Report on 'Truth and Meaning: the Dialectics of Theory and Practice' by Mgr. Ladislav Koreň

Recommendation. I unreservedly recommend the Defence Decision Committee to award the degree. The thesis is well up to the required standard and is publishable more or less as it stands. Despite its over general title, the thesis in fact discusses Alfred Tarski's landmark definition of truth for formal languages of certain kinds. The focus is on the philosophical rather than the logico-mathematical import of Taski's work, both in its context at the time of original publication and in current philosophical debates concerning what role (if any) the concept of truth for the sentences of a language should play in an account of the meaning and semantics of that language. That said, there is sufficient discussion of the logico-mathematical interest of Tarski's definition, and the discussion in Chapter 4 of the relation between Tarski's and Gődel's respective landmark results was particularly impressive. In general, Mgr. Koreň's exposition and discussion throughout is well-informed, careful, clear, insightful and shows good critical judgement, covering the relevant elements of Tarski's work and the wider range of material relevant to its philosophical impact over the last seventy or so years.

My reservations and criticisms which follow should be read in the light of the above positive recommendation: they are of a relatively minor nature and mainly concern points of current controversy. Hence, in my judgement, they do not outweigh the considerable merits of the work.

<u>**Particular issues arising in the course of the dissertation**</u>

The condition of material adequacy: S is true iff p. Tarski clearly thought that his definition met his condition of material adequacy, and throughout the thesis there is much discussion of the philosophical import of the condition of material adequacy. Koreň believes (as do most commentators) that Tarski's definition met his condition. However, the detail of the discussion raises grounds, which Koreň does not take enough note of in my opinion, for being sceptical of this claim, or of what this claim actually amounts to.

Start from the quote from Tarski on p.26 and again on p. 36 (misattributed to Tarski 1935: 157 on p. 26, correctly attributed to Tarski 1935: 187 on p. 36). There Tarski glosses the condition for a correct definition of truth as that it should be, so to speak, the infinite logical product: S_1 is true iff p_1 and S_2 is true iff p_2 and ... and S_i is true iff p_i and ... for each sentence S_i of L. This condition is clearly met by a Tarskian definition of truth for the *propositional fragment* of a formal language (section 3.4.2, p. 38.). Here each T-biconditional is derivable by logical rules alone from the definition. So there is a clear sense in which Tarski can say, of the propositional fragment that his definition is the logical sum of the biconditionals. But for the full *quantificational* language (section 3.4.3, p. 39.), this is arguably not so. In Koreň's derivation of a sample T-biconditional there comes a point at which non-logical axioms are tacitly invoked from the theory of sequences: viz., in the transition from (8) to (9) on p.46.

(8) '$\forall x_1(x_1$ ist ein Mann) v (x_1 ist eine Frau))' is satisfied by every sequence iff for every sequence *s*, every sequence $s^*\approx_1 s$ is such that s_1^* is a man or s_1^* is a woman.

(9) '$\forall x_1(x_1$ ist ein Mann) v (x_1 ist eine Frau))' is satisfied by every sequence iff every object (*o*) is such that it (*o*) is a man or it (*o*) is a woman.

This transition is made by an informal explanatory gloss in Koreň's text (p. 46), and nothing is made of it philosophically. But it seems to me that the point is of philosophical importance. Tarski's definition for a quantificational language *cannot* be regarded as the logical sum of the T-biconditionals: rather, it is (at best) the logical sum of *sequential analogues* of the T-biconditionals (in the way that (8) of p.46 is a sequential analogue of (9)). To get from these to the T-biconditionals themselves requires axioms of the theory of sequences to do formally what Koreň does informally on p.46 when taking us from (8) to (9).

The upshot, I suggest, is that Tarski's definition for a quantificational language did *not* meet his *strong* version of Convention T (that the definition be as it were the infinite logical sum of the T-biconditionals – a sense in which his definition for the *propositional* fragment *is* the logical sum of its T-biconditionals). Rather, it meets a *weaker* version of Convention T: each T-biconditional is derivable from the definition using only logical and *non*-semantic premises from the theory of sequences.

Koreň does note the need for an additional premise on p.47, and again in his appendix, p.235. He writes:-

> Strictly speaking, in order to deduce from the metatheory augmented with the truth-definition the T-biconditionals for sentences of the form $\forall x_i A$ that do not mention infinite sequences, we need to prove in the metatheory an instance of the following schema for each given sentence in question:
>
> $\forall s^*[\forall k(k{\neq}i \rightarrow s(k)=s^*(i)) \rightarrow A]$ iff $\forall x_i A$

Two comments: (i) This schema, or any relevant instance, is clearly to be provided by the theory of sequences. It is a non-semantic, non-logical premise. Koreň fails to notice the philosophical significance of this for the question whether Tarski's definition meets his (strong) Convention T? Or alternatively, the question of what convention T, precisely, does Tarski's definition actually meet?

(ii) The schema offered is incorrect. Suppose, for instance, we substitute Fx_i for A. We get:-

$\forall s^*[\forall k(k{\neq}i \rightarrow s(k)=s^*(i)) \rightarrow Fx_i]$ iff $\forall x_i Fx_i$

The right hand side is a closed sentence –assuming a value for i. But the left hand side is an open sentence with free s and x_i. I would offer instead, where A is schematic for any *monadic primitive predicable* (only) of L:-

$\forall i\{\forall s \forall s^*[\forall k(k{\neq}i \rightarrow s(k)=s^*(i)) \rightarrow A(s^*(i)/x_i)]$ iff $\forall x_i A\}$, with A schematic.

Page 27. Section 2.5 Koreň inadvertently begs the question against deflationary accounts of truth. Koreň remarks:

> [E]pistemic ideas seem to presuppose the notion of truth, because we devise our proof procedures and epistemic procedures in general to track truth, the grasp of which notion guides us in our efforts.

Well, not according to deflationists (disquotationalists), who are to be discussed at length in Chapter 7. They would say that Koreň has here been misled into a 'substantial' reading of what it in fact merely a generalising use of 'true'! Those interested in the colour of snow tailor their epistemic procedures towards finding out whether snow is white, not whether 'snow is white' is true. And those interested in the height of Mt. Everest seek to determine whether it is over 8000 meters, not whether 'Mt. Everest is over 8000m' is true. There need be no *general* epistemic procedure, only a heterogenous set of *specific* procedures, one for discovering the colour of snow and another specific procedure for discovering the height of a mountain. It is only when we want to *generalise* over all our heterogeneous methods of enquiry to distinguish them from say tossing a coin or guessing, that we say they all aim at truth. So it is mistaken to say that truth *guides* those procedures, the deflationist/disquotationalist will say. Koreň is not committed to deflationism about truth, it is left an open question in his thesis. However, he should not make remarks such as the above without noting that deflationists would reject them.

P 81

Koreň like other recent authors (Shapiro 1998, Ketland 1999) offers a proof that a Tarskian definition of truth for L, $D_{L\text{-}TR}$, is non-conservative with respect to the axiomatization of *first-order* elementary arithmetic in L given on p. 63, since he claims, where MT incorporates first-order Peano arithmetic in L:-

(6) MT U $D_{L\text{-}TR}$ ⊢ ¬ Pr(0=1)

I disagree, and at this stage want to register two problems that (6), if true, would generate for Tarskian semantics. Since ¬ *Pr*(⌜0=1⌝) is not provable and L_{PA} is first-order, L_{PA} U *Pr*(⌜0=1⌝) is a proof-theoretically consistent first-order set of sentences. Therefore, by Gödel's completeness proof for first-order logic, it models a (non-standard) structure. Call such a structure S*. But we should be able to use the Tarskian technique straightforwardly to define true-in-S* in ML for sentences of L_{PA}, in the manner discussed in chapter 5. Call the resulting definition $D_{L\text{-}TRinS*}$. Let ML⊃L so that $D_{L\text{-}TRinS*}$ delivers T-sentences of ML of the 'disquotational' form *Tr*(**P**) iff p. Now consider the set of sentences of ML: L_{PA} U *Pr*(⌜0=1⌝) U $D_{L\text{-}TRinS*}$. Ex hypothesi *Pr*(⌜0=1⌝) is true-in-S*, and if the argument (1) to (6) goes through we also have ¬ *Pr*(⌜0=1⌝) true-in-S*. Hence L_{PA} is inconsistent of S*. But no model of a structure is inconsistent. Hence *either* L_{PA} U *Pr*(⌜0=1⌝) does not model S*, *or* a Tarskian definition of true-in-S* for L_{PA} U *Pr*(⌜0=1⌝) cannot be given when S* is non-standard and ML⊃L! I'll return to this topic below when discussing chapter 7, section 7.7. For the moment I would simply raise two problems for Koreň:

(1) If L_{PA} is a first-order language containing the arithmetic axioms of p.63, and (6) MT U $D_{L\text{-}TR}$ ⊢ ¬ *Pr*(⌜0=1⌝), then we cannot give a definition of truth-in S* for a non-standard model S* of L_{PA} U *Pr*(⌜0=1⌝), when ML⊃L.

(2) The above threatens, at least *prima facie*, the generality of Tarski's theorems (I) to (IX) reported by Koreň on p.80: since they will not, seemingly, apply to *all* first-order models when ML⊃L. They won't apply to some nonstandard models of PA. To keep such models consistent, we must confine the induction schema of PA to predicables of L, banning predicables of ML which are not also predicables of L – i.e., employing T_T(PA) of p. 220 rather than T_T(PA)* of p. 221. But for models of T_T(PA) we cannot prove (I) to (IX), as Koreň notes.

Note: No such problems arise *directly* for CTFL itself, since (a) Tarski used a higher-order object language, and the Peano axioms are categorical at second order, and therefore they have no non-standard models, and (b) the object language theory, the calculus of classes, lacks an induction schema, so the induction axiom Tarski himself uses to prove his versions of (I) to (IX) is an axiom confined to ML.

P 114 Strictly, the two 'sequences' offered on lines 11 and 13 down, <c1,c2,...,1p1, etc> and <c1R,c2R,...,1P1R, etc> cannot be correlated in the manner described, unlike the sequences <**C**0,...,**C**n,...> and <C0,...,Cn,...> in the Tarski quote following the above passage. The problem is that on p113 the set of individual constants/predicates/etc. are each required to be denumerable, but *not* each required to be finite. So, whilst with Tarski we can define how far along the one sequence **Ci** is, and how far along the other sequence Ci is, and hence show that each is in the same relative position, such a question makes no immediate sense with respect to the relative positions of 1p1 in its 'sequence' and 1p1R in its 'sequence', nor of the relative positions of nP1 and nP1R, and so on. Only the initial 'segment' of the two 'sequences' is enumerated. To give enumerated sequences in the style of Tarski, we need first to enumerate *all* the primitives in each 'sequence'.

Actually one reads what Koreň has written as shorthand for a complex sequence of nested sequences:-

<<c1,c2,...>,<<1P1,1P2,...>,<2P1,2P2,...>,...<nP1,nP2,...>,...>,<<1f1,1f2,...>,<2f1,2f2,...>,...<nf1,nf2,...>,...>>> and

<<c1R,c2R,...>,<<1P1R,1P2R,...>,<2P1R,2P2R,...>,...<nP1R,nP2R,...>,...>,<<1f1R,1 f2R,...>,<2f1R,2f2R,...>,...<nf1R,nf2R,...>,...>>>

Now, the three members of the outer sequences can be correlated with their counterparts in R-sequence, and the members of the respective correlates can be themselves correlated, and so on until we get down to correlating sequences whose elements are enumerated but are not themselves sequences.

General remark on 6.5.2: The objections from *non-extendibility* and *no commonality*, pp. 160-167. The general topic of this chapter is whether Tarski's definition of truth is *semantic* or not? Section 6.5.2 deals specifically which objections which claim that Tarski does not provide a semantic definition, because his definition is not extensible if new constants are added to the target language (and also does not provide a general definition of truth-in-L for variable L, but I leave the second objection aside as it is well covered).The discussion is generally well informed, clear and well conducted. However, regarding non-extensibility, I would have liked to have seen more discussion of what we might *intuitively expect* regarding the extensibility of an intuitively adequate semantic theory? For example, suppose I understand a little language *L* with the signature <David Cameron, Angela Merkle, Nikolas Sarkozi, v_i is a man, v_i is a woman, v_i loves v_k>, and I have an intuitively adequate semantic theory *T* for *L*, such that its sentences mean what you (reader) expect them to mean. What, intuitively, should I be able to deduce from *T* about the semantic properties of *L**, which is *L* extended by a new name 'Hilary Putnam' and a new predicate 'is peachy' – assuming only that I am given the extended formation rules, so that I can identify the first as a new individual constant and the second as a new predicate? Clearly *not* who the bearer of 'Hilary Putnam' is, *nor* what property 'is peachy' ascribes. So what is it that we *should* require, *if anything*, by way of extendibility of a semantic theory for it to be intuitively adequate? Suppose we are offered the following extension *T** to *T*: *D*('Hilary Putnam' = £41.26p) and *s* satisfies 'v_i is peachy' iff s_i is a prime number > 2. We might think *T** is likely to be *false* on various (pragmatic?) grounds: but a false semantic theory is still a *semantic* theory. Or we might think it's a *true* semantic theory, given that those who offered *T** are the 'owners' of L* and this is just their stipulation in their stupid game. If, like me, you think that nothing about the semantic properties of a language so far constrains what bearer a new name may have, nor what a new predicate might ascribe, then 'the objection from non-extensibility' is lame.

P 210. Koreň remarks: 'The upshot [of Quine's position on truth] is that if we think that truth is an indispensable expressive device, we cannot hope to define it.' Koreň seeks to reconcile Quine's claim with Tarski's explicit definition of truth by saying that Tarski's definition is of truth in a formal language only, whereas Quine's position concerns 'our ordinary notion of truth as applied to a natural language'. What Koreň says is correct as far as it goes, but not enough to reconcile Quine and Tarski. The same reasons which led Quine to say that truth is an indispensable expressive device in a natural language, could arise for a formal metalanguage ML which defines the truth predicate for a suitable formal object language L, such that we might say in ML: ∀*x*((*x*εL & the Pope says *x*) → *x* is true) – viz., this covers the infinite set of sentences of L any finite subset of which, for all we know, the Pope says, and whatever he says is true. The situation is exactly parallel to the reason Quine gives for the indispensability of truth in a natural language.

However, I think the disagreement between Quine and Tarski here is only apparent. Quine (and other disquotationalists) claim that what is indispensible is the *expressive role* that the truth predicate plays, not that the predicate that actually plays that role is itself indispensable. Thus, if we had an explicit Tarskian definition DT of truth in L of the form ∀*x*(*x*εL → (*x* is true

$\leftrightarrow x\varepsilon S$)), I don't think Quine would deny that we could use '$x\varepsilon S$' in *the same role* as '*x* is true': $\forall x((x\varepsilon L$ & the Pope says $x) \rightarrow x\varepsilon S)$.

P. 220, T_T(PA) clause (i), and clause (i) in footnote 315. These are not well-formed. If we take 'Tr(A) $\leftrightarrow$ A' to be a schema, then the left hand side does not make sense when a sentence of L is substituted for the schematic *A*. Alternatively, if we read the whole as an axiom in the manner given in the footnote, then the right hand side '*x*' doesn't make sense – unless the initial quantifier is construed substitutionally, which I assume is not the case here. On p.221 where T_T(PA)* is put through its paces, the usual apparatus of arithmetization has been assumed, so we have expressions of the form *Tr*(<$\underline{A}$>), where <ξ> takes us from a sentence ξ of L to its arithmetic code, and $\underline{\xi}$ takes us from that number to its numeral in L. Strictly, this apparatus should be used throughout T_T(PA) (i) – (v).

Section 7.7. Is MT U D_{TR} non-conservative over T, as Koreň claims? (Following on from the remarks above on p.81). Agreed, T U D_{TR} is *syntactically* 'non-conservative' over T, if T is second-order Peano arithmetic. But not non-conservative: because being non-conservative is a *semantic* notion requiring: for some S of L, T U $D_{TR} \models$ S but not T $\models$ S, and second-order T is categorical, so T U $D_{TR} \vdash$ S implies T $\models$ S. So the issue of conservatism arises only when T is first-order Peano arithmetic. Agreed, for first-order PA, T_T(PA)* is non-conservative, whereas T_T(PA) is conservative. So the question is: which, T_T(PA)* or T_T(PA), represents Tarski's position?

The text of CTFL will dot decide between T_T(PA)* and T_T(PA): Tarski's object language theory is higher order and so categorical; it does not contain any axiom schema, and his remarks in the Postscript may therefore relate merely to syntactic 'non-conservatism'. Koreň identifies T_T(PA)* with Tarski, remarking that Tarski 'was thus ready to sacrifice conservativeness in favour of deductive capacity'. I disagree. I identify T_T(PA) with Tarski, for three reasons:

(i) Tarski=T_T(PA)* is inconsistent with the fact that we can give *Tarskian* definitions of truth-in-M for any models M, including a non-standard model of PA in which $Prf(\underline{0=1})$ is true-in-M and ML⊐L, as discussed under the heading **p.81.**

(ii) Hence, if Tarski=T_T(PA)*, theorems reported as (I) to (IX) on p.80 lack generality, they do not apply to some non-standard first-order models of PA.

(iii) If Tarski=T_T(PA), he can still prove analogues of (I) to (IX), and their application will be fully general, including non-standard models of first-order PA. He simply needs to do what he in effect does in the text of CTFL, i.e., introduce an induction schema/axiom in the metalanguage using a variable *n* of ML, not present in L, whose domain is stipulated to be just the integers (or more generally, to allow for non-standard models of PA, just the ω-sequence in D(L) anchored by D('0'): $[\phi(0)$ & $\forall n(\phi(n) \rightarrow \phi(Sn)] \rightarrow \forall n\phi(n)$. He will then get analogues of the proofs he gives in the body of CTFL for the calculus of classes: $\forall A(Tr(A) \vee Tr(\neg A))$, etc. And if we generalise in the manner of Chapter 5: $\forall A(Tr\text{-}in\text{-}M(A) \vee Tr\text{-}in\text{-}M(\neg A))$, etc. which will go through even for non-standard *M* of PA. Similarly we can prove in ML, for any model of PA, that all the theorems of PA are true: we can define, as Tarski does in CTFL, $C_{PA}(A,n)$, *A* is consequence of degree *n* of the axioms of PA, and then *Prf*(*A*) as $\exists nC_{PA}(A,n)$, and prove by induction on *n*: $\forall A(Prf(A) \rightarrow Tr(A))$, even if M is a non-standard model in which $Prf(\underline{0=1})$. (Note the difference between '$Prf(\underline{0=1})$', a sentence of L true-in-M some non-standard M, and *Prf*('0=1'), a false sentence of ML not of L, since if contains the variable *n* which is confined to ML.) Thus, given only T_T(PA), not T_T(PA)*, we can prove *a* consistency sentence for PA, but, rightly, not *the* consistency sentence.

Hence I would dispute Koreň's claim (p. 223, second paragraph) that a deflationist cannot require *both* that the definition of truth be conservative *and* that the definition enable us to prove the required generalizations involving *Tr*. T_T(PA) is up to the job.

P. 223. Hitherto Koreň has been discussing 'disquotational' theories of truth, Here there is an abrupt change to 'deflationary' theories of truth. There should have been a brief discussion to explain the switch: clearly, disquotational theories are deflationary, but are there, might there be, deflationary theories that are not disquotational?

Typographical errors and slips. I suggest an erratum sheet be inserted to deal with these.
p. 32: (v) '*s*' is true and *s* is not true" should read: (v) *s* is true and *s* is not true.
p. 33 line 3 down. L should read ML.
p. 33 line 7 up. 'the predicate true of all and only the sentences of E_{n-1}' suggests all the sentences of E_{n-1} are true! I suggest instead: "the predicate 'true' can be applied significantly to all and only the sentences of E_{n-1}".
p. 35 line 5 down 'signs' for 'sings'.
p. 35, ft. 63, line 2. 'if' for the second 'is'.
p.37, line 12 up. 'L0' for 'L1'. Line 9 up: close quote after 'grun'.
p. 39, line 3 down, and also line flagged (f) in (D3): '*oder*' for '*or*'.
p. 40, line 6 up: 'three' for 'two'.
p. 41 (D4) (i) clause (f): 'positive integer *i*' for 'positive integer'. D(4) (ii) clause (d): 'of the form B^C or BvC' for 'of the form B^C'.
p. 43, line 9 up, definition of true sentence: '*x*' for '*s*'.
p. 45, proposition (5), "Frau" for 'Mann'. Last 4 lines are unnecessary, as (7) = (6).
p. 48, ft.67 line 3 up: delete surplus bracket.
p. 52 line 9 down: 'but' for 'nut'.
p. 59, ft. 87 line 3 down: 'axioms' for 'axiom'.
p. 63 line 4 down: better 'chapter' for 'section'. Line 1 of para2: 'below' for 'bellow'.
p.64 para2 line 11 down: 'it' for 'is'. Line 12 down: strictly, need to insert 'if any' between 'expressions' and 'it encodes', since standard codings may 'miss out' some numbers.
p. 65 ft 98: references to sections 4.3.4 and 4.3.5 should be renumbered as 4.2.4 and 4.2.5.
p 65 proposition (3) and sentence next following: $\Phi(\underline{<\Phi>})$ for $\Phi\underline{(<\Phi>})$ – i.e., underlining extends too far.
P66 ft 99: last line $f(m)\neq n$ for $f(m)=n$.
p. 68 a*) four occasions and b*) once: $\underline{<\gamma>}$ for $<\underline{\gamma}>$. Ft. 102 C): 'does not prove' for 'does prove'.
p. 70 line 11 up: (4.4) for (4.5). Line 7 up: Tr(<a=b>) iff v('a') = v('b') perhaps?
p. 63 frst line below induction schema: 'below' for 'bellow'.
P 70 line 7 up: Should read $Tr(\ulcorner a{=}b \urcorner)$ iff $v(a)=v(b)$?
p. 75 section 4.2.5 for 4.3.5. P. 77 section 4.3 for 4.4. P. 89 section 4.3.1 for 4.4.1.
p. 77 proposition (11*) should be $\neg Pr(\ulcorner \varphi_k(k))$
p. 78 quote from Tarski 1935,p. 255 line 3 up: 'sentences' for 'sentence'.
p. 79 ft 112 line 3 up: 'of' for 'o'.
p. 79 ft. 113: Ketland (1999) is not in the bibliography.
p. 82 line 13 down '$\underline{x}$' for '*x*'.
p. 87 ft 126 line 4 up: 'of' for 'o'.
p. 91 line 8 up; 'signs' for 'sings'.
p. 94 second paragraph line 2 down: 'found' for 'find'; line 5 down: 'still' for 'instil'.
p. 96 ft 137 last line: 'urged here' for 'urgedhere'.
P 101 line 6 down: 'signs' for 'sings'.
P. 102 2nd paragraph, line 4 down: delete bracket after 'L'.
P. 104 propsition III(d): Should read 'instance of $A(in/v_i)$'.
P. 106 line 2 up, p. 107 first line: 'signs' for 'sings'.

P. 107 line 2 up of the Awodey quote: 'model' for 'mode'?
P. 108 last line: close bracket and full stop needed.
P. 110 last line: 'sign' for 'sings'.
P 113 proposition (c): delete 'individual constants {c1,...,cn,...}'.
P 115, initial diagram: delete superscripts from second 'sequence', or insert them in the first. Proposition (b) of the definition of an atomic formula: delete underline.
P. 116 line 2 down: 'is' for 'us'.
P. 121 proposition (II)(d): '*i*' for '*k*'.
P. 130, first line: 'for' for 'or'.
P. 131 line 15 down: should read 'uninterpreted non-logical constants'? Ft. 189, grammar of third sentence needs attention: better, replace 'did' by 'was the' and delete the following 'is'.
P. 132 ft. 191: 'Soames' for 'Somes'.
P. 134 line 2 up: 'develop' for'developed'.
P. 138 line 3 down: 'if' for 'is'.
P. 140 line 5 up of main text. 'SCT' abbreviates 'semantic conception of truth' I assume. The abbreviation was introduced on p. 25 and last used (I think) in chapter 2. Reader needs reminding of what it abbreviates.
P. 145, second paragraph line 3 down: Why gives only *a couple of* semantic rules? Why not just gives semantic rules (number unspecified)?
P. 149, second line down after proposition b): 'none' for 'non'.
P. 154 last sentence before second indented passage: 'latter' for 'former'?
P. 155 line 5 down of paragraph beginning 'The first defence strategy ... : 'an' for 'n'.
P. 159 section 6.5.1 first line: (D1) occurred on p. 37, reader might need reminding that it was a definition of *x is a true sentence of* L_0. Similarly, later in the paragraph, L_1 and L_2 were given on pages 37-9. In the body of the paragraph: 'including semantic relations *to* objects, *and* their significant constituents ...'.
P. 160 second paragraph, line 2 down: 'truth definition' for 'truth definitions'.
P. 163 line 8 up: 'true in L_0' for 'analytic in L_0'.
P' 164 Quine p.134)misquoted: close parenthesis on 'analytic' and delete ':'. Line 3 up: 'since it is an English paradigm' for 'since is an English paradigm'.
P. 167 section 6.6 line 2 down: 'is' needed between 'it' and 'not'. Line 5 down of 6.6: 'sense' or 'use' needed between 'translinguistic' and 'cannot'.
P. 171 line 6 up: 'worthy' for 'worth'.
P. 178 ft. 261 line 3 up: 'what' for chat'.
P. 182 first line: 'says' or 'may say' for 'say'.
P. 184 Field quote from p. 362: final parenthesis should be 'T1 [namely B-variant]', see earlier parenthesis.
P. 190 ft. 270 clause (A*): remove quotes from round second occurrence of 'Angela Merkle'.
P. 193 second paragraph line 3 down: 'sections' for 'chapter'.
P. 195 proposition **(I)**: 'iff' for 'ff'. Proposition **(II)**: '*Pr*' for '*t*'.
P. 199 last sentence of **7.2**: suggest 'varying interpretations of a formal language are construed' for 'varying interpretation of formal language construed'.
P. 200 line 7 up: 'affecting' for affect in'.
P. 203 Ayer quote: 'since For' misquoted?
P. 207 first line: 'white' for the second occurrence of 'true'? Second paragraph, first sentence: 'mean' for means'. Last paragraph, first sentence: 'message' for 'massage'.
P. 211 second paragraph. Koreň writes of 'devices stimulating infinite conjunctions or dis junctions'. I assume that should be 'simulating'. And since the conjunctions and disjunctions

are *infinite,* what follows should read: '..., and (if x='s_n' then s_n),...' and '...,or(if x='s_n' then s_n),...'. Not as given: '..., and (if x='s_n' then s_n)' and '..., or (if x='s_n' then s_n)'.

P. 212 section 7.4.1 line 5 down: delete 'are'. Line 11 down: 'do' for 'dot'. Check quote from Quine 1992:82: 'tells us this in just as clear' looks garbled.

P. 213 ft. 301 line 3 down: 'concept than the' for 'concept that the'.

P. 216 line 13 up: '(GDS)' for '(GTS)'.

P. 217 ft. 306: the supposed 'additional axiom' is in fact a complex predicate, having x free.

P 218 ft. 312: delete footnote reference '312' from within the text of the footnote.

P. 219 last paragraph, first sentence: 'disquotationalists' for 'the disquotationalist' would sort the grammar out.

P. 221 line 15 down: '$True_{PA}$' for '$True_T$'. Line 18 down: ft 318? No footnote.

P.222 line 4 down: '(L(T)' needs another bracket, or one less.

P. 224 second paragraph line 3 down: 'not' for 'non'. Line 9 down: delete 'not'.

P. 231 sub paragraph b). No footnote 324.

P. 232 line 4 down: no footnote 325.

P. 234 line 15 up: '*NTIx*'⌢*N*' for '*NTINx*'⌢'.

P. 238 line 4 up: 'set' for 'se'; line 13 up: 'good' for 'goods'.