

NOT MUCH HAS CHANGED. A REJOINDER TO RACLAVSKÝ¹

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0 Statement of Intent

It is disappointing that Raclavský's forthright paper (2007) does not (to my mind, at least) advance significantly the discussion of the problem of verisimilitude. What it does is erroneously to identify as erroneous a number of assertions made, or imagined to have been made, in my various critical excursions (from 1974 to 2006) against the various definitions of verisimilitude proposed by the late Pavel Tichý. Although many of Raclavský's mistakes have been exposed and put right by Taliga (2008), to whom I am greatly indebted, I should like to add something here about three points of disagreement. Sections 2 and 3 deal with what seem to me to be misunderstandings on Raclavský's part. Section 4 reaches the centre of the dispute between Tichý and myself. In section 5 it will be explained why the positions that Raclavský and I occupy in matters of semantics are closer together than he supposes, so that the bulk of his censure is *de trop*. Unattributed page references are references to Raclavský (2007).

1 Transparent Intensional Logic

The general lines of my ancient criticism of Tichý's definitions (that they are in some sense unacceptably language dependent) may be taken as understood. To set the scene for Raclavský's response, I shall first summarize my understanding, no doubt sadly imperfect, of the technical machinery that he borrows from Tichý's *transparent intensional logic* (TIL). In the beginning there exist *individuals*, enmeshed in an *intensional basis* made up of *attributes*; there are *possible worlds*, 'immaterial, conceptual entities' that are 'conceivable distributions of attributes through certain items [presumably individuals]' (p. 346), and there are the *truth values* T and F (about which Raclavský tells us little). 'Individuals, truth-values, possible

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worlds and intensional basis together may be called [an] *epistemic framework* ' (p. 335). Mappings from possible worlds to classes of individuals are *intensions*, and are said to 'explicate' attributes (p. 335). Mappings from possible worlds to truth values are *propositions*. With each proposition are associated infinitely many logically equivalent *constructions* (Tichý 1986). 'A construction expressed by an expression [such as a *sentence* or a *theory*] is conceived as its *meaning*' (pp. 336f.). A *formula*, such as $\neg h \ \& \ r \ \& \ w$, though of course named here by a linguistic object, is not itself a linguistic object but a construction, in this case the construction 'expressed by the English sentence „It is not hot, it is rainy and it is windy” or by the Czech sentence „Není horko, je deštivo a větrno”' (p. 339). Constructions are therefore structured entities that somehow recapitulate the structure of the sentences that express them. Numerous articles available in print and on line, for example Duží & Materna (2000), are devoted to aspects of TIL.

2 Definitions

Least important of those of Raclavský's strictures analysed here, but deserving some correction, is his condemnation of an 'awkward error' (p. 339) in my (1974):

'Verisimilitude, like truth, will always, if defined, be defined relative to a language. But just as truth is language independent ... so must judgments of verisimilitude be' (Miller 1974, 176). This incomprehensible couple of sentences shows again Miller's fumbling in the heart of the matter.

I shall indicate why the incomprehension that Raclavský confesses to in this passage is based on a failure on his part to distinguish the procedure of definition from what the definition defines.

(a) Tarski's method of defining truth for the sentences of a formalized language, and all its variants, rely on the (syntactical) structure of the entities (meaningful sentences or statements) for which truth is defined. If the definition of truth for each of two mutually intertranslatable sentences in different languages is in each case materially adequate, then one is true if & only if the other is true. If sentences are understood to express propositions, or constructions, we may go on to define the truth of a proposition as the truth of any one of the sentences that expresses it. This makes truth independent of language in the sense intended, but it does not make the definition of the truth of a sentence independent of the language to which the sentence belongs.

(b) It is a familiar fact in almost every field of mathematics that we sometimes have to make reference, in a definition, to a specific, but arbitrary, element of a class of equivalent objects. Coordinate systems in analytic geometry provide an example known to almost everyone. Another example is the definition of the sum $\kappa + \lambda$ of two cardinal numbers κ and λ . The required sum is the cardinal number of the union of a set of cardinal κ with any disjoint set of cardinal λ . But in whatever way cardinals are themselves construed, the set $\kappa \cup \lambda$ is not such a union. If cardinals are construed as von Neumann ordinals of a special kind, then κ and λ are not disjoint (unless one of them equals 0); indeed $\kappa \cup \lambda$ is identical with either κ or λ . And if they are construed in the manner advocated by Frege and Russell, $\kappa \cup \lambda$ is not a cardinal at all (unless $\kappa = \lambda$), since it contains elements that are not mutually equipollent. The standard procedure is to construct two disjoint sets k, l , of the required cardinalities, and to define $\kappa + \lambda$ as the cardinal number of the disjoint union $k \cup l$. Under the von Neumann construe, but not that of Frege and Russell, we may take $k = \kappa \times \{0\}$ and $l = \lambda \times \{1\}$, since κ and λ do indeed have cardinalities κ and λ respectively. It then has to be shown that the sum $\kappa + \lambda$ so defined is independent of the sets k and l , in the sense that the same result would have been obtained for any two disjoint sets of these cardinalities. As a piece of syntax, the definition of addition incontestably makes essential reference to disjoint sets such as k and l . The addition function is independent of them.

3 Distances

We shall postpone until section 5 a detailed consideration of what Raclavský labels 'Miller's first error', that is, the supposition that 'verisimilitude is counted with respect to linguistic expressions ... and not on what these expressions say' (p. 339; emphasis suppressed). Despite his conviction on p. 338 that there is here 'a substantial error', and that on this matter 'Miller is fundamentally wrong', two pages later (p. 340) Raclavský judges that this error,

Miller's unqualified shift from language semantic content (i. e. from constructions) of theories to the syntactical level[,] is only a minor error in his inquiry of verisimilitude counting. Had it been exposed alone, theoreticians might quickly disclose its fraudulent character. However the peril of the shift is in that it covers a much deeper fallacy in Miller's argumentation.

Let S_1 and S_2 be two agents, one of whom measures in metres, the other in yards, and let O be some object situated at the same distance from each. Let T_{S_1} and T_{S_2} be the theories favoured by S_1 and S_2 concerning their individual distances from O . Raclavský alleges (p. 341) that

Miller postulates a demand to the effect that – independently of systems of measurement on which ... T_{S_1} and T_{S_2} are based – when the theories are, for example, equally right (they express just the truth), then they should state the distance from O with the help of exactly the same number. For example, when T_{S_1} says the truth, it must state that the distance is just 1 (in meters) and T_{S_2} also saying nothing else but the truth must state that the distance is just 1 (in yards). Exactly similar ‘logic’ underlies Miller’s way of reasoning.

(a) Everyone knows of course that measurements of length cannot be reported as pure numbers, since the values reported are relative to the system of units used; and, as Taliga (2008, 194), notes, it is quite natural to use two systems simultaneously, to say that ‘a measured distance is 1 yard, or equivalently, 0.9144 metre’. Temperatures, likewise, may be reported in degrees Celsius or in degrees Fahrenheit, or both together, but not as pure numbers (except where the context makes it clear which scale is being used).

(b) Less banal examples of quantities that are relative to some system of reference occur in classical and (special) relativistic mechanics, in which the Galilei and Lorentz transformations respectively show how locations and times, and also measurements of spatial and temporal intervals, are converted from one inertial frame into the corresponding values in a frame moving at constant velocity with respect to it. In these physical theories, however, what matter are not the quantities and relations that vary from frame to frame but the *invariants* of the transformations, such as the laws of nature and the speed of light. A typical example of an invariant related to spatial separation is the relation of *betweenness*. In both classical and relativistic mechanics, if the points x , y , z are collinear in one frame, and y lies between x and z , then the same relations among x , y , and z hold in any frame in constant motion relative to it.

(c) It is not because they give values that change with changes in the language (or the conceptual framework) under consideration that the definitions of verisimilitude and approximation to truth advanced by Tichý and others are defective. It is because they do not preserve simple relations of order. Theory C may lie between theory A and the truth relative to one language (or conceptual framework), while A lies between C and the truth relative to another. This has been the implicit (and often

explicit) gravamen of all my published proofs of language dependence, which on this score have often been misrepresented (see the complaints on p. 227 of my 1994 and on p. 221 of my 2006). The absolute values of verisimilitude (and approximation to truth), which are altered by inconsequential monotonic transformations, may be mentioned in the proofs, but they are of no significance to what is proved. (Compare section 2 above.)

(d) These difficulties can be substantiated by reference to the hackneyed example of two intertranslatable weather languages, which are introduced by Raclavský (p. 341) as

intensional bases $IB_T = \{h, r, w\}$ and $IB_M = \{h, m, a\}$. Instead of equivalence 1 yard \equiv_{df} 0.9914 meter, we manage equivalences $m \equiv_{df} (h \leftrightarrow r)$ and $a \equiv_{df} (h \leftrightarrow w)$. So ... $h \ \& \ m \ \& \ a$ (unpacked as $h \ \& \ (h \leftrightarrow r) \ \& \ (h \leftrightarrow w)$) is equivalent to $h \ \& \ r \ \& \ w$, ... $\sim h \ \& \ m \ \& \ a$ is equivalent to $\sim h \ \& \ \sim r \ \& \ \sim w$, and so on. Now suppose that the truth is ... $h \ \& \ r \ \& \ w$ (or $h \ \& \ m \ \& \ a$).

Let A be the theory $\sim h \ \& \ \sim r \ \& \ \sim w$. Like Tichý, Raclavský sets the distance of A from the truth $h \ \& \ r \ \& \ w$ (or $h \ \& \ m \ \& \ a$) equal to 3/3, since it is mistaken with regard to each of the three elements of its intensional basis $IB_T = \{h, r, w\}$. Distances from the truth of similar theories are computed similarly. But since $\sim h \ \& \ m \ \& \ a$, which is A formulated in IB_M , is mistaken only once (with regard to h), it has distance 1/3 from the truth relative to this intensional basis. In the same way, the distance from the truth of the theory C, which says that $\sim h \ \& \ \sim m \ \& \ \sim a$ (or $\sim h \ \& \ r \ \& \ w$), is 3/3 relative to the basis IB_M , but only 1/3 relative to IB_T (since $\sim h \ \& \ r \ \& \ w$ and $h \ \& \ r \ \& \ w$ differ on h alone). A few uninformative errors in Raclavský's calculations (for example, the conflation in footnote 12 of verisimilitude with distance from the truth) are here ignored.

(e) Raclavský opines that, for Miller to be satisfied, 'the value of verisimilitude ... must be the same, even if we move ... from the framework based on IB_T to the one on IB_M ' (pp. 341f.; emphasis suppressed). I have never demanded any such thing. What concerns me is that although relative to IB_T the theory C lies properly between A and the truth, since A makes all C's mistakes, and more, the ordering is 'suspiciously reversed' (to use Raclavský's own wording) when we change to IB_M . If this relation of between-ness is not an invariant as we move between intensional bases, the definition of distance from the truth loses all its interest, at least for me. I cannot, to be sure, demonstrate that this kind of reversal is incorrect. Relativistic theses are almost never confutable.

(f) It should however be noted that, despite Raclavský's attempt to assimilate the equivalences $m \equiv_{df} (h \leftrightarrow r)$ and $a \equiv_{df} (h \leftrightarrow w)$ to the equivalence '1 yard \equiv_{df} 0.9914 meter', there exist no equations, like '1 yard \equiv_{df} 0.9914 meter' or ' $F - 32 = 9C/5$ ' or the Lorentz transformation, that determine how distances between theories calculated relative to one intensional basis are to be converted to distances calculated relative to another intensional basis. Let B say that h & $\sim r$ & w . Relative to IB_T , the theories B and C are equally distant from the truth. But relative to IB_M , the distances from the truth of B and of C are 1/3 and 3/3 respectively. There is no functional dependence.

(g) Raclavský concludes this segment of his criticism, in the section entitled 'Miller and the invariance of verisimilitude', by highlighting what he calls 'two unacceptable direct consequences' of my supposed demand that distances from the truth remain constant as we move from one intensional basis to another (p. 342, emphasis suppressed). The first of these outrages is that two distinct theories that are equidistant from the truth may yet be jointly inconsistent. I have great difficulty in seeing what is so 'futile' about this result, or why it undermines anything that I have said. For on the one hand, any two distinct constituents (which are the only theories considered at this juncture) are inconsistent, independently of their distances from the truth; and on the other hand, it is popularly believed (though questioned by me) that, for instance, 'The number of the apostles = 11' and 'The number of the apostles = 13', which contradicts it, are the same distance from the truth (according to Bunge 1983, p. 273, for example, each of the theories deserves to be assigned the truth value 11/12). The second 'absurd consequence' that Raclavský imputes to my ideas is that 'by the suitable equivalences we can demonstrate, by Miller's method, that each theory (which does not hit the truth) is equally furthest from the truth as any other theory [that is: has the greatest distance from the truth of any theory]' (loc. cit., emphasis suppressed). The astute reader will notice that this result, far from being a consequence of any demand that distances from the truth be invariant under variations of intensional basis, is a consequence of Tichý's basis-dependent method of defining these distances, which implies that they are not invariant.

(h) Raclavský says that 'Miller's argument ... urges ... [the] completely unsatisfiable (and thus absurd) demand that theories based on certain conceptual framework should retain their value of verisimilitude when trans-

ferred into an entirely different framework' (p. 334). I cannot but feel that this judgement is as ungenerous as it is inaccurate. It is supposed to be an insight of intensional logics (such as TIL) that not all sets of unsatisfiable conditions are absurd. No one dismisses as absurd the conditions (non-dictatorship, independence of irrelevant alternatives, ...) on a social welfare function that Arrow's (doubtless more important) theorem shows to be together unsatisfiable.

4 Translations

There are two steps in Raclavský's rebuttal of my thesis that the definition of distance that he and Tichý commend renders distances of theories from the truth (and, more generally, distances between constituents) dependent on the language in which the theories are formulated. The first step, which underwrites the second, is to deny that truth, and verisimilitude, are properties of linguistic items such as sentences and theories. Much more forcefully stated by Raclavský than by Tichý, it will be considered in section 5 below. The crucial step in the rebuttal, however, is shared by Tichý and Raclavský, despite a terminological difference in the way that they present it: it is to deny that the different sentences (Tichý) or constructions (Raclavský) that appear in my argument are mutually translatable. In spite of the acknowledged equivalences $m \equiv_{if} (h \leftrightarrow r)$ and $a \equiv_{if} (h \leftrightarrow w)$, the expressions h & r & w and h & m & a do not, according to Tichý, say the same thing or, according to Raclavský, 'express the same construction' (p. 348), even though in section 3(d) each was loosely referred to 'the truth'. It is a simple mistake to think that the theories A and C can be indifferently represented by constructions erected on different intensional bases $IB_T = \{h, r, w\}$ and $IB_M = \{h, m, a\}$. 'Clearly, if two sentences (or theories) are really intertranslatable, they express the same [propositional] construction; the verisimilitude of this construction is, of course, immune to translation' (*loc. cit.*).

(a) There is a lot more huffing and puffing where this came from. What it leaves pretty much out of consideration is the fact that empirical scientists and mathematicians time and time again rewrite their theories in new vocabularies; or, if you prefer, rework them on new intensional bases, new epistemic frameworks, or new 'conceptual system[s]' (pp. 348f.). On p. 364 of my (1978) and on p. 217 of my (2006) I gave several examples of theories that glory in alternative formulations: linear ordering, Boolean

algebra, probability theory, group theory, classical propositional logic, Euclidean geometry, elementary arithmetic, classical mechanics. The first of these examples may perhaps be dismissed as involving little more than notational variation (of no more significance than the choice between top-to-bottom *tategaki* and left-to-right *yokogaki* in modern written Japanese). But it is hardly possible to regard in this light the many distinctive axiomatizations of Boolean algebra and of group theory, or the different Newtonian, Lagrangian, Hamiltonian, and general covariant formulations of classical mechanics.

(b) None of those (including Tichý, Oddie, Niiniluoto, Tuomela, Schurz, Weingartner, Kuipers, Zwart, Brink, Heidema, Burger, Barnes, Weston, Volpe, Smith, Britton, Gemes, and Raclavský himself) who have played in this tournament in the colours of the language dependence team, or have supported the team from the touchline, has, to my knowledge, managed to explain satisfactorily how these theories, and others, can be routinely acknowledged by their practitioners to be open to variant formulations, featuring novel primitive vocabularies (or intensional bases). Like it or not, it evidently is possible to translate sentences written in one vocabulary into sentences written in another. No semantical theory that denies the possibility merits much attention.

(c) One approach to the problem of preserving the objectivity of verisimilitude, only fleetingly relevant to our present concerns, is the idea that, although a theory may be expressed in different vocabularies, or on different intensional bases, one of the competing foundations is (for metaphysical, physical, or other reasons) the right one, so that comparisons of verisimilitude are indeed absolute. Tichý himself shied away from this somewhat desperate revival of essentialism, as I do; my objections to it in (1975), § vi, and in (2006), Chapter 11, § 3, have not, however, deterred Raclavský from reporting that ‘Miller ... appeals to us to consider such preferable, fundamental conceptual system’ (p. 351). Raclavský himself, within the space of scarcely more than a page, declares that ‘there is no privileged, „absolute” conceptual system’ (*loc. cit.*; emphasis suppressed) and then states the ‘wish for unique, cogent conceptual system’ to be a ‘desirable’ one (*op. cit.*, p. 352). As Taliga *op. cit.*, § 4, observes, in this closing paragraph Raclavský also concedes that after all a theory can be transformed from one ‘conceptual system’ to another. It is difficult to know what to think.

(d) Tichý advises us that ‘[a] proposition is ... a set of possible worlds’ (1978, § 8), and ‘[a] possible world is simply one conceivable way

in which the attributes forming the intensional base are distributed through the universe of discourse' (*op. cit.*, § 1); that is, a function from the intensional basis to the class of individuals. He concludes that 'if a sentence of one language is to be intertranslatable with a sentence of another, the two sentences must stand for the same proposition; ... *a fortiori*, the two languages must be based on the same epistemic framework' (*op. cit.*, § 8); *ergo*, 'the proposition denoted (or expressed) by $\sim h \ \& \ r \ \& \ w$ is distinct from that denoted (or expressed) by $\sim h \ \& \ \sim m \ \& \ \sim a'$ ' (*op. cit.*, footnote 4), and there is no translation of one of these sentences into the other. This inference of Tichý's is valid, no doubt, but since the conclusion must be false, as we have seen, one of the premises must be false. The culprit stands indicted: it is the assumption that, although it may be only in terms of an intensional basis that we can specify a possible world, other bases cannot do the task just as well. This would be like assuming that although it may only be by reference to disjoint sets of cardinality κ and λ that we can define the sum $\kappa + \lambda$, other disjoint pairs cannot do the task just as well. On this way of going astray, see section 2 above.

(e) Raclavský reveals some qualms concerning Tichý's line of argument, for example in the first complete sentence on p. 346. Although he goes to some lengths in the final section of his paper to strengthen the argument and to assuage the qualms, the outcome cannot be expected to be of great interest in the present inquiry, however richly the explication of 'possible worlds in the hyperintensional way ... as collections of propositional constructions' (p. 348; emphasis suppressed) may ornament semantics. For the failing of Tichý's account of verisimilitude is not that its strange doctrine of the untranslatability of interdefinable languages remains unjustified, since that is the fate of all theories, but that it continues to ignore straightforward criticism. Until the fact that scientific theories admit variant formulations in variant vocabularies is honestly faced, and explained, there is little to be said for labouring the unobvious.

5 Constructions

Raclavský persistently chides me for misrepresenting Tichý's theory of verisimilitude by predicating truth and falsity, as well as verisimilitude, of linguistic expressions such as sentences and theories. The second paragraph of (2007) reveals the paper's plan:

In this paper I am going to show that Miller's argument is based on a false assumption that verisimilitude is not to be counted with respect to [the] entities [that] verbal formulations of the theories express but with respect to expressions as such

He repeats the charge in several places (see the beginning of section 3 above). It is even held to be 'apparent that Miller was unable to recognize other entities but sentences; that he was unable to understand propositions as entities associated with sentences' (footnote 23). An alternative conception of truth, falsity, and verisimilitude, is announced in these words (pp. 339f.):

[t]he property being true is fundamentally connected with propositional constructions and thus language independent, but the truth of [a] sentence is dependent on the truth of the propositional construction the sentence expresses in a certain language; and a propositional construction is true provided the proposition constructed by it is true (i.e., its value is just T at given possible worlds). Analogously, the likeness to the truth is fundamentally ... [a] matter of constructions (and subsequently, of propositions constructed by them) and it is language independent..

He goes on to assert that 'constructions are extralinguistic objects, therefore, it is absurd to conceive a set of extralinguistic objects as a language and then call verisimilitude counting based on them „language dependent“'. I am afraid [he confesses] (or rather: aware) that my main thesis really touched the neuralgic point of the whole language dependence controversy' (footnote 11).

In the remainder of this rejoinder I shall dissent vigorously from this dramatic self-assessment.

(a) It is conceded by Raclavský that in his (1974) 'Tichý himself used the term „sentences“ in connection with verisimilitude counting' (footnote 7). Raclavský suggests in extenuation that there was a good tactical reason in the 1970s 'not to ... [expound] verisimilitude ... in terms of constructions' (footnote 8). '[W]hat I still miss in Tichý's papers on verisimilitude', he adds (*loc. cit.*), 'is at least a short reference to his theory of constructions.' The plain fact is, however, that the elaborate apparatus of TIL was not needed in the 1970s, and is not needed 30 years later, for a rigorous treatment of verisimilitude. Reference to constructions is redundant. If we are careful, we can develop the theory, and resolve the difficulties that it encounters, entirely in terms of (meaningful) sentences (which may also be called statements), and classes of intertranslatable

sentences (which may be called propositions). This is not to say that the introduction of the highly abstract ideas of TIL is mistaken. What is mistaken is only Tichý's unyielding insistence, fostered by Raclavský, that each proposition is tied by an unbreakable umbilical cord to a unique intensional basis (section 4(d) above).

(b) The *truth* of a (meaningful) sentence of a formalized (but not formal) language is defined by Tarski as its satisfaction by all sequences drawn from the universe; and the *satisfaction* of a formula by a sequence is defined via a recursion that exploits the syntactical structure of the expressions of the language. Tichý acknowledged that it is 'Tarski's definition of truth [that] tells us in rigorous terms what it takes for a statement to be [true or] false' (1976, proem; emphasis suppressed). Neither Raclavský nor any English-language paper on the TIL website <http://til.phil.muni.cz/> says anything useful about how truth is defined in TIL, but since constructions are structured entities (p. 336), it may be supposed that their truth is definable recursively in the Tarskian manner, and that it is possible to formulate an analogue of Tarski's Convention T. Instead of requiring that the meaningful sentence $\sim h \ \& \ r \ \& \ w$ be true if & only if it is not hot, it is rainy and it is windy, we require that the construction $\lambda w [\sim {}^0\text{Hot}_w \ \& \ {}^0\text{Rainy}_w \ \& \ {}^0\text{Windy}_w]$ be true if & only if it is not hot, it is rainy and it is windy. Or more generally, we require that there be derivable from the definition of truth all instances of the scheme '*S* is true if & only if *p*' where '*S*' is replaced by the name of a construction and *p* is replaced by the sentence that expresses the construction or, we must suppose, any sentence that correctly translates this sentence.

(c) There is such a strong structural similarity between constructions and the sentences that express them – on p. 348 Raclavský even uses the name of a sentence to refer 'in a truncated way' to the construction that it expresses – that one might wonder whether they can be identified. But rather than risk further disaccord by suggesting that propositional constructions may be sentences in disguise, I shall propose the reverse: that linguistic items such as sentences may be thought of as constructions in disguise. (This does not exclude the possibility that there are constructions that cannot be identified with any expressions.) In a logical investigation such as the present one, languages cannot be thought of as fluctuating sets of noises, inscriptions, electronic pulses, or other physical items, but must be composed of abstract objects of some kind. I cannot see that it matters much which abstract objects expressions are identified

with, provided that there is, as in Gödel numbering, a 1 – 1 primitive recursive function between an expression and its syntactic structure, and provided that we can make good sense of ascriptions of truth and falsity to those propositional constructions that I call sentences. I admit that I have no very lively understanding of what constructions are, but nor do I know what formalized languages or sets are.

(d) With this identification, many of Raclavský's objections disintegrate. Whenever I talk about linguistic entities such as sentences, the reader offended by my lack of intensional polish is invited to understand me as talking about the corresponding constructions. Raclavský's paper from start to finish needlessly magnifies the difference between us.

6 Conclusion

My central dispute with Raclavský is not settled by such an assimilation of sentences to constructions. Rather than repudiate the commonplaces of scientific life mentioned in section 4 above, I demand that although a propositional construction (sentence) may be associated with a unique intensional basis (primitive vocabulary), a proposition can be associated with many distinct bases (vocabularies), into each of which the constructions that construct it can be translated. Despite the simplicity of the argument, which is understandable even to a logical novice, Raclavský, following Tichý, continues to reject the possibility of these translations. 'Thus an ichthyologist might urge us to give up the idea that fish can swim, pointing out that his theory of fish behaviour prevents it' (Tichý 1976, § 4). I am sorry to say it, but not much has changed since (1978, § 8), when Tichý pilloried the argument for its 'propensity to confuse'.

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