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## The Logical Investigations of Chrysippus

Chrysipp (3. Jh. v. Chr.), der Dritte der stoischen Schule, war einer der bedeutendsten Logiker der griechischen Antike. Seine vielen Bücher sind alle verlorengegangen, und unsere heutige Kenntnis der chrysippeischen bzw. stoischen Logik rührt von verschiedenen Quellen her: elementaren Einführungen in die Logik, allgemeinen Berichten (die oft oberflächlich sind), polemischen Anspielungen, fragmentarisch erhaltenen Zitaten oder Bruchstücken. Unter den wichtigsten Fragmenten befindet sich eine Papyrusurkunde, deren dreizehn Spalten einen Teil von Chrysipps *Logischen Untersuchungen* wiedergeben. Der Papyrus ist lückenhaft und schwer zu lesen. In den letzten beiden Spalten, die relativ gut erhalten sind, kann man die Überreste einer detaillierten Diskussion von Problemen der Logik tier Befehlssätze erkennen. Diese Problematik, an sich für die heutige Philosophie höchst interessant, ist bezeichnend für das weit- und tiefgehende Interesse der stoischen Logiker. Zudem geben die Spalten wichtige Auskünfte über die Grundlagen der chrysippeischen Logik.

In the third century BC the Stoics developed a subtle logical theory. The chief architect of the theory was Chrysippus, the third head of the School: if the gods needed logic, it was said, then they would use the logic of Chrysippus. There have been three giants in the history of logic: Aristotle, Chrysippus, Frege.

Chrysippus wrote more than three hundred books on logical subjects. All are lost. Lost too are all the works written by Chrysippus' Stoic successors. Modern attempts to reconstruct the logic of Chrysippus rely on three kinds of evidence: first, there are the few fragments of Chrysippus' own works, some preserved on papyrus and others surviving as quotations in later authors; secondly, there are various handbooks and summaries (Galen's *Institutio logica*, the account of Stoic logic in Diogenes Laertius' *Lives of the Philosophers*); finally, there are critical and polemical notices and discussions in later texts (for example, in Alexander's commentary on Aristotle's *Prior Analytics*).

The difficulties which any reconstruction must meet and overcome are daunting. Two of these are often overlooked and deserve particular mention. There is first the problem of dating the information we find in our sources. Although Chrysippus was indisputably the greatest figure in the history of Stoic logic, so that we may properly speak of Chrysippean logic, nevertheless his followers were not mere parrots. We know that some of them in some respects modified his views or added to them. Thus when a

late source speaks of 'the Stoics' - and such indeterminate forms of reference are the rule - it is often quite uncertain whether he is reporting old Chrysippean doctrine or adverting to some subsequent theory. In general, scholars are too prone to ascribe things to Chrysippus.

Secondly, there is a difficulty caused by the gross disparity between the handbooks and summaries on the one hand and the fragments and polemical discussions on the other. The summary material is introductory, superficial, uninspiring: the fragments and the discussions indicate something sophisticated, detailed, profound. Scholars tend to put too much emphasis on the summary material. And it is in any case hard to combine evidence of two such disparate types and to form a convincing story of Chrysippus' original logic. It is as though our understanding of Shakespeare's plays depended on a handful of quotations and a Guide to *Hamlet* of the sort produced for American college students'.

The surviving fragments of Chrysippus, spare and sparse though they are, thus assume an enormous importance. And the most important single fragment is the battered papyrus text of Chrysippus' *Logical Investigations* which was discovered in the lava of Herculaneum. What follows here is a preliminary discussion of two columns of that invaluable and puzzling papyrus<sup>2</sup>. I offer an English translation and a brief commentary. The Appendix prints the Greek text which the translation presupposes; to the Appendix are relegated a few notes on matters of detail.

(A) *Translation:*

XII ... such cases too, for example: "Walk - otherwise sit down". For everything falls under the command, but it is not possible to take any  
15 predicate in its place; for no object is exhibited by such a thing as "He is walking - otherwise sitting down".

20 Now we *use* such things, for the sake of brevity, fore. g. "Walk, but if you don't do that, sit down", and e. g. "Please walk, but if you don't do that, sit down". And this can be extended still further - indeed, it  
25 ends (?) ... (?) "He is walking - otherwise sleeping", and "He is most probably doing this - otherwise this - otherwise this". (?) ...  
30 (?) was commanded (?) ... (?) that he is walking - otherwise sitting  
35 down...

XIII ... commanded not to do it. But such cases - "Either walk or sit  
down" - will be used ambiguously: in one sense (?) ... (?) is com-  
10 manded; in the other, this: "This - otherwise this".

15 Then shall we say this - or should we assert that here too what is commanded does indeed exist (in the way in which there is a statement of the sort "Dio is walking - otherwise sitting down"), and that

- 20 it is plausible that there is a predicate of the sort *to be walking- otherwise sitting down*, and that if this is so it is also plausible that things of this sort are commanded?
- 25 Next, there is another matter of this sort worth attention: perhaps those who command in the following way - "Take whichever of these", and "Take any one of these" - command nothing. For it is not possible to find any predicate that is being commanded, nor anything else of that sort at all.

(B) *Commentary:*

The Stoic theory of *'texrâ* or *'sayables*' distinguished between complete and incomplete sayables. The latter included predicates or *xarr7YoQr77zara*. The former came in a variety of sorts - statements, questions, commands, oaths, etc. We find eight lists of complete *.lexrâ*, no two of them identical, in the ancient sources. The *iricoua* or statement was naturally the most important of the complete *2exrâ* from the point of view of logical theory, but there is evidence that the old Stoics also discussed the logical properties of other types of complete sayables - for example, oaths (Stobaeus, *Anthology I* xxviii 18). The Greek grammarians took the Stoic list to be tantamount to a list of the grammatical *moods*. Modern scholars tend to treat it rather as a list of *speech-acts*. Neither interpretation is wholly satisfactory, but it is not my intention to discuss these general issues here.

Columns XII-XIII of Chrysippus' *Logical Investigations* deal with a particular problem within the logic of commands. (The command, *MQoataxrt-xbv*, features in most of the lists of complete *Aexrâ*.) The problem is discussed in terms of the imperative utterance:

- (1) Walk - otherwise sit down.

But it is raised generally by all imperatives of the form "Do this - otherwise do that".

The end of column XIII introduces a new problem of the same sort. One of the problematical imperatives here is:

- (2) Take whichever of these.

The problem raised by (2) is plainly stated. Sentence (2) appears to be a perfectly intelligible imperative; yet there is here no predicate which is commanded. For *to take whichever of these* does not seem to be a predicate at all, inasmuch as the putative indicative sentence "He is taking whichever of these" makes no intelligible assertion.

The problem with (1) is entirely analogous. Sentence (1) appears to be an intelligible imperative - it is in use (XII 20). Yet "it is not possible to take any predicate in its place" (XII 15-17), since *to walk - otherwise sit down* does not seem to be a predicate. And this does not seem to be a predicate because the

putative indicative sentence "He is walking - otherwise sitting down" does not 'exhibit an object' (XII 17): it fails to signify a  $\tau r Q \hat{a} y, u a$  or a  $I g x z b v$  and hence makes no intelligible assertion.

This exposition of the problem raised by (1) and (2) implicitly invokes two semantic principles. First, it is assumed that if " $!_O(a)$ " commands anything, then  $to_O$  is a predicate. (I use " $!P$ " to represent the imperative sentence "Let it be the case that P". " $!_O$  you walk" represents "Walk") The thought is surely this: a command is issued only if there is something which counts here as obedience (or disobedience); but to obey a command expressed by the imperative " $!_O(a)$ " is to bring it about that  $a$  possesses the predicate  $to_O$ . Hence commands presuppose corresponding predicates: the predicate can indeed be said to be what is commanded. Secondly, it is assumed that if  $to_O$  is a predicate, then the indicative sentence " $\phi(\delta)$ ", where " $\delta$ " is a demonstrative, can express a statement or  $\hat{a} 4 i w, u a$ . For every predicate " $O$ " there is a corresponding definite statement " $O(a)$ ".

Both these semantic principles seem eminently reasonable. Given the two of them, the imperative sentences (1) and (2) must come to seem puzzling.

Chrysippus' answer to the problem raised by sentence (1) occupies the central portion of column XIII (lines 15-24): at all events, the phrase "or should we assert that .. ?" appears intended to introduce his solution. Between the statement of the puzzle at XII 12-19 and the statement of its solution at XIII 15-24 occur two puzzling sections of text. It is unfortunate that the end of column XII and the beginning of column XIII are both mutilated beyond repair.

XII 20-36 divides at line 25. In the latter section ("And this can be ..:'), Chrysippus seems to be contemplating an extended version of the problematical sentence. As well as "rp - otherwise yr" we may find " $O$  - otherwise  $y r$  - otherwise  $x$ ", and so on. In lines 29-32 it is probable that there is mention of the putative indicatives which would correspond to such extended imperatives; and in lines 35-36 it is possible that Chrysippus referred to the putative predicates which would be commanded or asserted by the extended imperatives or indicatives. But the text here is fragmentary. It is not clear what role the extended cases play in the argument - whether they require and receive a special solution, whether they are thought to help with the simple case, and so on.

Nor are things much clearer with XII 20-25, where the text contains gaps at crucial points and where the grammar of what can be read is highly uncertain. Two different interpretations of these lines seem possible.

First, the point of the lines may simply be to insist that the imperative (1) has an intelligible use: it is a short form of the imperative:

(1\*) Walk - but if you don't do that, then sit down.

Since (1\*) is surely acceptable, and (1) is merely a short version of (1\*), then (1) must - whatever the problems it raises - be an intelligible imperative and hence it must somehow command something.

That interpretation is unexciting, but it fits the lines into their context and it may well be correct. It is nonetheless worth sketching a second and more ambitious interpretation; for whether this interpretation is right or wrong, it will help to elicit a further aspect of the puzzle case. We might be tempted to see in XII 20-25 a proffered solution to the problem - a solution which may seem initially plausible but which Chrysippus himself does not accept. For if (1) is a short version of (1\*), then we shall have dissolved the problem which (1) appears to raise if we can show that there is no genuine problem with (1\*). And it might well be thought that (1\*) is not at all problematical.

Sentence (1\*) is a complex complete. *Iexrbv*. Its form is perhaps exhibited by the formula: "(! rp (*a*)) and (if not  $\epsilon a$  (*a*), then ! yr (*a*))". That is a conjunction. It will be unproblematical if each of its conjuncts is unproblematical. The first conjunct is plainly non-problematical: it is a command, and the predicate commanded is *to ca*. The second conjunct is a conditional. Its first member is a statement which embeds the predicate *to ca*, and its second member commands the predicate *to yr*. There is no difficulty here in finding the predicates which legitimate sentence (1\*) and show how it is intelligible.

Thus it remains true that there is no (single) predicate commanded by (1). But that is because (1) is, so to speak, a disguised conjunction. Once the disguise is removed, the apparent difficulty disappears with it.

This solution is certainly suggested by XII 20-25 even if the original point of the lines was not to advance it. It is not the solution which Chrysippus eventually gives. Why did Chrysippus reject it? (Or why would he have rejected it?) And should it be rejected?

At XII 13-15 Chrysippus says that in the case of (1) "everything falls under the command". This remark contains two important points. First, the whole content of (1) must be construed as being commanded. In our notation (1) has the form "! P", where the command operator governs the whole sentence. Secondly, sentence (1) expresses a single command - in our notation it will be expressed by means of a single "!". Neither of these things is true of sentence (1\*) as we have construed it: it is neither a single command nor nothing but a command. Hence (1\*), so construed, cannot express the same thing as (1), and the fact that (1\*) is unproblematical does not show that (1) is unproblematical.

The Chrysippean objection to the proposed solution seems correct. At all events, it is implausible to construe (1) as issuing *two* conjoined commands - the more so in that the two cannot be simultaneously obeyed. In fact (1\*), construed as we have construed it, begins itself to look very strange once we reflect upon it: if it is indeed synonymous with (1), then it must be

understood by way of our understanding of (1) and it cannot be used to shed light on (1). It is precisely the fact that (1) issues a *single* command which is puzzling: it surely does issue a single command - and yet there appears to be no single predicate which it commands.

It might be thought that the problem with (1\*) is that it is conjunctive. Perhaps we should replace it by a disjunctive imperative? That, it seems, is the suggestion which was canvassed at the beginning of column XIII. Line 14 ("Then shall we say this .. 7) refers back, with implicit dismissal, to a preceding attempt at solving the puzzle. From line 9 it is clear that the solution had something to do with the disjunctive imperative:

(1\*\*) Either walk or sit down.

The simplest way of discovering a putative solution in (1\*\*) is this: sentence (1) is synonymous with (1\*\*); but (1\*\*) is unproblematical; hence the apparent problem with (1) is only apparent. (Sentence (1\*\*) is evidently unproblematical if it is construed as having the form "(!  $\zeta\phi$  (a) or (!  $\zeta\phi$  (a))", for then it involves the two predicates *to  $\phi$*  and *to  $\psi$* . It is also unproblematical if it is taken as "(! (rp (a) or yr (a))"; for then we have the disjunctive predicate *to  $\psi$  or  $\nu$*  available if it is needed.)

Chrysippus' rejection of this solution involved the objection that (1\*\*) will turn out to be ambiguous. One sense of (1\*\*) is given at XIII 13: (1\*\*) will have the sense of (1). The other sense was explained in the illegible lines 9-12. That sense must surely have been the *normal* sense of (1\*\*), the sense in which it conveys a simple disjunction of commands (or perhaps a disjunctive command). If that is what Chrysippus had in mind, then it constitutes a rejection of the proposed solution of the puzzle. For if (1) is not synonymous with (1\*\*) in its *normal sense*, then nothing is gained by appealing to a synonymy between the two sentences; for any puzzles which (1) may raise will equally be raised by (1\*\*) when it is construed in its non-standard sense.

And it is plain that (1) is not synonymous with (1\*\*) in its normal disjunctive sense. For example, (1\*\*) is equivalent to:

Either sit down or walk.

But (1) does not convert in that way. Equivalently, you satisfy (1\*\*) equally well by walking and by sitting down, but that is not the case with (1). It is in this difference between (1) and (1\*\*) that the unity or singleness of (1) consists.

There remains Chrysippus' own suggested solution to the puzzle. What he thinks emerges without ambiguity from the text. Sentence (1) *does* express a command (XIII 15-16, 22-24). There *is* a predicate of the form *to walk- otherwise sit down* (XIII 19-22). There is a statement of the form "Dio is walking - otherwise sitting down" (XIII 17-19). And it is clear that this does, in a way, constitute a solution to the problem raised by (1). The prob-

lem arose because there seemed to be no predicate commanded by (1): Chrysippus now decides that there is an appropriate predicate - and the problem disappears.

In another way, this must seem to be no solution at all. Why does Chrysippus now think that there is a predicate of the relevant sort? How is it that the difficulties with such a putative predicate have suddenly vanished? For a solution, we need more than Chrysippus' bland assertion that, after all, the predicate is there to be commanded.

It is, of course, possible that Chrysippus said more in some lost part of the papyrus - perhaps after his discussion of the analogous problem which is raised at XIII 24. And it is tempting to think that XIII 15-24 contains a hint or two toward the content of Chrysippus' hypothetical explanation of his solution. For strictly speaking Chrysippus does not say that there *is* a predicate of the sort in question - he says that *it is plausible* that there is such a predicate. And, secondly, the statement corresponding to the predicate is not a 'definite' statement ("This man is walking - otherwise sitting down") but an 'intermediate' statement ("Dio is walking - otherwise sitting down"). Perhaps these two facts are hints?

The second of the two semantic principles presupposed by the puzzle was this: if  $to \phi$  is a predicate, then the definite indicative sentence " $\phi$  ( $\delta$ )" can express a statement. Perhaps Chrysippus is now hinting at a weaker version of this principle: if  $to \phi$  is a predicate, then some intermediate indicative sentence of the form " $\phi$  ( $a$ )" - where " $a$ " is a proper name - can express a statement. Now even though "This man is walking - otherwise sitting down" does not express anything, "Dio is walking - otherwise sitting down" does express a statement, and hence it is at least plausible that there is a predicate of the form *to walk - otherwise sit down*.

If this was Chrysippus' line of thought, then he must have seen a crucial difference between the definite sentence:

This man is walking - otherwise sitting down,  
and the intermediate sentence:

Dio is walking - otherwise sitting down.

Now we know that the Stoics did think, correctly, that there were important logical differences between definite sentences of the form " $\phi$  ( $\delta$ )" and intermediate sentences of the form " $\phi$  ( $a$ )". But I have been unable to think of any sensible way of applying these differences to the case before us: I do not see how, in this case, the difference between definite and intermediate statements is, or could be thought to be, of any significance.

If that is right, then the use of an intermediate sentence at XIII 18-19 is of no importance. And when Chrysippus says that it is plausible that a predicate of the required sort exists, he means just what he says: given that (1) seems to be an intelligible single command, then there surely must some-

how be a predicate which it commands. Perhaps it is difficult to see what this predicate could be; but exist it plausibly will. On this view of the text, Chrysippus is not really purporting to solve the puzzle raised by (1). The *Logical Investigations* are, after all, *c7)rimara* and not *Aûogiiç*. The goal is the raising of problems and their discussion - it is not, save incidentally, their solution.

Finally, it might sanely be wondered if there is really a problem here to be solved. Both Chrysippus' semantical principles may well seem sound; yet together they only raise a problem with sentence (1) if we are inclined to believe that *to walk - otherwise sit down* is not a genuine predicate, and that "He is walking - otherwise sitting down" is not an intelligible indicative sentence. But why should we be suspicious about the predicate or the sentence? They are, perhaps, a little odd; but that is not to say that the predicate does not exist and the sentence signifies nothing.

I am inclined to think that Chrysippus was right to see a small puzzle here. We might well think that we can understand an imperative sentence only if we grasp the conditions under which it is obeyed. (Obedience conditions stand to imperatives as truth conditions stand to indicatives.) Yet it is curiously difficult to express the obedience conditions of sentence (1) - and if it has no obedience conditions, then it is not a genuine command. If you address (1) to me and I go for a walk, then I have clearly obeyed you. And equally, if I do not go for a walk but sit down, I have obeyed you. But there is clearly more to the command than just that. (Compare the advice: "Fly *via* Hannover - or better fly direct". If I fly direct, I have taken your advice. So too if I fly *via* Hannover. Yet that is not all there is to the advice, and someone who knew only that it could be taken in either of these two ways would not have understood it.) It is what the command has over and above these two features which gives it its unity and which constitutes the problem which Chrysippus addresses.

## Appendix

- XII 12 *xa[i ro:]o[6]uov oi[o]v ne-  
ptnâre[i, ei (3)]è /sr/, xçfiY[ou]. nav-  
ra /lè[v y]à[p] tin[d] rily [n]pôa-  
15 raçrtv ninre:, xarriydrip[  
dè] /seradaßeiv oini[èv] t æ-  
rrv. où\$èv yâp è,ccva[ive:] ro:-  
ôûro npâypa, oiïroç [ne]p:na-  
r[e]i, ei dè /d/, x&:%7ra:. [èa]r:v  
20 y' i/ xpeia ro:a6r77 d:à [r]où  
[rà]xouç )6') oiov nep:nC:re:, è-  
àv dè roâr[o /s]tj èxno:[p, x]è-  
i3ou, xa7 oiov /tâ.l:ara [c]èv ne-*

- pitâtei*, èàn dè ToúTO [p]r7 èx-  
 25 *nolt*), xáaov. diivazai [d'] eif  
*td xai èni [7f].1éov èxt[eNeo-*  
*aaí xai ín] dia{v} xaranava*  
**t**..... mTOUTWV..e.  
 . . ev[nepi]nazel, ei d[è pr~,  
 30 xaaevde[i], xai páPio]ta [Woi]et  
*ram*, ei dè [p]i), T011[TO nolci, Ei dè  
 flT), mÚr[o . . .] o]TWÇ  
*O. vorv* ..... [o]úrnyç .....  
 . pay np[oa]Teraxénavi .....  
 35 *toi*][T]ov We[pzHateiV, ei Sè  
 pr), xaaí)aa[ai . . .] ev(pa

- XIII 6 Wpoa-  
*tâ[tT]e[a\$]ai pt) n[oiei]v. tô dè*  
 TOIOUTO d[I]x(Wf p7a1a[e]tat, ïl  
 nepznCTe[i])] xüü[OU], Wv TÓ p[èV  
 10 èa[zi] .....  
*fi[e]f* .....] OUTWVriEV [. . .  
*pe[. . . t]poatâttecaai, t[d*  
*dè [toioút]o, toúto, ei dè pri, [to]ú-*  
 TO. Hót[e]pov otiv TanTa .lè[çro-  
 15 *mev ni priTéov xánrahaa ei-*  
*va[i d]r/ td tpo[a]Tarrópevon,*  
*dv tpóHov è[o]zi Toioáto áef-*  
*npa, nepzta-rel diWv, ei dè*  
*pi), xCariral, xai xat>[yóp>)-*  
 20 *p]a nia[a]vón eival Toioútro,*  
*nepitateiv, ei Sè pf], xa19r!je-*  
*aaí . ei dè toúto, xai npoaTCÉT-*  
*teca]ai t[oí]oúzo niaavón ei-*  
*val. Merà Sè Taúta xai [etÉ-*  
 25 *pa èariv ènictaaic TO[i]aú-*  
*t>), priHOre xai oi oÚ2-cog npoa-*  
*rattpVTeç, O ETUxe TOUmV*  
*.laβé, xai ðHoiovo[úv Tod]rnn*  
*~aβé, oúa[e]v HpoσTiczpovov.*  
 30 *oÚTe yap xatpíyóplpá Ti ëa*  
*πiv ellpeiv TÓ [Wpoai]arr6p[e-*  
*VOV OÚTe rozOÚzOv OÚ-*  
 aÉV.

XIII 12-13: The old texts read o[úroç]; Frede and I conjectured olov, and Marrone has now read o[i/o]v. The two verbs in the example could be restored in the

- indicative, *neptnarei* and *xat9Yirat*. But the run of the argument makes the imperative reading far more likely.
- 15-16: The old texts read *xarr7Yopria*], but *xarriyôpriatç* is otherwise unknown. Marrone sees no sign of a sigma but possible traces of *amu*. She tentatively suggests *xarr7Yop4u[aroç I ôiè]*.
- 17: I construe *rotoiro* as subject and *ornltèv npâyma* as object of *kittpaivet* (which then has the same sense as *aripaIvet*, as often in e. g. Apollonius Dyscolus); *oûroç xr2* is then in apposition to *rotoi ro*. This is not easy. Frede has wondered if *ki.ivaivei* can be taken in a middle sense ("No such object as *o&roç xr2* reveals itself"). On any account the *npaypa* is (as often in Stoic texts) a 2.exr6v.
- 20-21: Reading and sense are obscure. I have supposed that the scribe wrote *ô' oiov* by mistake for *oiov*, and I have construed the sentence as a brachylogy, But I have no confidence in this.
- 30: *xat?evôe*[t is indicative; hence *nepurarei* is better than *nepinaret* in line 29, and Chrysippus is providing a putative example of the sort of indicative which would parallel the problematical imperative. Some have thought that the verb is wrong: why should we suddenly change from *xa\$rirat* to *xaÛeûôet*? But since Chrysippus is talking here about the extended examples of the puzzle case, we should in fact expect a new verb. We might indeed desire something like: "He is walking - otherwise sitting - otherwise lying down".
- 32: The old texts read *eîç ânetpov* here, and suggested that Chrysippus was imagining an indefinitely extended imperative of the form "Do this - otherwise this - otherwise this - otherwise this - ..". Marrone's reading makes this reconstruction impossible. But her new reading at line 27 (*xaranaua I r*] for the earlier *xarrix[... I r*]) may suggest the introduction of essentially the same thought. (Perhaps the text read: "And indeed it ends never")
- 36: The infinitive, *xabiim* [at, will express the predicate, *to sit down*. It is tempting to suppose, after Crönert, that the letters *evtpa* hide some form of the verb *epçoaivety*.
- XIII 9-12: The text is wholly uncertain. The readings offered by earlier editors differ vastly from one another. Marrone's new readings unfortunately leave us with too little to build on.
- 14: Where I print *2éleo I pry* others prefer *2é[yo I pry* or *2é[yw I pry*.
- 20: Editors take *rn avôv* as an adjective with *xarriyôpriµa*: grammatically that is possible - but it is hard to know what a 'plausible predicate' might be. In line 23 *wtûavov* must be taken as "it is plausible that .. 7: the same construal is therefore probable in line 20.

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## Notes

1 During my months in the Wissenschaftskolleg the chief object of my research was Stoic logic. The results of this work will eventually appear in the *History of Hellenistic Philosophy* which Myles Burnyeat, Tony Long and I are editing for the Cambridge University Press. The present paper is no more than a preliminary report of 'work in progress': further study will certainly modify some of the suggestions tentatively advanced here, and - more importantly - it will set the subject in the larger context of Hellenistic logical theory.

I should like to record here my profound gratitude to the Wissenschaftskolleg for electing me a Fellow, and for providing ideal conditions in which to work. I owe a particular debt to the Library, whose staff were unfailingly helpful, and to the Sekretariat, whose patience and skill were unsurpassable.

It was remarkably pleasant to have as colleagues in Berlin my friends Jacques Brunschwig, Michael Frede and Günther Patzig. Our regular Tuesday meetings were always profitable and often thrilling. They were, for me, one of the most enjoyable features of a wholly enjoyable sojourn in Berlin. The topic of the present paper was discussed on a Tuesday afternoon, and the paper itself essentially reflects a collaborative effort to understand a difficult text.

2 The papyrus has been published more than once. In many places the different published versions print puzzlingly different readings. I rely principally on the composite text in K. Hülser, *Die Fragmente zur Dialektik der Stoiker* (Konstanz, 1982). Livia Marrone is shortly to publish a new text of the whole papyrus, and a definitive account of the columns I discuss here must wait upon this edition. She has, however, already made public a number of important new readings ('Nuove Letture nel PHerc. 307 (Questioni Logiche di Crisippo)', *Cronache Ercolanesi* 12, 1982, 13-18), and in correspondence with me she has answered a number of questions about disputed passages in the two columns: without her generous advice I should not have attempted to write anything on this subject.