibility of stored information and allows for an active process of recall. Yet as the perceptual aspects of learning are concerned. According to Robinson, perhaps the best known exponent of the interpretation in question, it succeeds account of knowledge, but fails in respect of providing it, simply because Plato had not worked out an analysis of knowledge by acquaintance and knowledge by description as Russell did. He was, perhaps, groping towards it but was too much inclined to confuse the two. As far as straightforward recognition-memory is concerned, the wax-tablet is quite satisfactory and the "refutation" of it (v.p. 6) is actually fallacious. It would not be disputed that the assumptions that seem to be made in the *Theaetetus* are out of keeping with the portrayal in other dialogues of the nature of reality, the nature of the knowledge that may be gained of that reality, and the nature of the mind that can acquire that knowledge. When it is pointed out that some of these Un-Platonic assumptions lead to contradictions and lack of clarity, rather than the opposite, even "within the ontological frontiers of the empirical world" (Runciman p. 38), commentators like Robinson and Runciman seem to put the blame on the very incomplete awareness Plato is said to have had of the nature of propositional knowledge.

Needless to say, on this interpretation, another kind of distinction Plato had been most insistent about, that between "knowledge" in the full sense and mere "opinion",

the former associated with “Forms”, that latter with the sensible world, he had by now come to abandon.

Section 4

Psychological Memory - Models - I

If Plato in his later period, at the time he wrote the *Theaetetus*, became reconciled to Empiricism, it is not surprising that he should have fathered what Richard Robinson called the “great empiricist image”; and a minor oddity I commented on is explained. The linkage through Aristotle and the Stoics to Locke and modern psychology seems straightforward: one can readily understand both the fondness of Psychology texts for the wax-tablet and its occasional ascription to Aristotle.

However, after recalling the major features of the development of research and theory in Psychology from the turn of this century one would probably conclude that although one aspect of the metaphor, one not stressed by Plato, the initial blankness of the tablet, aptly represents the anti-nativist ethos of the pre-Chomsky era, there is rather less correspondence between the nature of the impressions as described by Plato — static, semi-permanent, spatially-located etc. — and the way memory processes have often been described by psychologists. Yet there appear to be sufficiently striking affinities for the writers of a recent historical review, Marshall and Fryer, to enthuse, “The stature of Plato’s work (i.e. the tablet) is amply attested by its power to have sustained empirical research for two millenia” (p 21) and “experimental research, both psychological and physiological, in the nineteenth and twentieth centuries has been primarily devoted to working out and quantifying the empirical consequences of a small number of metaphors that were formulated at the birth of formal psychology” (p 20). While I do not think their enthusiasm is really justified by their own arguments, some of their points are quite telling and others capable of becoming so after more consideration of the context.

As one might expect, Marshall and Fryer mention Ebbinghaus at an early stage, noting his professed aversion to various popular metaphors, including “engraved images”... “there is only one thing certain about these figures of speech and that is they are not suitable”. This is contrasted neatly with what he himself wrote about relearning. “The series are more deeply *engraved* and fade out less easily”. It is argued that Ebbinghaus main legacy was his development of techniques and quantitative methods, “in terms of conceptual advance he took not a step beyond the Platonic tablet” (p 8).

The leads given by Ebbinghaus to memory research may be followed into the classic conflict between trace-decay and interference as causes of forgetting. The evidence has frequently been reviewed (e.g. Reynolds and Flagg, Lindsay and Norman) and the parallels which may be drawn, though not capable of being developed very far, are quite evident. A resolution of the conflict noted in the reviews, that a combination of both processes accounts for the experimental data very neatly, is also a feature of the *Theaetetus* account (195 a) “impressions in soft wax quickly get blurred, *but if in addition* they are jumbled on top of one another, because of lack of capacity, they become even more fuzzy”.

Marshall and Fryer pass from Ebbinghaus to Bartlett without noting a historical

consideration which militates against the development of some of the parallels which might be drawn. This is that most of the work on memory has been done in the U.S.A. and, because of the philosophical climate prevailing there early this century, the emphasis on structure in the Psychology newly imported from Germany quickly gave way to an emphasis on function. Questions related to representation and storage became openly disavowed, as for example by Watson, or treated too dismissively to permit a rewarding analysis of structural features in much of the theorising of this period.

A treatment not open to this objection, of course, is the Gestalt account of memory. It may seem perverse to link this with an interpretation of the wax tablet that I've called empiricist; but as previously remarked it is not the anti-nativist aspect which is the immediate concern. Moreover to some of the theorists to be considered later, Gestalt theory is in important respects as associationistic as what it professedly opposed (Weimer 1973 p. 18) and quite as sensationalistic in relation to memory. (Anderson and Bower pp 46-57) Their acceptance of nativism and distrust of reductivism in no way inhibited the Gestalt psychologists from positing the closest relationship between perceptual input and form of storage. In accordance with their central, though rather woolly, construct of "isomorphism" they assumed the existence of a "trace" which resembles Plato's description not only in being a copy of the percept but in being physically "stamped" in the cerebral wax - "Neural events tend to modify slightly the state of the tissue in which they occur. Such changes will resemble those processes by which they have been produced". (Köhler 1938, cited in Anderson and Bower p. 50).

Perhaps in an effort to stress what to them was an important divergence from accepted Associationism, Köhler and his colleagues maintained that the problem of the *contact* between perceptual experience and memory trace, which had long ago been noted as an inadequacy of Associationism by Harold Hoffding (Neisser p. 50, Weimer, 1973, p. 24) could successfully be accommodated by their formulation. To show the way they elaborated the hypothesis of template-matching, which, as Neisser notes, they "rejected in its simple form but never gave up the notion altogether". What Plato says about the recognition process in the wax-tablet passage, particularly the subsidiary metaphors involving shoes and footprints, could hardly fail to be recalled to anyone familiar with it by the perusal of any modern account of template-matching (e.g. Neisser Ch. 3, Reynolds and Flagg pp 60 ff, Lindsay and Norman pp 5 ff).

The inadequacies of the template-matching hypothesis are, of course, very well recognised, and Marshall and Fryer (p 4) seem disappointed that Plato didn't refine his early version. The possibility that it was the inadequacies that Plato was chiefly concerned to point out will be considered in my next section.

Equally the province of a later section it is a consideration of the memory model of Anderson and Bower; but this seems the natural place to remark on some concessions made by these authors to the perceptual or sensationalistic aspects of memory that Plato's Wax tablet, on the first interpretation, throws into prominence. As will be clear from the references in section 1 Anderson and Bower display a strong historical awareness and their orientation is decidedly Aristotelian. The follow Aristotle in believ-

ing that the input to memory is mainly perceptual (pp 16, 154) and that language, so much later both developmentally and phylogenetically, attaches itself to this. Sentences such as their faintly exotic stock example “In the park the hippie touched the debutante” is stored in image form. They see a necessary part in memory theories for “traces”, though not necessarily the same sort that Lashley unsuccessfully sought for 30 years. They cite with evident approval examples noted by the Gestaltist Asch of how abstract terms derive, after a period of metaphor status, from a perceptual base. They quote a notable passage from Whorf “I *grasp* the *thread* of another’s argument, but if the *level* is over my head my attention may *wander* etc... (p 155). To follow up these “concessions” would involve a dislocation of the most convenient sequence, particularly as Anderson and Bower modestly admit, “of course, these sensationalistic claims for our memory structure currently have the status of pure dogma – or, less pejoratively, a promissory note to be cashed in the future” (p 155). However, they point to a theoretical development in the shape of recent work on imagery which will occupy the final part of this section.

The subject of imagery is rather resistant to being slotted into a particular context, as I have admitted I am going to do, since, as the previous paragraph suggests, it is associated with quite diverse positions in psychology (NOTE 6). It seems justifiable, however, to suggest a few of its features may be seen as modern correlatives of an ancient model of memory.

Imagery is generally not a theory about what memory is or does, but rather a matter of emphasis within theories. In a recent article rebutting criticisms of the concept, and the woolliness of it in particular, Kosslyn and Pomerantz give a characterisation which is quite reminiscent of the wax tablet... “an image is a spatial representation like that underlying the experience of seeing an object during visual perception... images, once formed, are wholes that may be compared with to percepts in a template-like manner”. (pp 65, 66)

Experimental evidence reviewed in this article and reported in Kosslyn (1975), together with a large volume of work stemming from Paivio and his collaborators, while not purporting to settle the claims of imagery vis-à-vis “network” theories, certainly present it as a principal means of storage. Whether it is to be taken as complementing or actually underlying other kinds of representation there is no doubt about the interest and partisanship this topic has aroused and continues to generate. The spatial variables explored in imagery seem particularly difficult to explain in other ways. (Paivio 1975, Kosslyn 1977) and the way generic concepts may reduce to “prototypes” (Lindsay and Norman) is quite a striking argument which seems to accord well with common experience.

At the beginning of this section a highly favourable assessment of the wax-tablet presentation was noted with some reservation. This view of Marshall and Fryer, however, is supported to a degree by the sample of assorted psychological endeavours I’ve introduced. There can be no doubt that hundreds of thousands of hours have been spent in psychological investigations which may have elaborated or given empirical support to Plato’s metaphor without going beyond it conceptually. However, there are two reasons, at first sight separate but quite possibly related which make it premature to

rush into an endorsement of the “it just goes to show how bright Plato was” variety of attitude. First, this attitude is not really justified by what I think ought to be adopted as a test of significance in investigating these ancient-modern correspondences, that is that resemblances in form need to be supported by the form of the argument underlying them. Secondly, the alternatives to the positions within psychology glanced at here need to be given consideration also. What I take to be the important ones go very far beyond *the author* of the wax-tablet will be the subject of the next two sections.

Section 5

The Platonist Interpretation of the Theaetetus

What I have called the Platonist interpretation of the Theaetetus is a direct contradiction of the “empiricist” interpretation. It asserts that far from changing his mind, what Plato wanted to convey by the twists and turns of this dialogue was completely in keeping with the convictions which he was working towards in his early dialogues and which are most familiarly presented in the dialogues of his “middle” period. These convictions, of course, amount to the theory of “Forms” for our purposes a near synonym of Platonism since it comprised all that was most distinctive about Plato. The metaphysical content is hardly our concern here but some of the ways in which Plato develops and illustrates this theory, or series of theories, can be legitimately be considered as bound up with cognitive problems, not just ontological or epistemic ones. (NOTE 7).

In the Theaetetus there is no direct mention of the “Forms”. This omission is a *prima facie* support for the empiricist interpretation of Section 3. The Platonist, however, would want to stress that none of the attempts to define knowledge achieve anything precisely to demonstrate just how essential to understanding knowledge Plato considered his theory to be. One of the best known statements of this argument is that of Cornford in his classic translation and commentary, e.g. (p. 28) “The dialogue is concerned only with the lower kinds of cognition, our awareness of the sense-world and judgments involving the perception of sensible objects... the purpose... is to examine and reject this claim of the sense-world to furnish anything that Plato will call “knowledge”. The forms are excluded in order that we may see how we can get on without them; and the negative conclusion means... without them there is no knowledge at all.”. Cornford wrote in 1953, and the empiricist interpretation, having the authority of the positivistic style of philosophy of the succeeding decades, has perhaps made him seem more anachronistic than he deserves. For my purpose a more suggestive illustration of the “Platonist” view of the *Theaetetus* is provided by Addo, who takes much more pains with the wax-tablet passage than Cornford did, and has the advantage of being able to take account of all Cornford’s critics up to the end of the nineteen-sixties. Here and in the notes I will present his arguments, which are very closely reasoned and derive their support very largely from the internal evidence of the *Theaetetus*.

Addo goes further than Cornford in his claim that the *Theaetetus* is not merely aporetic but amounts to a *reductio ad absurdum*. In this *reductio* the wax tablet has quite a prominent part. It does not present any argument, nor is it introduced merely to support an argument, but is rather a supposition entailed by an argument, and that a

previously refuted one. It functions as a deliberate and palpable non-explanation. Ostensibly it shows how the “alloodoxy” theory might be made more plausible by taking account of learning (v. NOTES 2 and 3); but, as previously suggested, it not only does this in a somewhat implausible way, it is also part of an enterprise of studied implausibility in that the “alloodoxy” theory itself is presented as a logical consequence of a more general theory *refuted* earlier in the dialogue. The “empiricist” interpreter is inclined to explain this oddity by maintaining that despite the apparent “refutation” Plato was aware of various compelling features of the more general theory which he thought deserved more attention. Addo takes the “refutation” as exactly that. In an analysis which is more detailed than any other I have read he insists that all the time Theaetetus is grasping at suggestions with great confidence, then rapidly floundering, Socrates is being heavily ironic (NOTE 8). In this work of demolition, following a pattern quite typical of Plato’s portrayal of him, Socrates makes two points, or two series of statements, which Addo takes to be quite pivotal, standing out from the satire and banter and fully serious interpolations expressing Plato’s true beliefs.

The first comes at 189e just before the wax-tablet is introduced at 190. The single reference made to the wax-tablet by Brett (v. above p.) connects them closely, though without saying why. Addo, in the twenty pages he devotes to the wax-tablet refers to it no less than four times (pp 250, 257, 264, 266).

189 e 4 ΣΩ. Τὸ δὲ διανοεῖσθαι ἄρ’ ὅπερ ἐγὼ καλεῖς; ΘΕΑΙ Τὶ καλῶν; ΣΩ λόγον ὃν αὐτὴ πρὸς αὐτὴν ἢ ψυχὴ διεξέρχεται περὶ ὧν ἂν σκοπῆ οὐκ ἄλλο τι ἢ διαλέγεσθαι, αὐτὴ ἑαυτὴν ἐρωτῶσα καὶ ἀποκρινομένη, καὶ φάσκουσα καὶ οὐ φάσκουσα.

189 e 4 Soc. Is your definition of thinking the same as mine? The. What is your definition? Soc. It’s the discussion that the mind carries on with itself about something - the subject can be anything at all... It’s nothing more or less than a conversation with the mind asking itself questions and answering them, stating and contradicting.

After all that Plato claimed for the merits of dialectic, and his constant practice of expressing his philosophy in dialogue form, it seems inconceivable that he should try to explain error, and by implication correct judgment also, in a way that totally subordinates linguistic factors to perceptual ones. As Addo points out (p. 230) “the prerequisite for having a competent internal λόγος as in the case of dialectic, is to know what each term means – otherwise one may easily describe things as other than they are – and this is precisely how false judgments arise”. And later (p. 257) The waxen block simile does not explain anything about the process of forming judgments about our sensations for it takes no account whatever of the terms employed in forming a judgment – terms which at the end of his refutation of the thesis that αἴσθησις is knowledge, Socrates clearly distinguishes from αἴσθησις itself. On the waxen block explanation of knowledge, we only have to have a vivid impression of something we have sensed or thought to possess knowledge; whereas Socrates has already explained.. (189ε etc.).

The psychological correlates of this will be considered in the next section but could

be left to speak for themselves.

The second “serious aside” is the insistence on being clear about what knowledge is. I have already mentioned the way this is re-iterated (p. 5) in between the abandonment of the wax-tablet and the consideration of the succeeding model of the “aviary”.

After the conclusion of the aviary passage, when Theaetetus has admitted that this model cannot answer the main problems either, Socrates returns to the point in a way that Addo claims is an indication of the main purpose of the whole dialogue, and might strike anyone as intended to make a telling point.

Speaking at 200 c/d Socrates says –

Ἄρ' οὖν ἡμῖν, ὦ παῖ, καλῶς ὁ λόγος ἐπιπλήττει καὶ ἐνδείκνυται ὅτι οὐκ ὀρθῶς ψευδῆ δόξαν προτέραν ζητοῦμεν ἐπιστήμης, ἐκείνην ἀφέντες; τὸ δ' ἐστὶν ἀδύνατον γνῶναι πρὶν ἂν τις ἐπιστήμην ἰκανῶς λάβῃ τί ποτ' ἐστίν.

“Where we, went off course was in giving priority to our inquiry into errors of judgment and leaving knowledge out of the picture. Until we get a proper grasp of the meaning of “knowledge” we won’t be able to make sense of the problem to error.

Taken together, and in conjunction with all the difficulties poor Theaetetus encounters in the intervening pages, these two interpolations, it is felt, emphasise that the sensationalistic premisses underlying the discussion are fundamentally unsound.

Section 6

Psychological Memory Models - II

The kinds of psychological developments now to be considered may readily be guessed from the drift of the previous section. If it is true that Plato deliberately intended to explain by his wax-tablet only a fraction (Cornford) or nothing at all (XZAddo) of what he thinks ought to be explained, then the focus must shift to the psychological formulations that can be linked with the statements at the beginning and end of the “allodoxy” section in the *Theaetetus*, where Plato provides pointers to the underlying purpose of the aporetic discussion.

The claim that Plato at this time was well aware of the nature of propositional knowledge (which claim, because of its controversial nature, has perhaps been accorded an intrusive amount of consideration in NOTE 8) and wanted to highlight some consequences of his analysis, may first be matched with the proposal of psychological models variously called “semantic” “propositional”, and “network” (e.g. Reynolds & Flagg pp 183 ff, Lindsay and Norman Ch. 10). Although, as has been seen in the case of Anderson and Bower, their proponents are not necessarily inclined to depreciate perceptually-based representation, these models are commonly much more ambitious and held to be correspondingly more powerful in characterising all kinds of knowledge and its retrieval and use. Some follow the pattern of formal logic in concerning themselves mainly with sets of classes, properties and instances, and the categories of inclusion and exclusion – “The basic assumption... is that information in memory is coded as belonging to various sets and that these sets overlap”. (Reynolds & Flagg p. 186) At the time of proposing their own model Anderson and Bower claimed that «most models of semantic memory

are really systems of rules aimed at divining.. the memory structures that underlie our universal concepts". (p. 191) As is well known their own proposal, HAM, was something much less inert, which, by representing various entities in "nodes" and relations in "associations", suggests how a computer simulation might be made of any item of knowledge anyone might possess, not just of "things" but of the flux of events in the world. Models of this kind have proliferated and diversified; but it is not necessary to attempt a classification of them to show how much more suitable they are for addressing what Addo had in mind (v. above, p.) when he stated the real reason for arriving at wrong opinions, the advertised problem of the discussion, which cannot possibly be explained by any perceptually-based process like fitting mental feet into mental footprints. One might also ponder the necessity of postulating this kind of psychological model in connection with some of the other human capabilities introduced in an earlier part of the *Theaetetus* (178 C ff) such as a doctor's being able to predict whether his patient will have a fever, or a philosopher's acumen in assessing the validity of arguments. One of the most frequently cited supports for the importance of linguistic elements in thought is the capability of representing the "merely possible" as well as the "actual". If the storage-system that makes this kind of operation possible is not linguistic it is at least necessary to suppose it symbolic in some sense rather than merely perceptual. Altogether, HAM and other models of recent years entail a representation of knowledge, strikingly similar to what is entailed, on the "Platonist" interpretation, by the manifest inadequacies of the wax-tablet. Lindsay and Norman (p. 385), with the LNR model chiefly in mind, remark, "knowledge contained within human memory forms an interrelated web of concepts and actions. Knowledge of one topic is related to knowledge of others. The human memory system makes possible the tracing of the relationships among the knowledge within the data base".

Now while it is highly creditable to Plato to suppose that he could, if resurrected, instantly discern and confirm from his own writings the virtues of the psychological formulations so far outlined, the area that is potentially the most interesting of all remains to be considered. According to the "Platonist" interpretation the last word on the subject of the wax-tablet went beyond propositional knowledge, which, however greatly its incorporation might improve a sensationalistic account of memory, was still "opinion" rather than what Plato always considered full "knowledge". To Plato this full "knowledge" ἐπιστήμη went beyond what could be expressed in language as well as beyond what could be apprehended by the senses. It was a matter of having some acquaintance with the "Forms". As has been stressed previously the "Forms" are the true (though concealed) subject of the *Theaetetus* to commentators like Conford and Addo and the injunction to be clear about the nature of this. It declares that remembering cannot be divorced from the totality of comprehending, of discerning the essential meaning of things. To conclude this section a brief presentation will be made of some recent developments in cognitive psychology which, far more explicitly than semantic memory models, seem to be making the same point.

The work in question is that associated with Bransford, McCarrell and Franks, who with various colleagues are known as the BMF group. Weimer, whose Platonist inclinations have already been remarked on (v. above Note 7) is closely linked with this

group although without, as far as I know, going into the question of memory in any depth on his own account. My main sources have been Weimer and Palermo, and Shaw and Bransford. Though quite prolific in publishing articles, and provocative to the point of iconoclasm, the BMF group is not all well represented in the texts I have consulted for the contributions of the theorists introduced so far.

Collectively and individually the BMF psychologists insist that the question of meaning, the "click" of comprehension, is cognitive psychology's main problem. They do not claim to have progressed very far in solving it? but lay enormous stress on the necessity of recognising it and at least derive some satisfaction from the new directions it indicates for theory and empirical work. They see themselves in the "constructivist" tradition of Bartlett and Neisser, which, though so influential, had by their standards not been followed through authentically by most other professedly "cognitive" psychologists. The question of *meaning*, for instance, they complain is completely ignored by theorists like Anderson and Bower (Shaw and Bransford p. 440). Not only semantic memory-models but most of what passes for Semantics itself is dodging this issue (Franks, in Weimer and Palermo pp. 245-249) No linguistic account, can be adequate; words don't "carry" meaning but merely "trigger" meanings already there in the user's head. The dictionary - plus - rules explanation often given is no explanation, "There are no meanings in dictionaries, only alternative verbalisations. Dictionaries embody paraphrase relationships, but meaning, which is what makes paraphrase a matter of paraphrastics, is already in the head that uses a dictionary". (Weimer and Palermo p. 424). Since there are features of common experience noted by James and others (Brewer p. 268) that apparently have a non-linguistic and non-perceptual base, the question of what other sort of base there must be needs to be asked. The well known difficulties of explaining how we cope with novelty (Shaw and Bransford p. 435) and the partial novelty involved in pattern - recognition (Weimer, 1977, pp 427-8, Franks p 241) are taken as additional evidence for the necessity of conceptual re-jigging.

Members of this group have argued that a necessary preliminary to greater success, or at any rate less dismal failure, with these massive problems is to incorporate a psychologised version of Polanyi's conception of tacit knowledge (Turvey p. 172 ff. Weimer, 1976, p. 12ff) to which is assimilated the very widely known "Deep structure" of Chomsky, and the lesser known "primacy of the abstract" of Hayek (Weimer 1973). The emphasis laid on the global nature of learning and comprehending goes well beyond Chomsky but though their proposed 'contextualism' may sound speculative and mentalistic it can be given substance both from the psychological laboratory and the discipline of linguistics. More important, perhaps it is claimed to be heuristic in respect to both (Weimer and Palermo, Ch. 8, 10, 11, instance empirical and theoretical support).

One of the results of the difficulty of dealing with notions of storage of abstractions, a difficulty which other theorists who have much in common with BMF apparently find manageable (e.g. Pylyshyn) had been the group's preference for abandoning the storage metaphor in favour of a Bartlett / Neisser / Gibson conception of 'attunement'. (Shaw and Bransford Ch. 16). Tacit knowledge is not accessible to introspection at all and not readily to any other kind of investigation. The focus accordingly shifts to the

process of how intuitions, images, overt acts, and speech are generated from the knowledge-system. "One may begin with a vague feeling of knowing that some argument is erroneous or that he or she had some potentially fruitful idea. Only gradually does this abstract framework become articulated and focussed. Finally it may reach a level sufficient for specifying particular, concrete ideas about what should be done" (Shaw and Bransford p. 449). This does not accord very well with any version of the storage metaphor but it is very like what Barthelet invited psychologists to take seriously in 1932. His arguments and illustrations, such as his showing the impossibility of the suggestion that we learn tennis mastery by storing specific memories of positions and velocities etc., are cited with great approval. A very simple, but quite cogent illustration of the same principle is provided by Shaw and Bransford, (p. 431), who imagine the response to the smoothness of a car's ride by a person who has previously only driven trucks. Is it to be supposed he has stored traces of individual bumps and jolts? Treating tacit knowledge as a set of stored things that can be inspected is suggested by Franks (p. 231) to be even more implausible in relation to more complicated matters like language acquisition "In just a few years" children develop "...an adequate theory of meaning and knowledge - adequate in that the child can use language and interact with the environment effectively... How do the child's acquisition processes differ from the theorist's? If they were the same "we could have formulated a theory of knowledge and meaning in a few years, just as the child does.

The abstractness and inaccessibility of what makes possible the grasping of items of knowledge is very much the meaning of the manifest and emphasised deficiencies of the wax-tablet on the "Platonist" interpretation. Knowledge is not a succession of specific items, according to this view, that can be passed over from person to person or identified with traces of sensory experience. In a way that cannot be developed here it is dependent on the "Forms". As Addo says (p. 84) in a phrasing closely similar to what Weimer (above p.) employed about "dictionaries", "knowledge that... must involve acquaintance with forms. A proposition does not itself constitute knowledge, it expresses knowledge only in relation to one who understands it.

A related point which is also productive of striking parallels is the integrated and holistic nature of the knowledge which is seen by Platonist commentators as underlying the aporetic conclusion of the wax-tablet and other passages in the *Theaetetus*. To quote Weimer and Palermo again, "just as it was once a telling argument to point out that people speak sentences only mean what they do in fact mean because they are embedded in the complex web of cognitive relations that constitute human knowledge and understanding". (p. 422) This kind of emphasis is very evident, and instances in the chapter by Franks in particular could hardly fail to detain the Platonist. Some of the discussion here and elsewhere might even more strikingly be linked to a later long section in the *Theaetetus* where Plato explicitly addresses the wholism - atomism issue (201c - 206) but are almost equally relevant to the wax-tablet. The statement (Franks p. 44) "tacit wholes determine experiential pieces; the pieces do not determine the wholes" is precisely the way acquaintance with Forms is portrayed in relation to knowledge of specific instances throughout the dialogues that deal with them. The reception of sensory impressions from the environment is something man shares with

the animals; but fitting them into a framework of reality, of investing them with meaning, is achieved, if at all, only after a slow and painful process of education (*Theaetetus* 186c). Education, it is almost unnecessary to add, was never seen by Plato as the handing over of pieces of information; the metaphor of "attunement" borrowed and developed in Franks' chapter comes much nearer to what Plato considered its essence to be. The *Theaetetus*, if it really is about meaning-in-its-entirety, approaches the issue negatively; it says what true knowledge is not. In general his approaches to this problem of problems are negative or allegorical; they are not explicit in a doctrinal sense. The particular negative approach of the wax-tablet may well be saying, in the pictorial and allegorical language of Plato, just what Franks and his colleagues maintain are the psychological *impasses* that necessitate their fresh approach, "perceptions are wholistic... perceptual knowledge structures must be wholistic to generate such wholistic derivations... since we are not directly aware of these tacit structures we are... led into appealing only to aspects of surface structure derivations (Franks p. 242, 3) "We cannot consciously think in terms of wholistic generative relations" (p. 244) but to solve these problems we just have to learn to think in a new way, a wholistic, non-discrete, "analog" kind of way. Perhaps, one might add, a Platonic way.

Section 7

Conclusion

One conclusion which seems to be strongly supported by the foregoing has already stated: that after the terminological screens have been penetrated the conceptual content of modern memory theory would be readily comprehensible to a resurrected Plato. As far as this area of psychology is concerned his position would be different in kind, not just in degree, from, say, Galen's *vis-à-vis* modern Medicine or that of any Greek cosmologist in relation to twentieth-century astronomy. It could plausibly be maintained that the divisions between present-day theorists about the what, how, and whether of storage, would, on the second interpretation presented here, not only be immediately understandable to Plato, but would afford him considerable amusement.

A further and more significant conclusion is suggested by the work reviewed, unfortunately in an over-condensed form, at the end of the last section. It is tentative, and very much more extended and searching comparisons would be needed before it could be presented confidently. This is that the correspondences noted here can largely be accounted for by constraints applying both to Cognitive Psychology and to the tasks Plato set himself, constraints which, it can be argued, Plato was aware of and which, in Cognitive Psychology, is associated with the mind's apparent capacity to model any process except its own activity. No account of memory processes alone, however, could credibly take this further.

CHAPTER NOTES

1. The picture is even more confusing than it first seems. Boring traces the image back no further than the Stoics and Warren's dictionary more pointedly distinguishes the 'tabula rasa', which he ascribes to Chrysippus, from the wax tablet of Plato. It

seems odd that he cites no authority for this since as far as I know classical scholarship is decidedly against him, e.g. “the whole of the traditional language about ‘impressions’ and ‘ideas’ is ultimately derived from this passage (in *Theaetetus*) (Taylor p. 341) (the *Theaetetus*) contains the first, or first surviving statement of the great empiricist comparison of the mind to a waxen tablet. (Robinson p. 42) Plato does not actually say the tablet is unmarked at birth but implies it, and actually is quite explicit on this point in the description of the wax-tablet’s companion-piece in the *Theaetetus*, the Aviary model, which is “empty at birth”. In this he may be going further than Aristotle himself, who, though generally credited with believing “nothing exists in the mind that wasn’t in the senses first”, never actually wrote this and may well never have believed it. (“Empiricism” in *Dictionary of Philosophy*).

One of the reasons for the confusion may be the suggestion at one point in the stoic period that the wax-tablet be understood as a medium for writing, rather than for receiving “impressions”. There is very good reason, as I’ve tried to show, for supposing this is very definitely not what *Plato* intended.

2. This is part of the extreme-relativism position of Protagoras and his followers on which Socrates spends a great deal of time in the first part of the *Theaetetus*. Though in a sense logically impregnable Socrates and *Theaetetus* are agreed that Socrates has refuted it at the end of the first section (186e) The section in which the wax-tablet occurs, dealing with incorrect judgment as ‘interchanges’ of true ones (the ‘allodoxy’ theory) has been understood as a separate line of argument since the *advertised* subject of the second section of the dialogue is the claim of correct opinion to equal knowledge. This is the view associated with the first interpretation I have summarised, and represents Plato as very puzzled about the whole thing. The second interpretation is linked with the view that despite their agreement of taking a new subject to examine, Socrates is really taking *Theaetetus* back to what the latter thought they had just finished with, with quit good reason! The importance of these technicalities is of course that if Plato is using the illustration of the wax-tablet to prop up an explanation which in turn is developed to prop up a theory which he only wants to discredit, its inadequacies will be more revealing than its virtues.

3. One inadequacy is the psychological implausibility of this very account of learning. The rigid distinction between knowing and not knowing is in no way relaxed by the introduction of the capacity to learn, since all learning is made to do here is to transfer things to the totally-known from the totally-unknown category. The portrayal of this transfer as immediate is the cause of all the trouble; the slightest notice of an intermediate state would be enough to take care of the difficulty that leads *Theaetetus* to agree to scrap the model!

4. This, and the distinction made here between the capacity for quick learning and for long retention, are picked out for special approval by Morris and Fryer (p. 8). These observations do not seem to me to deserve any special notice for what they tell us about Plato’s acumen; rather they appear to be the kind of commonplace remark that any parent or teacher might make.

5. The distinction corresponding to the modern one between STM and LTM is more interesting than the subject of the previous note but the Aviary model will not be considered further here. In general, the two interpretations contrasted here deal with the Aviary in a way that corresponds quite closely to their polarised treatments of the wax-tablet.

6. Recent popularisation of the topic by Paivio and others is often seen as a challenge to over-rigid methodological prescriptions in behaviourism, and properly 'cognitive'. Yet some theorists of the position considered in section 6 see Paivio's approach as almost retrogressive. Weimer (1977 p. 271), for example, asks "What principled distinctions remain, when a behaviourist such as Paivio can call himself a cognitive psychologist simply for studying images?"

In the same paragraph Weimer notes "both behaviourism and cognitive psychology do and do not utilise storage concepts to account for memory". On the other hand imagery can be seen as itself a product of constructive processes, owing little or nothing to 'storage' (Franks 1974).

7. A notable illustration of this claim may be found in Weimer (1973), where one of the most unlikely candidates for psychological scrutiny, Plato's idea of recollection (from our former existences or even a disembodied state!), is considered in relation to Chomsky and Hayek, then presented in a highly credible evolutionary version which may account for some highly intractable problems in cognitive psychology. (Although this particular aspect is of marginal relevance here there will be some further references to Weimer in connection with more general aspects of ancient-modern correspondences in treatments of cognition). As far as I know, historians of psychology as well as experimental psychologists have never given much attention to Plato's "Forms". Philosophers on the other hand, apart from a few decades of comparative neglect, have devoted great effort and ingenuity to explaining, elaborating, pointing out and offering to resolve inconsistencies, disputing about whether Plato proposed one theory of forms or several, and generally maintaining the traditions of Plato's own Academy. The interpretation of the wax-tablet considered in section 5 does not depend upon any particular interpretation of the theory of "Forms" itself. Consequently, for the purpose of setting out the non-psychological background to the cognitive issues considered here, a rough sketch should be acceptable.

Plato's 'Forms' are something like a psychologist's 'concepts' but with a life of their own. Instead of being assumed to exist only in the mind, abstracted from instances in the outside world, they have a reality-status far above that of events in space-time. Plato did not say, as is sometimes supposed, that the 'ordinary world' we are aware of is unreal, rather that it is not fully real. Its contents accessible to us through the senses, stand to the world of 'forms' rather like a shadow does to an object: the object in a sense causes the shadow; the shadows doesn't in any sense cause the object. The objects and events of spatial and temporal existence are said to 'participate in' the full reality of the non-spatial, non temporal forms, or to represent it in the way an actor might give an audible and visible representation of a role as conceived by a playwright. It is not disputed by Platonists that Plato never found it possible to find a form of words

which encapsulated what he meant by 'Forms'; rather it would be maintained that he had so little confidence in the efficacy of any verbal formulation that he consciously varied his language and choice of metaphor to prevent his students from developing a technical vocabulary.

This ontology is closely linked with Plato's epistemology: corresponding to this full reality there is a state of full 'knowledge', to half-reality the interior state of 'opinion' or judgment. The relation of these is further developed and to some extent given a psychological dimension, particularly in Books 5-7 of the *Republic*.

It is the question of whether 'forms' are to be considered as dispensable or indispensable that marks the main division between interpretations of the *Theaetetus* and other late dialogues. Even in the latter case of an interpretation which holds the whole dialogue is an ironic and indirect justification of 'forms', since only a limited series of consequences are being considered, my attempt at a characterisation of the theory, brief and rough-hewn as it is, should suffice for the non-psychological fabric which provides the background for the cognitive matters which are the main concern.

8. Since I do not know a published source to which I can refer for illustration of a treatment of the wax-tablet so radical as Addo's, and especially since this interpretation, exceeding even Cornford's in its unremitting fidelity to the Plato of the 'forms', is peculiarly appropriate for my purposes, it seems only fair to summarise the reasons for the claim that the whole of the wax-tablet passage is merely ironic.

A major reason is psychologically relevant insofar as it relates to the first of the Socratic asides (v. p. above) which Section 6 attempts to link with certain recent psychological treatments of memory. However, its main impact is philosophical; and it seems better to deal with all the reasons together in a note than to include in Section 5 more than can be presented in a psychological light in Section 6.

Addo considers there are strong stylistic grounds for suspecting that Plato meant none of the wax-tablet to be taken as a serious explanation. He sees the choice of expression and adoption of a repetitive and laboured manner as indicating an attitude of studied frivolity. Even in translation the enumeration of the causes of error, the detail of the imperfections that commonly occur in wax manufacture, the profusion of subsidiary metaphors — footprints, mirrors, archers, shoe-fitting — appear gratuitous and *outré*.

This impression might well be strengthened on further examination, for instance reflections in mirrors had previously been used by Plato to illustrate deceptiveness of appearances* and the fitting of a foot into a footprint would, to a contemporary Greek, call to mind an incident in a very well known tragedy which would be more likely to generate confusion than clarity about the process this simile is brought in to illustrate. (v. Aeschylus: *Choephoroi* 197 ff). An untranslatable but infantile pun, and the expression "hairy soul", both referred to Homer, also suggest ridicule more than serious philosophical endeavour.

* Whereas 'alldoxy' theory amounts to confusion of the realities, *this* is a favourite Platonic method of showing confusion between reality and unreality!

Oddities such as these, Addo argues, are not easy to explain on the 'empiricist' interpretation, but fit in very naturally with some deliberately contradictory elements in the passage. By saying we 'know' whatever is imprinted on the wax tablet Plato seems to be stacking the decks against the model and the 'alldoxy' theory with which it is associated, since, as is later admitted, some of the impressions must be false. Moreover, at the beginning it is casually mentioned that some impressions may not be sensory ones, but after this there is nothing at all to prepare the reader for the arithmetical discussion at the end, where it is made clear that the wax-tablet has in fact nothing to say about how errors occur in abstract thought. The basic assumption, the consequences of which are suggested in NOTE 3, that we can make in all cases a neat and clear distinction between things we know and things we don't know, is not only un-Platonic in a way the empiricist might account for as a change of mind, but is insisted on perversely while the contradictions accumulate!

It is altogether a very appealing feature of Addo that he is able to go through the Greek text phrase by phrase with such relentless assiduity and reach the conclusion that most other scholars have misunderstood it through lack of a sense of humour! A still stronger line of argument, however, and one that actually has psychological relevance, is his attempt to remove a main plank of the 'empiricist' interpretation. This is the contention, expressed probably in its most familiar form by Robinson, that the ways in which the wax-tablet seems to fail are due not to a ironic sense of humour on Plato's part but to his confusing what is now, after Russell, called knowledge by acquaintance and knowledge by description. If Plato had worked out a propositional account of knowledge, there would be, according to Robinson, no problem, but he got into difficulties because he did not realise that thought is 'symbolic' rather than "prehensile" i.e. he was prone to carry over the absurdity of saying "I grasped the apple, but it wasn't there" into the inappropriate area of statements like "I saw Theaetetus, but he wasn't there". Similarly Plato confused the act of getting a wrong answer in mental arithmetic with the act of actually saying and believing "XI is 12" Addo is quite certain that Plato, even if he didn't supply a formulation of the distinction, was perfectly clear about knowledge by acquaintance and knowledge by description. He deliberately 'confuses' the two as part of the *reductio ad absurdum* of Protagoreanism and the rigid knowing - not - knowing dichotomy. The reminder to Theaetetus that in the activity of thinking, the mind talking to itself, there is a process of "*affirming and denying*" is a definite indication of the point. Previously at 178 a-c in the first set of arguments against the Protagorean equation of opinions based on present perception about what may happen in the future; this, such as the doctor's prognosis of a suspected fever, the chef's prediction about a meal not yet prepared, the vine-grower's assessment of a future vintage, are marshalled against the sensationalistic premise and would be unintelligible if knowledge by acquaintance was thought to be the only kind of knowledge.

Further evidence is provided in the section in which the wax-tablet occurs by what a deliberate choice of vocabulary and syntactical construction to point to a distinction between the two kinds of knowledge. Finally, it may be remarked that Addo also satisfied himself, after an examination (pp 236-243) which is far from superficial, that

two earlier dialogues, the *Euthydemus* and the *Cratylus* also attest to Plato's being fully aware of the absurdities that may follow from not taking account of the nature of propositional knowledge. Support for the claim advanced by Addo may well have become more general since he wrote (Matthews pp 20-23). If what he says about Plato's recognition of a distinction usually associated with Russell is true, it is almost impossible to understand the wax-tablet as anything but a step in a *reductio ad absurdum*.

ΠΕΡΙΛΗΨΙΣ

Ἐνταῦθα ἐξετάζονται αἱ εἰς τὸν Θεαιτήτον τοῦ Πλάτωνος προσαγόμεναι ὑπὸ τοῦ Σωκράτους δύο μεταφορικαὶ ἐρμηνεῖαι, αἱ ὁποῖαι βεβαίως εἶναι ἀντίθετοι πρὸς τὴν Πλατωνικὴν περὶ γνώσεως ἀντίληψιν· αὗται ἐνῶ κατ' ἀρχὰς ἔγιναν δεκταὶ ἐνθουσιωδῶς ὑπὸ τοῦ Θεαιτήτου, κατὰ τὴν ἐπακολουθήσασαν ἐπ' αὐτῶν συζήτησιν ἐλέγχονται ὡς ἐσφαλμένα καὶ ἀπορρίπτονται.

Εἰς τὴν μελέτην ἀποδεικνύεται ὅτι κάθε μία ἐκ τῶν ἐρμηνειῶν τούτων ἐκθέτει προληπτικῶς δύο ἀντιπάλους ἀπόψεις περὶ μνήμης αἱ ὁποῖαι ἤσκησαν ἰσχυρὰν ἐπίδρασιν εἰς τὴν σύγχρονον ψυχολογικὴν σκέψιν.

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