AH: A CORPUS-BASED EXERCISE IN CONVERSATIONAL ANALYSIS

Guy Aston
Università di Bologna

0. Approaches to spoken discourse phenomena

In manifesting a convergence of participant worlds in conversation, and in providing talk with the characteristics of an orderly product, an important role seems played by what we may call ‘minimal responses’ - *mhm, yeah, I see, OK, oh* and the like. Until recently they have however been little studied, probably because they are essentially discourse rather than sentential phenomena - their meaning, to a very large extent, is a matter of use rather than usage. And as with most discourse phenomena, the intuition-based approaches of mainstream linguistics seem pretty unhelpful - it is difficult to come up with anything very convincing in descriptive terms from an intuitive interpretation of paradigmatic substitution in, say,

— I loathe George Eliot.
— Ah/Right/Oh/I see/Mhm/OK

We need to look at naturally occurring talk if we are to describe these things at all adequately. And in recent years, a certain amount of work on minimal responses has been carried out doing precisely that: in corpus linguistics (Aijmer and Henry, 1985), and in conversational analysis (CA: v Heritage, 1985, for a review). The latter approach has the advantage of being theory-driven: it considers utterances both as means of achieving and manifesting convergence and of producing sequentially orderly talk (for a clear example of the interaction of these two viewpoints in CA, cf Sacks and Schegloff, 1973), whereas the corpus linguists have gone in for eclectic ad hoc categorisations. It is therefore from a CA standpoint that I want to here examine the minimal response *ah* (including the variant *aha*) as it occurs in the PIXI corpus of bookshop encounters¹. There are something over 150 encounters between customers and assistants in the English portion of the
corpus, and 31 transcribed occurrences of *ah(a)*. Given the homogeneous nature of the corpus, and the limited number of occurrences of *ah* within it, the considerations here have no pretense to universality. In particular, it should be noted that the corpus consists of instances of what Brown and Yule (1983) term primarily transactional speech, i.e., where the main concern is with information transfer. Examination of a corpus of primarily interactional speech, i.e., where the main concern is with interpersonal rapport, might, I shall suggest, lead to rather different findings.

1. Ah *in and out of conversation*

   *Ah* is an instance of what Goffman (1978) terms ‘response cries’, along with *oh*, *ow*, *oops*, *phew* and a host of others. He characterises these as being essentially ‘self-talk’, i.e., as being utterable without their producer being priorly engaged in a state of talk with others, and he proposes that the use of such cries ‘cannot be adequately analysed without reference to their original function outside states of talk’ (p. 122). So let me start with one or two (intuitive) observations on this function. I suspect I go ‘Ah’ to myself when I find something I’ve been looking for, see something (or one) I’m charmed by, come in from the cold or go back to bed. It seems to me that in all these examples I overtly (verbally) respond to, and thereby bear witness to, a change in my affective state, moreover with the implication (at least in these examples) that this new state represents an improvement - there is an implied evaluation of this change as relevant to my well-being.

   With this sketch in mind, which I leave the reader to match from his own experience, let us move to *ah* in conversation. In what follows I shall be drawing extensive parallels with work by Heritage (1984) on *oh*, both in its conceptual framework and its methodology. Heritage suggests that *oh* is a change-of-state token which is used as a ‘news receipt’, i.e., indicating that its producer has experienced a change of state from one of being uninformed to one of being informed. I shall similarly posit that *ah* is another change-of-state token, leaving aside for the moment whether it manifests cognitive (i.e., informational) change, as Heritage claims for *oh*, or affective change, as implied by the self-talk introspective examples above; and whether this change is for better or worse. Methodologically I shall follow Heritage in considering sequential context, i.e., how *ah* is placed with respect to preceding and following talk. For if *ah* is a response cry, we must see what sort of things it is used to respond to, and if it is a change-of-state token, we must
seek evidence in what follows it if we are to understand what change of state has been brought about. Specifically, I want to focus on the following contextual features:

**Sequence**
Type of sequences in which turns with *ah* occur

**Turn**
Type of turns in which *ah* occurs

Position of the turn with *ah* within the sequence

Position of *ah* within the turn (turn-shape)

Implications for sequence continuation

Implications for turn continuation

I shall discuss the occurrences of *ah* in the data in three groups, classed according to the first two of these criteria, i.e., the type of sequence in which they occur, and the position of the *ah* turn within that sequence. Some statistics on distribution are provided in table 1.

Table 1
*Distribution of ah(a) in the corpus (150 encounters ca)*

<table>
<thead>
<tr>
<th></th>
<th>occurrences</th>
<th>encounters with <em>ahs</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>customer</td>
<td>23</td>
<td>16</td>
</tr>
<tr>
<td>assistant</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>total</td>
<td>31</td>
<td>21</td>
</tr>
</tbody>
</table>

(Only in 1 encounter do we find both customer and assistant *ahs*)

*Sequence-type/position of turn with ah*

- request sequence, third turn (ie customer) 17
- correction sequence, third turn (either part.) 6
- request sequence, second turn (ie assistant) 5 (1 repeated)
- nc 2

*Turn shape*

- turn-initial 29 non-initial 2
- turn-final 10 non-final 21

(Of the 10 turn-final *ahs*, 6 are completely overlapped by ongoing talk from the first speaker)
2. Ah in the data

2.1 Request sequences: third turn position

This first group involves occurrences of *ah* in sequences of the following prototypical form:

Customer: requesting move
Assistant: informing move
Customer: *ah* (+ continuation)

The customer asks for a particular book or subject area; the assistant then responds to the request; the customer then goes *ah* (i.e., in the third turn position in the sequence). Examples 1–8 appear to be based on this pattern.

(1)  
    C: ...have you got Robert Burchfield's The English language?  
    A: No.  
    C: = Or have you sold out?  
    A: Yes, it's reprinting already, and it's due: on% the sixteenth of February, I think.  
    C: $Yes. Everybody's sold out. %  
    C: = = Sixteenth $of% February is it?  
    A: $Mhm. %  
    A: = = Hm. Somewhere around that + $date, % yes.  
    \[\rightarrow\]  
    C: $Aha? %  
    C: Right.  
    \[\text{(1a04a)}\]

(2)  
    A: It's on- they're only available up to three, (?3syll).  
    C: What's happeneden to number four, then.  
    A: Number four's not been printed. As far as Cambridge are concerned, it's not going to be printed until nineteen ninety nine, but I think they're kidding.  
    \[\rightarrow\]  
    C: $Ah. %  
    C: + All right.  
    \[\text{(2a17)}\]

(3)  
    A: (120) Well. + + Hh. §cough§ + + Yeah, there isn't ANYthing in here at all! There's the basic writings of phenomenology, but
there's no- no s- I'm getting mixed up with Hegel, I'm afraid.

(a) → C: = Ah. + Yeah, $(2\text{ syll})$-
A: $We\text{ haven't even }\%\text{ got anything listed as no longer stocked, or out of print or anything.}$

(b) → C: = Aha. It might actually be $more\text{ than }\%\text{ a year ago then, I suppose.}$
A: $So-$
A: = = Yeah. I think: er you can forget that one altogether frankly, and I DON't think it'd be worth looking even in Skoob.

(c) → C: = Aha. + Could you tell me where it is anyway ...

(1b56a)

(4) C: Would I find George Steiner's Language and silence up here $(??)$-
A: $No you\%\text{ wouldn't, it's reprinting and we've no idea when it's going to be available again.}$

→ C: Ah. (?Then actually) it would be down in literary criticism anyway.

(2a01b)

(5) C: I'm looking for a magazine called Index of censorship.

...........
A: I haven't $inquired\%\text{ myself yet }but\%\%\text{ politics:}$
C: $No.$
C: $No.$-

→ C: Ah.
A: = Second floor.

(1a11)

(6) C: Excuse me, where can I find reference, dictionaries.
A: Just through there, where it says reference.

→ C: Ah, thanks. ///

(1b33a)

(7) C: $Am I in the right place for + finding Freud's: two short accounts of psychoanalysis?$
A: = No you need to be either in the Penguin department on the ground floor, or the psychology department in the basement.

→ C: Aha, what a- + bout the Classic fairy tales, ....

(2a04)
(8) C: I wondered if you had a copy of this book please, ...

A: = Try upstairs on the: erm (2) anthropology section where they have a bit on folk: CULture- $folk\%$ culture.

(a) → C: $Ah.$%
C: Yes.
A: = If they can’t help you there, go down into the basement in the psychology department they also have a bit about fairy tales + $an$d myths$\%$ there.

(b) → C: $Ah.$%
C: = = Yes, I see. But upstairs it’s ...

(2a29)

To describe the use of $ah$ in these examples, Heritage’s notion of the ‘news receipt’ seems a useful starting point. The assistant’s responses can in each case be seen as providing ‘news’ to the customer, which news $ah$ appears to acknowledge as understood and informative: in no case is $ah$ followed by requests for clarification or expansion (ie repair). But we may also note a further characteristic of the assistant’s responses in this group, namely that they are all dispreferred - they fail to satisfy the customer’s request. The preferred response to such requests is something like ‘Yes we have that’, whereas dispreferred responses take the form of accounts of why the book is unavailable (examples 1-4), or suggestions that the customer should try elsewhere (examples 5-8) (Aston et al, 1986; on preferred/dispreferred responses in general, cf Levinson, 1983, ch 6). It appears only to be dispreferred responses to requests which receive $ah$ as their acknowledgement in third turn.

With this regularity in mind, let us move on to turn-shape. In these examples, $ah$ is always turn-initial, but it is not on the whole turn-final: it appears to project further talk by the customer. If we look more carefully at exactly what kind of talk follows, we can see that there are two main tendencies: either a topic-terminating item such as $OK$, $right$, or $thanks$ (examples 6,8a), or else a change of topic (examples 7,8b). In those cases where the same topic is continued by the customer, a marker of disjunction is employed ($actually$, $anyway$: examples 3b, 3c, 4). Together this data suggests that $ah$ proposes topic closure. Such an interpretation is compatible with the remaining examples in which $ah$ is turn-final, ie where it is the assistant to take over the floor, since in these cases (eg example 5) there is no topic change, and the assistant can be seen as deliberately overriding the sequential im-
plications of *ah*, going on with the original topic before the customer gets a chance to change it. In these cases the assistant is arguably ignoring the *ah*, which is frequently completely overlapped (examples 1, 2, 8a, 8b) or immediately latched to (example 5) by the assistant’s continuation.

The two points to emerge from this discussion - the use of *ah* as a ‘news receipt’ following dispreferred responses, and its implications for topic closure, make for an interesting combination. In fact the conversational analysis literature stresses the role of *preferred* responses in negotiating topic closure, noting that dispreferred responses typically lead to further attempts to negotiate a preferred outcome (Pomerantz, 1984). *Ah* seems to counter this tendency, treating the dispreferred response as, in the circumstances, an acceptable outcome notwithstanding its conventionally dispreferred status. *Ah* therefore seems to be a means of achieving topic closure in the context of a dispreferred response, displaying the producer’s appreciation of its dispreferred status while avoiding the sequential implications of a dispreferred response for further talk to topic. This in respect to the role of *ah* in constructing sequentially orderly talk. In respect to its role in indicating convergence, these examples appear to suggest that *ah*, like *oh*, indicates a change of state to one of being informed - but we shall return to this matter in due course.

2.2 *Correction sequences: third turn position*

The second group of occurrences involves the use of *ah* in correction or repair sequences (examples 9-12).

(9) C: Do you have uh Burchfield The English Language.
A: =No we’ve sold out and I’ve been- and I’ve been informed by one of my colleagues that it’s actually reprinting, and won’t be available again until I THINK she said the sixteenth of June- sixteenth of
C: Sixteenth of June?
A: Sixteenth of February.
C: Febru- February.
A: Yeah.
→ C: =Ah. Um: OK.
(1a17)

(10) C: Yes well my brother says it’s published by the London University
press but er ++ Hatchards disagreed, they said it was published by the something, hockluss, hockliss, hocklitt. Society? Hadlitt + society. %laughs%
A: Oh. Oh I see. + It’s probably - er oh yes. + Hackluyt isn’t it, the: explorer.

→ C: Ah.
A: I’m not sure, I don’t know.
C: Mm.
A: But er + erm. + I suppose that would make sense, yes.

(1a04a)

(11) A: There’s mm: Letters to Atticus: + Murder Trials: + On the good life: + Selected political speeches and Selected Works, so there’s five.
C: Yeah.
A: So I suppose it might be somewhere in amongst:
C: I don’t suppose so,
A: = You don’t $suppose so.%
C: $because it’s a ve%ry long thing, $$so it would be-%%

→ A: $$Ah, I see.% % Yes. I - I don’t remember seeing it, ...

(1b11)

(12) A: = Second floor.
C: Is- isn’t this the second, $this is the first%
A: $No. You% passed the mezzanine on the way up.

→ C: Ah. So one more up.
A: %laughs% Right.
C: Thank you. ///

(1a11)

Ah here again appears in the third turn position, in the following structure:

informing or checking move
other-correction move
ah (+ continuation)

As in the first group, we again have a dispreferred move in the second turn position - the explicit correction of another’s mistake (Schegloff et al, 1977) - and in the third turn position we have acknowledgement of this cor-
rection with *ah*. Again, we can see it as receipting news (the correction), but from these examples we can also see that the nature of the change of state manifested by *ah* differs somewhat from that claimed by Heritage for *oh*, ie from uninformed to informed, with a reduction of uncertainty. In these examples the *ah*-producer’s initial state hardly seems one of uncertainty, of being uninformed, but rather of being misinformed - he is not simply unsure, he has got it wrong. Thus in example 9, the customer has incorrectly (however justifiably) understood that the reprint date is the sixteenth of June; in example 10 she has got the name wrong; in example 12 she is under the impression that she is already on the second floor. In each case *ah* seems to indicate correction of what I shall call a faulty presupposition.

Now I want to suggest that this use of *ah* may be usefully be considered as the central one in this corpus, ie as acknowledging correction of a faulty presupposition, showing that this correction has been understood and accepted. In such cases *ah* seems to bear witness to a change in the producer’s state which is not merely cognitive (more informed), but also has affective overtones (rightly rather than wrongly informed): this matches our earlier intuitive observations on the use of *ah* in self-talk as indicating affective change (cf section 1 above).

With this in mind, let us go back a moment to the first group of occurrences - third turn *ah* in request sequences (cf 2.1). Can we see *ah* as acknowledging correction of a faulty presupposition here? To do so, we must consider what presuppositions of requests could be seen as being corrected by the assistant’s responses. Two conditions for felicitous requests are that S must believe that H may be able to fulfil the request, and that the request needs to be made if the desired goal is to be achieved (Searle, 1969; Labov, 1972). Now all of the assistant’s responses in the first group imply that one of these presuppositions is incorrect. If the book is out of print, or belongs to a different subject area, it is wrongheaded to expect the assistant to be able to provide it. Example 6 involves the other presupposition mentioned - that the request is needed at all: in fact there is a large sign saying REFERENCE on the adjacent doorway, so if the customer had only used her eyes, she needn’t have asked in the first place.

So in all cases in both these first two groups, it seems to me that we can see *ah* as acknowledging correction of a faulty presupposition of some kind, with a change of state from wrongly to rightly informed. Before passing to a third group of occurrences, we should however briefly return to the sequential implications of *ah* in the second, which we have not yet considered. The textual role of *ah* in the second group seems similar to that in
the first group in most respects. Again it is turn-initial and non-final, and it is not followed by reparatory or remedial work, notwithstanding the dispreferred character of the response it receives. It is in this group difficult to claim, however, that it proposes topic closure: in examples 11 and 12 ah is followed by a formulation of the correct informational state, which is hardly a change in topic. Rather it might be said that ah seems to propose completion of the correction sequence, ie that no further reparatory work is called for, and that business as usual may now be resumed, with the definition of that business left to the ah producer. (In the one case where further reparatory work does take place, ie in example 10, this is initiated by the assistant, who retakes the turn, overriding the sequential implications of ah).

2.3 Request sequences: second turn position

We may now move on to the last group of occurrences. These too involve request sequences, but this time ah occurs in second turn position, produced by the assistant prior to the response to the request.

   Customer: request  
   Assistant: ah + informing move

(13)  C: Hallo. I'm looking for a magazine called Index of Censorship;  
     → A: Ah. + Right. Ah perhaps you're looking for the poetry $thing. %  
     C: $I am.%  
     A: Yes $$I've thought about that too. % %  
     C: $$Yes. % %  
     C: = = Should I go hh.  
     A: = Yeah, um: second floor. I'm not sure whether they've got it, ..  
     (1a11)

(14)  C: I'm looking for a book by Aron V + Bees + Institute of credit management.  
     → A: + Ah. That will be in the: business section on the second floor.  
     (1b09)

(15)  C: I'm looking for: a copy of: Emanuel Kant's Critique of pure reason, published by Macmillan. Because there's an Every$man edition on the shelf-%  
     → A: $Ah. Yes. % We are out of it at the moment.  
     (1b42)
C: Can you help me. Where can I (?) get this book.

→ A: Er: ah:

C: (?) The book I cas).

A: Well the: er most of these would be literature on the ground floor.

Ah here is not in any way topic-final - it projects the continuation of the turn with a reply to the request. Nor would it appear that ah here is acknowledging any kind of correction, thereby proposing closure of a correction sequence. The assistant has, after all, not yet said anything which might be corrected by the customer.

True. But we need to remember that presuppositions are mental states, not linguistic productions. And in fact both parties bring to a service encounter a whole set of presuppositions about the nature of that encounter (such as the customer’s presuppositions when he makes a request), and these presuppositions may be proved faulty. Goffman has discussed the matter for encounters between customers and ticket sellers in cinemas:

the performer is obliged to have in mind what it is that will make sense of cryptic utterances regarding tickets and so orient to any unacquainted other who might approach the service post. And this obligatory matter for consciousness does not come from any prior utterances in a conversation but from an institutionalised service arrangement and the probable transactions that will be engineered in its terms ... To ask someone for information that they could not ‘reasonably’ be assumed to have is a perceivedly disoriented (and distorting) thing to do. Which is also to say, of course, that by nicely expressing that we realise how unreasonable our request is, we can get away with making it ... (Goffman 1983, 35f)

What can a bookshop assistant be reasonably expected to have in mind? Roughly speaking, in this bookshop he can be expected to have information on the various books his department usually handles, and as to where other subject areas are located in the store. He cannot reasonably be expected to know all of the books dealt with by all of the departments, let alone all books ever published. Now three of the requests which receive second-turn oh in response are ‘unreasonable’ in this sense, being for specific books belonging to other areas (examples 13, 14, 16). The exception (example 15) is a book which does belong to this department, but here too we can see how the assis-
tant is having to change gear, moving from what he has in mind (in this case, the edition of Kant which he does have) to something which he has to dig up from memory - another edition. In other words, all these cases seem to involve the assistant in correcting his presuppositions as to what is the relevant area of memorised information to access to deal with the request. *Ah* signals that this correction has been successfully performed - the book has been successfully identified. Further details in order to obtain the correct information from memory are not called for. The implicit correction sequence is proposed as complete, and a reply is projected.

3. Conclusions

3.1 The placement of *ah* in request sequences

Within the request sequences in this corpus, we find two distinct places where *ah* can occur. It may appear in third turn position, produced by the customer, or in second turn position, produced by the assistant. In both cases, moreover, the request typically obtains a dispreferred response - the assistant cannot provide the book. Apart from the placement of *ah*, the sequences seem identical. The question I find myself asking is whether we can systematically account for these two different placements. For in theory, in many of these sequences it would seem possible for *ah* to be produced in either second or third turn. Either party could propose that they stood corrected. One might even expect to find a preference for assistant *ahs* in second turn, since this is the first opportunity to acknowledge correction which presents itself, and to thereby take responsibility for the faulty presupposition, which would surely be the polite thing to do. But we do not seem to find this preference in the data. Second turn *ah* is relatively infrequent (cf. table 1), and I don’t think this means that the assistant is systematically impolite. Rather, there is a further regularity which is perhaps relevant here, relative to the second turn *ahs*. Apart from example 16 (which is a particular case in that the customer shows the assistant a list rather than saying what book she wants), all the occurrences in this third group follow requests formulated not as questions, but as announcements with ‘I’m looking for’, ie as informing moves. What I would tentatively suggest may be involved here is a conflict between two distinct discourse rules - on the one hand a general politeness requirement - roughly speaking, blame yourself not others - and on the other the constraints of a particular discourse routine. The latter, quite
simply, is that *ah* is appropriately used following what can be heard as informing moves, rather than, say, questions, in a realisation of the adjacency pair structure informing-acknowledgement. Where the two rules clash, the conflict appears to be resolved in favour of the latter. If this is the case, and the use of *ah* is locally determined in this way, we might predict that the use of *ah* found in this corpus - a corpus which is homogeneous in terms of its overall goal and role structures - may in fact match very closely with its use elsewhere, in that the adjacency pair structure involved is in no way context-specific.

3.2 *Ah* as a token of change of affective state

However the informing-acknowledgement structure might just not be the only adjacency pair structure in which *ah* occurs. I have suggested that inasmuch as it acknowledges correction of a faulty presupposition, *ah* may be seen as signalling a change in the affective state of the producer, who is now rightly rather than wrongly informed. Let me now return to response cries. As I sink down in a comfy chair, with this paper over, I shall perhaps exclaim ‘Ah’ in pleased relief. I shall thereby bear witness to a change in my affective state. But am I necessarily accepting the correction of a faulty presupposition in so doing? Have I been wrong, say, in giving this paper? (This is a rhetorical question). It seems relevant to note that this data, being a corpus of primarily transactional speech, is primarily concerned with issues of cognitive rather than affective convergence. This may account for the central use of *ah* here being to indicate correction of a faulty presupposition: a cognitive change with affective implications. In interactional speech data, we might expect *ah* to have a more general use, ie to indicate a change in affective state in other respects, as in

— You’ll feel better with a nice cup of tea
— Ah, that’s good.
(fabricated)

In this respect, it might be hypothesised that the use of *Ah* is analogous in interactional terms to the use of *Oh* in transactional ones, that is to say that they respectively stress the affective and cognitive relevance of what they respond to: to investigate this hypothesis it would however be necessary to examine the use of both these response cries in a corpus of interactional speech as well as in this transactional one. It may however be noted that the use of *ah* (and *oh*) in interactional speech probably relates to a slightly different
adjacency pair structure from the informing-acknowledgment one outlined here, for instance the giving-appreciation structure identified by Goffman (1972) for ‘supportive interchanges’, which is perhaps present in the fabricated example above.

3.3 Ah as a sequence-closing and floor-allocating device

If we have proposed a function for ah in manifesting convergence, what function may it be seen as having in making for sequentially orderly talk? We have seen that ah appears to vary somewhat in its sequential implications according to its context, with different sequential constraints operating in each of the three groups of occurrences. In each case, however, Ah would appear to a) project further talk by the same speaker, and b) imply that the correction sequence is complete. In other words, it proposes that normal conversational business can now be resumed without further reparatory work, and attributes the floor for so doing to its producer. It thereby provides a means of exiting from one piece of talk and entering in an orderly manner into the next. Just what business is now called for appears to depend upon the current state of the talk in a wider sense.

3.4 Some caveats

Let me end with two caveats. Firstly, like all conversational resources, ah can be exploited by its users. I can clearly claim to have made a faulty presupposition, to have experienced a change in my affective state, even when no mistake had in fact occurred. Thus ah can probably be ironically used in friendly banter - though I have no examples of it in this data. Secondly, I have not touched here upon the specific colourings of an attitudinal nature which ah can take on - surprise, dismay etc - and more generally on the issue of whether it indicates an improvement in affective state. These, I would suggest, might be seen as implicatures which have to be derived on an ad hoc basis given the specific context. If you tell me what is clearly bad news, my acknowledgement of that news may well be heard as dismay; if good news, it may well be heard as pleasure. Here I have tried to argue for a core meaning of ah in transactional speech contexts, based on its regular collocation in an adjacency pair routine in a variety of sequences present in the corpus examined.

136
NOTE

\(^1\)PIXI is an MPI funded project (40\%) on the pragmatics of Italian-English cross-cultural interaction, focussing on bookshop encounters in the two cultures. Transcriptional norms in the corpus extracts are as follows:

 Speakers: A = assistant; C = customer
 + short pause
 (4) pause (length in seconds)
 $ or $$ beginning of overlapped material
 % or %\% end of overlapped material
 - previous syllable cut off
 : previous syllable drawn out
 = latched to preceding turn in transcription
 == latched to next-but-one preceding turn in transcription
 (? material) transcription uncertain
 $ comment bracket
 /// end of encounter
 .. ? punctuation provides a rough guide to intonation

Concordances from the corpus on which this study is based were prepared using the Oxford Concordance Program at CINECA, Casalecchio.

REFERENCES