The Stoics on Hypotheses and Hypothetical Arguments

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In the list of Chrysippus' logical writings in Diogenes Laertius, in its fourth section of works on arguments (λόγοι), we find ten books on hypothetical arguments (ὑποθετικοὶ λόγοι, D.L. VII 196). The question I shall follow up in this paper is: what were these Stoic hypothetical arguments about which Chrysippus had so much to say? Little has been written on this issue, the situation of the sources being not exactly favourable. No example of an hypothetical argument assigned to Chrysippus or any other early Stoic has survived, nor do we have any Stoic definition.

One way of approaching the issue is to look and see what arguments were called "hypothetical arguments" or "hypothetical syllogisms" after Chrysippus, and to examine whether these are the same kind of arguments Chrysippus wrote about.

In later antiquity we find a classification of types of arguments which is presumably of Peripatetic origin: according to this classification, a first division is made into categorical syllogisms and hypothetical syllogisms, and in a second step, a distinction is drawn between wholly hypothetical syllogisms (οἱ δι᾽ ὅλου ὑποθετικοὶ συλλογισμοί, Alex. *APr* 326.20ff.; 330.28-30; Philop. *APr* 243.11-36; [Amm.] *APr* 67.24-30) and mixed hypothetical syllogisms (οἱ μικτοὶ ὑποθετικοὶ ⟨συλλογισμοί⟩, [Amm.] *APr* 67.24-30).[1] The classification is based on a twofold distinction of the propositions from which the arguments are constructed. Categorical propositions are propositions that are simple in that they do not contain two or more propositions as components. Examples are "Socrates walks," "Some stones are white," "All humans are animals" (ibid., 11.17-19). Hypothetical propositions are propositions that contain two or more propositions as components. They encompass at least conditional propositions (e.g. "If it is day, it is light"); various types of disjunctive propositions

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[1] Other texts report a similar distinction, in which the arguments of the second type are called "mixed syllogisms" and those of the third type "hypothetical syllogisms"; see e.g. Alcinous, *Intr. in Plat.* 6 158-9 (Hermann).

(e.g. "Either it is day or it is night") and negated conjunctions (e.g. "Not: both it is day and it is night"). These propositions are named "hypothetical," in contrast to the categorical ones.

A categorical syllogism consists of categorical propositions only. The paradigm is *modus Barbara*. A hypothetical syllogism contains at least one hypothetical proposition. It is called "mixed hypothetical," if it also contains categorical propositions. Typical cases are of the forms

If p, q.   Either p or q.
But p.   But p.
Therefore q.   Therefore not q.

Wholly hypothetical syllogisms on the other hand contain exclusively hypothetical propositions. The paradigm case is of the form

If p, q.
If q, r.
Therefore, if p, r.

Chrysippus' hypothetical arguments, one could then propose, were either the Peripatetic "mixed hypothetical syllogisms" or the "wholly hypothetical syllogisms" – or both. There are some general problems with this suggestion:

There are no signs that the early Stoics made a terminological distinction between categorical and hypothetical syllogisms. As far as we know, they did not deal with categorical syllogisms in the Peripatetic sense at all. Neither did they call complex propositions "hypothetical" and simple ones "categorical." But this is the distinction from which the Peripatetic hypothetical syllogisms obtained their name.

Moreover, Chrysippus' hypothetical arguments are throughout referred to as *arguments* (λόγοι), not syllogisms (συλλογισμοί). For the Stoics, syllogisms make up that subclass of valid arguments that are valid in virtue of their form, and they had a distinct procedure to determine what arguments satisfied the condition of syllogismhood.[2] We would hence expect Chrysippus' hypothetical arguments to be neither a subclass of, nor the same class as that of Stoic syllogisms.

This deliberation allows us to rule out with reasonable certainty that Chrysippus' hypothetical arguments were the mixed hypothetical syllogisms. For the Stoics, this kind of arguments (see examples above) were

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[2] This procedure was called "analysis." For details see Bobzien, "Stoic Syllogistic," *OSAP* 14, 1996, 133-192.

all syllogisms, and would have been simply called "syllogisms"; or "inde-
monstrable syllogisms," if they belonged to a distinguished group of self-
evidently valid arguments. Chrysippus' books on arguments of this type
are listed in Diogenes' list of titles in the first two sections on arguments
(on indemonstrables, modes, and the analysis of syllogisms),[3] and would
thus not be expected to turn up again, under a different name, in the fourth
section. Chrysippus would have called the Peripatetic middle hypothetical
syllogisms neither "hypothetical" nor "argument".

The second possibility is that the hypothetical arguments were the later
so-called "wholly hypothetical syllogisms." This suggestion has to be
taken more seriously: First, in most reconstructions of the Stoic theory of
reduction of syllogisms, these arguments would not come out as syllo-
gisms, i.e. as valid because of their form. Thus, *if* Chrysippus dealt with
them, he would have called them "arguments." Secondly, since we know
that Theophrastus dealt with such arguments (e.g. Philoponus *APr* 306-
23),[4] they may have been "around" and discussed at Chrysippus' time.
But of course, Theophrastus also discussed categorical syllogisms, and we
have no traces of early Stoic writings on these at all. Equally, there are
no early Stoic examples of what the Peripatetics called "wholly hypo-
thetical syllogisms". Adding to this lack of textual evidence the fact that
the origin of the name "hypothetical syllogism" is based on a *later* non-
Stoic distinction of propositions, I conclude that it is unlikely that Chry-
sippus composed ten books about the later so-called "wholly hypothetical
syllogisms".

A stronger case can be made for a third possibility, for which there is
some textual evidence and which I shall now develop. This is the alter-
native that Chrysippus' hypothetical arguments were in fact something rather
different; different in a way from all the types of arguments mentioned so
far; different in that they do not owe their name to their containing *propo-
sitions* of a certain form or complexity. Rather, the suggestion is, their
name refers to the fact that they are based on something that is not a
proper proposition at all.

Let us have a closer look at the Chrysippean book titles in Diogenes
Laertius:

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[3] No doubt it is these Farabi *Int* 53.7-10 refers to.

[4] Cf. J. Barnes, "Terms and Sentences: Theophrastus on Hypothetical Syllogisms,"
Proceedings of the British Academy 69, 1983, 279-326.

Σύνταξις τετάρτη
    Περὶ ὑποθέσεων πρὸς Μελέαγρον γ'
    Λόγοι ὑποθετικοὶ εἰς τοὺς νόμους πρὸς Μελέαγρον πάλιν α'
    Λόγοι ὑποθετικοὶ πρὸς εἰσαγωγὴν β'
    Λόγοι ὑποθετικοὶ θεωρημάτων β'
    Λύσεις τῶν Ἡδύλου ὑποθετικῶν β'
    Λύσεις τῶν Ἀλεξάνδρου ὑποθετικῶν γ' (ψευδεπίγραφα)
    Περὶ ἐκθέσεων πρὸς Λαοδάμαντα α'   (D.L. VII 196)

We can note several things: First, the fourth section contains three books on hypotheses (ὑποθέσεις) in addition to the ten books on hypothetical arguments. Hence these hypotheses should be somehow relevant for the hypothetical arguments: In fact, *they* should have given them their name. And they should in some way be part of those arguments.

What are these Stoic hypotheses? An answer to this question requires a brief digression into the Stoic theory of λεκτά, or "sayables" (i.e. roughly: "meanings"): The Stoics distinguished complete and elliptic λεκτά (D.L. VII 63). Only the complete ones are of interest here. The complete λεκτά are those which have propositional structure and which correspond to a whole sentence – although not necessarily to a whole declarative sentence (ibid.). The most important complete λεκτά in Stoic logic are the αξιώματα, which resemble modern "propositions."[5] They correspond by and large to declarative sentences. They are the *only* type of λεκτά that have truth-values, i.e. that are either true or false. Other types of complete λεκτά are questions, commands, oaths – and hypotheses (D.L. VII 66). All these types of complete λεκτά do not have truth-values. This is obvious in the case of questions and commands: e.g. "Do you fancy him?" and "Shut up and eat your porridge!" do not have truth-values. But for the Stoics this seems to hold for their hypotheses as well.

The Stoic definition of "hypothesis" in Diogenes (D.L. VII 67) unfortunately became the victim of a lacuna. But we have some examples for Stoic hypotheses: "Let it be supposed that the earth is the centre of the solar sphere" (ὑποκείσθω τὴν γῆν κέντρον εἶναι τῆς τοῦ ἡλίου σφαίρας, Amm. *Int.* 2.31-2);[6] "Let it be <that it is> night" (ἔστω νύξ, Epict. *Diss* I.25.11); "Let it be that you are unlucky" (ἔστω σε εἶναι δυστυχῆ, ibid., 13).[7] That is, it seems that the characteristic linguistic form in which hypo-

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    [5] For the Stoic concept of αξίωμα cf. the chapter "Stoic Logic" in *The Cambridge History of Hellenistic Philosophy*, Cambridge 1998; M. Frede, *Die stoische Logik*, Goettingen 1974, 32-48.
    [6] Cf. also ὑποκείσθω ἡ γῆ σημείου λόγον ἔχουσα πρὸς τὸν ἥλιον, Σ Arist. *Int.* 93.28.
    [7] In D.L. VII 66 we read ⟨τὸ⟩ ὑποθετικὸν ⟨πρᾶγμα or λεκτὸν αὐτοτελές⟩ instead

theses are expressed begins with an impersonal third person imperative
"let it be supposed that . . .", "let it be that . . ." (ὑποκείσθω . . ., ἔστω . . .).
The hypotheses are the content, or meaning, of such linguistic expressions.
(Note also that all examples correspond to simple or – in Peripatetic jar-
gon – categorical propositions, not to compound ones.) A more accurate
translation of "ὑπόθεσις" in this context would no doubt be "supposition,"
and it is in this sense that I use "hypothesis" from now on.

It seems thus that Stoic hypotheses or suppositions are not propositions:
they are not propositions used as hypotheses in a certain context of argu-
mentation. They may of course have propositions correlated to them.
(For example "It is night" seems to be correlated to "Let it be that it is
night", and so in all cases.) But they are not the same. A proposition has
a truth-value. A Stoic hypothesis – like a command or a question – has
not. For the present, this may suffice on Stoic hypothesis.

There is another reason for assuming that the hypotheses in Chrysippus'
hypothetical arguments are those complete λεκτά called "hypothesis" or
"hypothetical": As the last item in the fourth section on Chrysippus' works
on arguments, and as the only one neither about hypothesis nor hypo-
thetical argument, we have one book "On ectheses, to Laodamas." Now,
in the context of various kinds of complete λεκτά, τὸ ἐκθετικόν occurs
repeatedly together with τὸ ὑποθετικόν (Amm. Int. 3.26ff., Σ Arist. Int.
93b). We get the example "Let this be a straight line" (ἔστω εὐθεῖα γραμμὴ
ἥδε) and learn that "the ecthetic speech is like what the geometers call
'ecthesis'." The occurrence of both "hypothesis" and "ecthesis" in the
same section of titles hence confirms that the hypotheses are the particu-
lar kind of complete λεκτά mentioned in Diogenes. And although the way
mathematicians postulate straight lines, etc. differs from, say, hypotheses
as used in empirical sciences, the similarity between the two is obvious,
and their discussion in close vicinity plausible.

I take it thus for – preliminarily – established that Chrysippus' hypo-
thetical arguments contained a complete λεκτόν of the kind "hypothesis"
or "supposition" in lieu of a premiss in form of a proposition. Accord-
ingly, "suppositional argument" would be a suitable translation of ὑποθετι-
κὸς λόγος, and I will use the expression "hypothetical argument" in this
sense henceforth.

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of ὑπόθεσις; and similarly in Amm. Int. 2 and Σ Arist. Int. 93b. But this does not
mean that two different things are at issue. For comparison, in Log. Zet. XII 14-15
Chrysippus talks of πρόσταξις, but D.L. VII 66 of τὸ προστακτικόν; D.L. VII 66 has
πύσμα, where Anon. Proleg. in Hermog. Stat. 187.3-5 has τὸ πυσματικόν; and in either
case clearly the same kind of λεκτόν is under discussion.

Let us now have a look at the context in which the section on Chrysippus' hypothetical arguments occurs in the list of his writings in Diogenes. This section follows the third section of his works on arguments, which deals predominantly with "changing arguments" (μεταπίπτοντες λόγοι), i.e. with arguments which have at least one premiss that changes its truth-value. These two sections together have their place between Stoic syllogistic on the one hand and writings on fallacies and sophisms on the other. Hence, if we find somewhere in Stoic texts changing arguments together with hypothetical arguments, we should assume that the latter are of the kind Chrysippus wrote about.

In Epictetus there are five brief passages in which he talks about changing arguments (μεταπίπτοντες λόγοι) and hypothetical arguments (ὑποθετικοὶ λόγοι) in the same breath – and always in that order: *Diss* I.7.1 and 20-25; III 2.6 and 17; 24.80. In III 24.80 we encounter the sequence syllogisms, changing arguments, hypothetical arguments, and in III 2.6 the sequence changing arguments, hypothetical arguments, the Liar (i.e. the famous paradox). This fits exactly with the order of Chrysippus' book titles.[8] There is in addition a slightly longer passage in which hypothetical arguments are mentioned, but changing arguments are not (*Diss* I 25.11-13.) I take it that this passage talks about the same kind of hypothetical arguments as those other passages.

In three of these six passages Epictetus also talks about hypotheses. Thus I assume further that in those passages in which Epictetus talks about hypotheses and hypothetical arguments, he talks about the same type of hypotheses and hypothetical arguments about which Chrysippus wrote in the books listed in D.L. VII 196. Hence these Epictetan passages may help us to find out what these arguments were. Three of the six passages provide us with additional information.

In the passage *Diss* I 25.11-13 we learn something about the nature of hypotheses as they are used in hypothetical arguments: Epictetus' mode of presentation is – as often – that of an imaginary dialogue:

> We ought to behave in life as we do in the case of hypothetical arguments.[9] "Let it be night." Let it be. "Well then, is it day?" No; for I assumed the hypothesis of it being night. "Let it be that you believe that it is night." Let it be. "Then

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[8] The order of the books need of course by no means be Chrysippus'; rather it reflects the canonical order of topics in Stoic logic.

[9] This passage is often taken as not dealing with hypothetical *arguments* (λόγοι), but with hypothetical utterances (λόγοι). So e.g. Barnes, *The Toils of Scepticism*, Cambridge 1990, 90-1 and Oldfather's translation (Loeb). But I can see no reason why Epictetus should here use the expression differently than he usually does.

believe that it is night." This does not follow from the hypothesis.[10] (Epict. *Diss* I 25.11-12)

This is not a complete hypothetical argument; it presents the beginning, or a part, of an hypothetical argument. Thus we can infer that the beginning or part of an hypothetical argument includes the – agreed – postulating[11] of an hypothesis. And that is, most probably, postulating it in place of a premiss.

In addition, we learn something more about the nature of the hypotheses. The assumption is agreed upon *qua* hypothesis and not as something that is true, *per se*. (Remember that hypotheses have no truth-value.) The interlocutors agree – as it were – to enter a non-actual "world" built on the respective assumption; but they remain aware of the fact that this assumption and, presumably, any conclusions drawn from it hold only relative to the fact that this assumption has been made.

What would be an example of an hypothetical argument? A definite answer is not possible. But Epictetus' example of an hypothesis "Let it be night" looks like one taken from a logic text book. For "It is night" is one of the Stoic standard examples of propositions. A very simple example of a Chrysippean hypothetical argument would then be this:

If it is night, it is dark.
Now, let it be <that it is> night.
Hence – on the assumption that it is night – it is dark.

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[10] Ὡς γὰρ ἐπὶ τῶν ὑποθετικῶν λόγων ἀναστρεφόμεθα, οὕτω δεῖ καὶ ἐπὶ τοῦ βίου. 'ἔστω νύξ.' ἔστω. 'τί οὖν; ἡμέρα ἐστίν;' οὔ; ἔλαβον γὰρ ὑπόθεσιν τοῦ νύκτα εἶναι. 'ἔστω σε ὑπολαμβάνειν ὅτι νύξ ἐστιν;' ἔστω. 'ἀλλὰ καὶ ὑπόλαβε ὅτι νύξ ἐστιν.' οὐκ ἀκολουθεῖ τῇ ὑποθέσει.

This passage is puzzling. Why does ὑπόλαβε ὅτι νύξ ἐστιν not follow from ἔστω σε ὑπολαμβάνειν ὅτι νύξ ἐστιν? I take it that the verb "to believe" (ὑπολαμβάνειν) is used as a semi-technical Stoic expression, i.e. as the generic term under which fall both "to have a δόξα" and "to have a φαντασία καταληπτική." (This is at least suggested by the context; cf. *Diss* I 25.9, 13, 17.) To have a belief (ὑπόληψις) of something in this sense implies having given assent to it and to consider it as true. (See the index in *SVF* IV, ὑπολαμβάνειν, ὑπόληψις.) Our passage on hypothetical arguments then concerns the illegitimate step from "let it be that you believe that p" to "believe that p" (in the sense of actually performing an act of assent to p): hypothesising that one believes that p may bind one to accept "I believe that p," but it does not entail or require that one actually believes p, i.e. performs an act of assent and consequently considers p as true. In modern parlance: as a result of accepting the hypothesis, the interlocutors are *committed* to q, but they need not have the *belief* that q.

[11] Cf. Epictetus *Diss* I.7.22, αἰτῆσαι.

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That is, this hypothetical argument would differ from a typical Stoic first indemonstrable only in that (i) it has an hypothesis instead of the proposition which was the second premiss and (ii) the conclusion is drawn "depending on the hypothesis," i.e. the conclusion cannot be detached from the hypothesis. (This latter point, admittedly, is so far conjecture on my part; the insertion of "on the assumption that it is night" is simply my way of expressing the non-detachability – I do not suggest that any such proviso was part of the canonical Stoic formulation of hypothetical arguments.)[12] Thus in the above hypothetical argument the first premiss has a truth-value, the hypothesis has not, and it is unclear whether the conclusion was seen as having one.

Let us assume that Chrysippus' hypothetical arguments resembled this kind of argument. This still leaves us with the questions: What was the use of these arguments? Why were they introduced? Epict. *Diss* I.7.22 may help; there we read: "Occasionally it is necessary to postulate an hypothesis as a sort of stepping-stone for the ensuing argument." (ἀναγκαῖον γὰρ ἔστιν ὅτ' αἰτῆσαί τινα ὑπόθεσιν ὥσπερ ἐπιβάθραν τῷ ἑξῆς λόγῳ.) That is, it seems that for some arguments, in order to be able to put them forward or get them going, one needs an hypothesis. But why? Take the above argument. Could I not just as well say:

> If it is night, it is dark.
> But it is night.
> Therefore it is dark.

and add that the second premiss is false, or uncertain, and that the conclusion may hence be false? It appears that according to some Stoics we could not. For they defined the premisses of an argument as the propositions that are adopted for the establishing of the conclusion by agreement (and since they appear evident) (S.E. *M* VIII.302; *PH* II.136). That is, at least in the context of dialectical argumentation, when one puts forward an argument, the interlocutors agree on the premisses as true, and thus, if the argument is valid, one (is bound to accept that one) obtains a detachable, true, conclusion.

This apparently rules out that there are arguments put forward with evi-

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[12] Alternatively, one could suggest that the conclusion of a hypothetical argument is itself a hypothesis. This would make some sense, if the conclusion, "Therefore, let it be that it is dark," were to be understood as "Therefore, hypothetically, it is dark." However, this does not fit in very well with the examples, nor with the general idea of "hypothesis" at the time; it may also raise the question why anyone would bother producing a whole hypothetical argument, instead of simply stating the hypothesis which is the conclusion.

dently false premisses; with premisses the truth-value of which is not or not yet known; or even with premisses which are now false but of which it is known that they will become true. In this way a whole range of arguments appears to be precluded from being used in dialectical discourse by the Stoics: indirect proof, scientific theories grounded on hypotheses not yet established, "thought experiments" of all kinds, arguments for or against future courses of actions, etc.

Perhaps then this is the general area where the hypothetical arguments find their place in Stoic logic. As we have seen, agreeing on an hypothesis as an assumption is not agreeing on the truth of that assumption. Thus all the afore-mentioned kinds of arguments could be put forward in a dialectical context in the mode of an hypothetical argument, substituting the correlated hypothesis for the proposition the truth of which one cannot agree upon.[13]

I do not intend to claim here that Chrysippus thought one could not construct arguments with false premisses. This would lead to disastrous consequences (or at least enormous changes) in logic. Rather, it seems to me, this point has to be understood strictly in the framework of dialectical argument, in which, for the beginning or progression of an argument, at any step, the interlocutors have to *agree* upon the premisses. The definition of "premiss" in Sextus mentioned above surely belongs in this context. And this dialectic context of live discourse is ever-present in Epictetus. In this context it may have been desirable to have a means to agree upon certain things without having to accept or assume their truth.

We thus have a possible reason why the Stoics dealt with hypothetical arguments, i.e. arguments with an hypothesis or supposition in lieu of a premiss. We may now also understand better how they arrived at their concept of hypothesis. Modern philosophers may say that "a proposition is an hypothesis when, and in the context in which, it is hypothesized; it is thus an hypothesis not absolutely, but relatively and within a determinate context of discourse."[14] Being an hypothesis or supposition is thus seen as a relational property of a proposition.

On the other hand, it seems that the Stoics made the function (of an hypothesis) which the premiss has in the context of discourse, i.e. a relational property, into a non-relational property of that "premiss." We may conceive of this in the following way: If, instead of "it is night" the

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[13] Cf. Plut. *Stoic rep* 1055c, where Chrysippus introduces a hypothetical assumption into a kind of "thought experiment": καὶ εἰ λόγου χάριν νοήσαιμεν αὐτὸ καὶ ὑποθοίμεθα. . . .

[14] So for example Barnes 1990, 91.

We can extract from the ancient sources some more confirmation of the above-sketched understanding of Stoic "hypothesis", and some more information about the role hypotheses and hypothetical arguments may have played in Stoic logic.

First, in the works of Sextus Empiricus, there are three parallel passages, of different length, which each contain a set of arguments directed against the assuming of hypotheses in arguments: SE *M* III 7-17, *M* VIII 367-78, *PH* I 173-4.[19] It has been assumed that in these passages Sextus argues "against the reasonableness of using Aristotelian hypotheses," i.e. of first principles, for example those first principles on which science is based.[20] It seems to me that these passages are directed against a conglomerate or amalgam of Peripatetic, Stoic, and mathematical conceptions of hypotheses and hypothetical arguments. For the last sections, *M* III 16-17, *M* VIII 377-8, show that the philosophers (or geometers) criticized are understood as subscribing to the Stoic-Philonian-Diodorean conception of consequence. Moreover, Sextus employs both examples and technical terms from this school of logic. There is furthermore a clear parallel to Epictetus' description of the function of hypotheses as stepping stones into an argument (*M* VIII 367, *M* III 4 and 6), although this is of course equally the Peripatetic view. (Cf. also SE *PH* I 173, the hypothesis as ὑποβάθρα of the argument, with Epictetus' ἐπιβάθρα in *Diss* I.7.22.)

The above-given analysis of the Stoic concept of hypothesis then enables us to solve a difficulty which commentators found with the second of the arguments in the Sextus passage:

> Again, the thing which is hypothesised is either true and such as we hypothesise it, or false. But if it is true, let us not postulate it, having recourse to a very suspicious thing, viz. the hypothesis, but let us assume it <as premiss> directly; for nobody hypothesises that which is true and obtains, such as that it is now day or that I am talking and breathing.[21] (SE *M* III 9, with parallels in *M* VIII 371 and *PH* I 173)

In agreement with modern conceptions of hypothesis Barnes (1990) remarks on this argument: "I cannot find any way to make [it] even mildly plausible. Nor can I discover any persuasive explanation of how Sextus might have come to advance this bewildering thought" (101). He starts

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[19] These passages are discussed in some detail in Barnes, 1990, 99-112.

[20] Ibid. 99 and 93.

[21] καὶ μὴν τὸ ὑποτιθέμενον πρᾶγμα ἤτοι ἀληθές ἐστι καὶ τοιοῦτον ὁποῖον αὐτὸ ὑποτιθέμεθα ἢ ψεῦδος. ἀλλ᾽ εἰ μὲν ἀληθές ἐστι, μηδὲ αἰτώμεθα αὐτό, εἰς πρᾶγμα ὑποψίας πλῆρες καταφεύγοντες, τὴν ὑπόθεσιν ἀλλ᾽ αὐτόθεν λαμβάνωμεν, ἐπείπερ οὐθεὶς τἀληθῆ καὶ ὄντα ὑποτίθεται, καθάπερ οὐδὲ τὸ νῦν ἡμέραν εἶναι ἢ ἐμὲ διαλέγεσθαι καὶ ἀναπνεῖν.

his comments by stating "No doubt any hypothesis is either true or false;" (100), and by listing two curiosities of the arguments: "what is wrong with a true hypothesis?" (100), and "whatever can be the contrast between hypothesizing something . . . and "directly" assuming it as true . . .? (101).

However, the argument makes good sense, if one understands it as being directed against a concept of hypothesis along the Stoic lines.[22] For, as we have seen, a Stoic hypothesis does not have a truth-value, and is substituted for a premiss in an argument, when one cannot agree upon the truth or evidence of the premisses. Accordingly, in our passage, we find a distinction between "the thing which is hypothesised" (τὸ ὑποτιθέμενον πρᾶγμα), which is said to be true or false, and the "hypothesis" (ὑπόθεσις), of which it is not said that it has a truth-value. The πρᾶγμα (a word often used for complete λεκτά, and in particular for propositions) may hence refer to the proposition which is correlated to the hypothesis.

Sextus' criticism is then simply based on the fact that the dogmatists (the Stoics in this case) use hypotheses in arguments only when the truth-value is uncertain. When it is known to be true, it is assumed (λαμβάνειν) directly (αὐτόθεν), i.e. qua proposition, and not by using an hypothesis as "proxy" for it. The fallacious element in Sextus' argument is that from the fact that every proposition is either true or false he unjustifiedly jumps to the conclusion that when we put forward an argument we *know* the truth-value of our premisses – which is exactly not the case in those cases in which the Stoics use hypotheses instead of propositions.

One use of hypothesis in logic, in arguments in which it is essential that one may be ignorant of the truth-value of the corresponding proposition, is documented in SE *M* VIII 468.[23] The task is here to show that the conclusion "proof exists" (p) follows from the premisses

  (i)   If p, p
  (ii) If not p, p
  (iii) Either p or not p

The method of argumentation used in this passage is, in brief, to introduce two hypothetical arguments, each including one of the conditional premisses (i) and (ii), and that disjunct of (iii) with which the respective premiss would form a first indemonstrable:

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[22] Note that the examples in SE *M* III 9 are typical Stoic examples for evident propositions.
[23] Sextus himself makes use of this type of reasoning in *M* VIII 294 and *PH* II 189-90.

If p, p.	If not p, p.
Let it be that p.	Let it be that not p.
Hence, on the hypothesis of p, p.	Hence, on the hypothesis of not-p, p.

Here all (that is both) possibilities given by the exclusive and exhaustive disjunction have been hypothesised separately, and the same conclusion follows each time. This is a method for showing the validity of arguments which consist of (a) two or more conditional premisses with the same consequent (b) an exhaustive, but not necessarily exclusive, disjunction of the antecedents of all the conditional premisses, and (c) the proposition which is the consequent of all conditional premisses as conclusion. Not all of these arguments can be analysed in Stoic syllogistic, and this method of using hypotheses may hence have been used as a substitute. For the validity of such arguments is independent of which of the disjuncts is true, and the use of hypotheses is hence in line with what has been said above.[24]

Lastly, one notable feature, both in Diogenes' list of Chrysippus' writings and in Epictetus, is that the hypothetical arguments are presented in close connection with sophisms. The last two titles on hypothetical arguments in D.L. VII 196 are "solutions" of hypothetical arguments,[25] and there is a third such title in section six on arguments, which deals with sophisms (D.L. VII 197). A passage in Epictetus suggests that the practice of hypothetical arguments could lead to nonsense results and to specific fallacies (Epict. *Diss* I.7.22-26, cf. III 2.17). The hypothetical arguments that need solutions are of the kind that, once an hypothesis has been granted as premiss, one can derive statements from it (together with other premisses) that are in logical conflict with the hypothesis (*Diss* I 7.24); or one can derive an impossibility (ibid., 25); or an absurdity

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[24] A further use of Stoic hypotheses and hypothetical arguments may have been to express what the Peripatetics dubbed "wholly hypothetical syllogisms," but which were not syllogisms (not analysable or reducible to indemonstrables) for the Stoics (see above). For in his *De Hypotheticis Syllogismis* Boethius presents (Peripatetic) wholly hypothetical syllogisms of the first figure as

If p, q; if q, r; p; therefore r.

And arguments of this type can be reduced into indemonstrables by a single application of the third *thema* (i.e. the third of the four Stoic rules of inference, see Bobzien 1996). So, some later Stoics may have considered wholly hypothetical arguments as valid in the specific sense, and may have offered constructions of the above kind as "corresponding" syllogisms. Perhaps they constructed them as (Stoic) hypothetical arguments, with the premiss p as hypothesis only, and a conclusion "therefore, on the hypothesis of p, r." This is of course mere conjecture.

[25] Although one of them is marked as spurious.

follows (*Diss* III 2.17). Logical training was required to be able to spot hypotheses which one was meant not to grant. These passages in Epictetus make it clear that not *all* hypothetical arguments were considered as fallacies. Accordingly, I take it that not all hypothetical arguments require solutions (λύσεις), but only those with a fallacious character.[26] We can then assume that Chrysippus' solutions dealt with fallacies of the kind Epictetus mentions.[27]

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[26] The case is similar for the above-mentioned changing arguments (μεταπίπτοντες λόγοι). I assume that they are simply those arguments which have premisses that change their truth-values, and which arguments, if valid, may accordingly change their truth-value, true arguments being defined as valid ones with true premisses (SE *M* VIII 312). There are however special cases, in which the stating of the premisses or conclusion itself leads to the change of truth-value of one of the premisses, and these are in need of solutions, and are the ones Epictetus has in mind in *Diss* I 7.20-1. One such argument has been handed down in SE *PH* II 231, 234.

I surmise that the fallacies in the case of hypothetical arguments were connected with the question of the epistemic status of hypotheses and perhaps with the restrictions the postulation of one hypothesis may impose on postulating further hypotheses.

[27] This piece is the revised version of the Stoic half of a lecture "Ipotesi e argomento ipotetico nella logica Stoica e Peripatetica" given as part of the Erasmus programme in Padua in 1994. Thanks are due to Mario Mignucci and Gerhard Seel for valuable comments.