Bengt Altenberg, *Prosodic patterns in spoken English: studies in the correlation between prosody and grammar for text-to-speech conversion*. Lund Studies in English 76. Lund, Lund University Press, 1987. 229 pp.

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The aim of Altenberg's book is summarized in his Conclusion, p. 193: 'firstly, to investigate the patterning of certain prosodic features that characterize the T[one] U[nit]s of spoken English and, secondly, to determine the grammatical predictability of these features for application in automatic text-to-speech conversion'. It comprises the first and second phases of a three-phase project whose final phase will be to test the resulting algorithm using a speech synthesizer. The underlying assumption is that 'although all aspects of the prosodic segmentation of speech cannot be predicted on grammatical grounds, the structure of a speaker's intonation units is grammatically constrained and hence to some extent predictable'. The text used as a basis for the study is an informal but partly scripted talk by a retired master builder addressed to a group of women on the subject of the life and history of their local village (p. 19). Nine other spoken sources are used for certain comparisons, e.g. speaking rate and TU length. The procedure is to take a spoken corpus, reduce it to a written text from which grammatical information can be read off (syntax and word classes), and on which the actual prosodic features, as judged by ear, are transcribed, to discover how successfully the latter might be supplied if only the information in the former were given. The desired outcome is an algorithm for reading aloud a printed text in a natural-sounding and readily interpretable way. The task that the study sets itself is actually a little harder than would be the case with most printed texts, which have the benefit of punctuation. The author expressly omits this crutch.

The prosodic features are adapted from Svartvik and Quirk (1980), and include the following (p. 199):

End of TU: black square.
Onset: double vertical bar.
Nucleus in the shape of seven nuclear tones, self-explanatory.
Booster in four degrees: triangles in three graded sizes plus one 'lazy triangle' for 'continuance'.
Stress in two degrees: tick and double tick.
Pause in two degrees: dot and hyphen, plus combinations for longer pauses.

A high success rate was found in assigning the prosodic features on the basis of the verbal text. TUs for the simple nuclear tones (those with uniform direction) were 90% identifiable 'by means of a rule referring to a positional norm and the recorded nucleus potential of lexical categories' (pp. 195–196). The figures for believers in the 'hat pattern' are reassuring: the onset occurs on the first or second word in 88% of TUs, and the nucleus on the last or next-to-last word in 90% of TUs with a single

focus (those – the majority – not having a compound tone or a fronted nucleus) (p. 194). So given 'a sophisticated parser that can analyse the input text up to sentence level', the system 'can be described as surprisingly efficient' (p. 195).

An especially valuable feature is the fine-grained classification of lexical categories, taken well beyond the crude two-way division into open-class words (with high accent potential) and closed-class words (with low). Altenberg identifies (pp. 133–134) 37 subclasses in terms of potential for accent, from lowest (the infinitive marker *to*, with zero nucleus potential) to highest (compound pronouns, 75% nuclear), divided according to the type of prominence: zero, stress, booster, nucleus, i.e., increasing order of manifestation of prominence. Presumably the parser would not have too difficult a time with the closed-class items in the list, could identify *-ly* adverbs by spelling and nationality adjectives and proper nouns by capitalization, etc., and would not be left with too much uncertainty.

Given the practical aim of the project, the means adopted may be theoretically pure or totally unorthodox, provided they give results. Whether some other approach than the Svartvik-Quirk one would give better results could only be worked out by applying its principles, exactly as Altenberg has done, to some spoken text. Ultimately only the synthesized output will tell. And it is not necessarily a shortcoming if Altenberg's analysis is missing certain characteristics of a livelier prosody, since as he points out (p. 13) 'most text-to-speech applications will not be required to produce spontaneous conversation but a more controlled form of delivery'. Nevertheless, for anyone interested in the current competition among models of prosody, Altenberg's approach raises some pertinent questions, to which, along with some doubts and uncertainties, I address the rest of this review.

First off, if the object is to produce a 'more controlled form of delivery', why this particular corpus? In fact, why any form of unrehearsed speech rather than something completely controlled and done to order by a skilled reader (or readers, with judges to determine the best rendition)? The object I should think ought to be to get the machine to imitate as closely as possible what a trained reader would do, with fumbles, false starts, interpolations, and repairs eliminated as far as possible. A printed text is edited to begin with, and an edited oral approach would seem to be more appropriate for feeding instructions to an automaton. Of course, if the text is say a reporter's account of a more or less extemporaneous piece of oratory, having a corpus like the one here as a model is all to the good, but some predigested piece of expository writing would be an easier first step.

The second most obvious question is how adequately the notation specifies the prosody. Without the F_0 and intensity tracings it is hard to be sure. The problem is of theoretical interest because some other system than the British tone-unit analysis may work as well or better, and of practical interest because if the machine is left guessing at some overlooked change point the result may be a distortion. As a speaker of a different dialect of English, I am in a fair position to play the role of brainless machine and point out a few such uncertainties. A good test passage is the one that Altenberg

offers (p. 19) to illustrate the notation. I mark the lines A through P and identify by number the position of the word referred to on a given line:

A well ||rather than 'give a ▵TÀLK a'bout■ the ||history of Stoke ▵PÒGES■ · I ||felt
B it 'might be a ▵little more ▵ĬNTERESTING {to you ||ÁLL■}■ - to ||hear a'bout my
C ▵own LĬFE■ - ||lived and ▵growing ÙP■ in ||this · 'wonderful △village of Stoke
D ▵PÒGES■ - - · I AT||TĚNDED■ ||Stoke SCHÒOL■ · and I ||must SÁY■ I was
E ||TÀUGHT■ ||very THÓROUGHLY■ the ||three ŔS■ - ||funnily e'nough my
F ▵FÀTHER■ · ||WÈNT to the 'same SCHÓOL■ · and ||he was 'one of the 'first
G ▵PÙPILS■ - be||fore THÀT■ · he ||used to GÓ■ to the ||SCHŎOL next ▵DÒOR to
H 'here■ · and ||PÀY■ · a ||{PĚNNY} a WÉEK■ a||long with △all the ÒTHER 'village
I BÓYS■ · ||for his 'EDU▵CÀTION■ - CON||SÌDERING■ · his ||schooling 'must have
J STÒPPED■ · ||at about ▵fourteen ▵YÈARS■ · ||his - △beautiful ▵copperplate
K WRĬTING■ · ||and his "△RĚADING■ · with ||UNDERSTÁNDING■ was ||really
L RE▵MÀRKABLE■ - - - I ||LĬVED■ · in my ||early LĪFE■ · in ||WÈXHAM 'Street■ ·
M ||it was a △SÈMI-DETACHED HÓUSE■ · ||BÚILT■ ||by my FÁTHER■ ||and
N ÚNCLE■ ||with their own HÁNDS■ - · ||and △we LĪVED■ · we were a ||FÀMILY of
O ▵FĪVE■ · there were ||three CHĬLDRENS [sic] ■ · ||two SĬSTERS■ · ||and
P MY△SÈLF■

A6, *talk*. Fall, but how far, and is the fall contained fully in that word? Too decisive a fall here might suggest 'talk rather than (e.g.) slide show' and not the intended 'talk about the history rather than talk about ... life' – a matter of narrow versus broad focus. It is entirely possible that that is how it was said, but it would not be the clearest rendition; the notation (to this American ear) is ambiguous. The same uncertainty affects A12, *Poges*: the dependent status of the *rather than* clause suggests a fall that is cut short well above creak, perhaps even with a slight terminal rise; too deep a fall would seem to dissociate the two clauses. The same goes for G3, *that*, and for J1, *stopped*.

The sample raises questions about the division into TUs, which seems to depend in part on the position and length of pauses (and other 'allomorphs of open juncture' – it remains unclear what the phonetic correlates of the black squares are), in part on the patterning of prominences, especially onset and nucleus, and in part on syntax. Altenberg notes the speaker's tendency to use short TUs, and that may betoken a somewhat halting manner of speaking, with excessive breaks between constituents, not exactly desirable for the algorithm. One expects prosodic continuity for F1–2, *father went*, H3–5, *pay a penny*, J1–2, *stopped at*, and M6–7, *built by*. If by some different set of criteria the hesitations (if that is what they are) could be ignored, the instructions to the machine would benefit. Related to this is marking of onsets. If the analyst is compelled by his protocol of locating a supposed nucleus plus a supposed break to mark a TU boundary at a given point, he will be motivated to look for just enough prominence in an early following syllable to mark it as an onset for the next TU. While it is certainly not impossible for prepositions, conjunctions, and possessive

pronouns to stand out in this way, the number of them so marked seems rather large (I2, J2, J6, M1, M7, M10, N2, N6, O8). As for the syntactic parameter, one sees it in positions like that of A7–9. The TU boundary is set between *-bout* and *the*, a rather unexpected place for any sort of physical break, but syntactically preferable to putting it after *the*. Since presumably the sequence *about the* represents a FALL TO a pitch below the speaker's 'normal level', prosodically it could just as well (and I think from a configurational standpoint better) be regarded as ambiguous between prehead and postnucleus. The TU division compels a choice that is prosodically arbitrary.

Two other doubts, what constitutes onset and what constitutes *focus* as the author uses the term, plague the nature and identity of the tone unit. Does onset, like rising tone and booster, involve a rise in pitch? It is defined in such a way (p. 30, 'the first stressed and normally pitch-prominent syllable in the TU') as to suggest a rise, but also in such a way ('it indicates the commencement of the pitch level [key] that is normal for each speaker') as maybe permitting a fall. If the former, then any succession of these three features will result in a higher and higher pitch. Such a succession occurs from M5 to N8: six rising tones, four onsets independent of rising tones, and one booster. This looks like an impossible result. If the second half of the definition is adopted and the onset produces a lowering (in order to get back to the 'normal level' after a higher pitch), then the characterization of the onset as 'stressed and normally pitch-prominent' becomes suspect, because in that same stretch the drop would be to the words *by, and, with*, and *and*, as already noted – hardly a likely situation for a function word to be described as either stressed or pitch-prominent (though of course it *could* be – I can only report suspicions). All of this makes me wonder if 'onset' is the tail wagged by the TU dog.

On the assumption that my doubts are unjustified, the explanation of the facts in question may reflect the monologic nature of the text. Altenberg notes (p. 34) that the 'strong tendency to place the onset as early as possible in the TU indicates that its position is less determined by thematic factors than by the lexical salience of the words occurring at the beginning of the TU'. This would be the natural consequence of a type of discourse in which there is a constant building of rhemes onto old – and hence unemphasized or elided – themes: the accent of the onset preserves the prototypical hat-pattern shape of the head but is not needed to highlight a theme. The opposite case would be that of an out-of-context utterance in which a theme has to be established, e.g.

What's happening out there? – A mób has stòrmed the Bastílle.

where the onset on *mob* performs its thematic function.

Still, it is hard to tell whether Altenberg would accept this example as an instance of a single TU as defined (p. 47) and as illustrated in the above passage from the text. A TU is manifested, among other ways, as 'a *cognitive* unit, maximally consisting of one newly activated concept and (optionally) some already active (or semi-active) concepts'. Is *A mob has stormed the Bastille* a single concept, or a series of concepts,

'mob', 'stormed', and 'Bastille', all newly activated? If *mob*, being totally new, gets a full tonal treatment, then – following the indications of the text sample – it will have a TU to itself. A striking example is 110, p. 88,

it ||used to TÁKE us■ all ||DÀY■

where instead of an onset on *take* and a single TU (with compound rising-falling tone) containing *day* as the nucleus, the sentence is split into two TUs (and why isn't *all* the onset in the second TU, rather than *day* serving as both onset and nucleus?) Presumably *used* has enough of a step-up to count as an onset, but why that should be desirable – why such a minor fluctuation should count at all in view of the consequences – deserves debate. To analyze this way is to lose touch with a cohesive thematic structure, except perhaps as manifested in exactly this type of text where all or most themes are 'already active or semi-active'.[1]

These uncertainties bear out the observations of Willems (1982:6) in reference to experiments by Currie (1979) and Brown, Currie, and Kenworthy (1980), in which trained phoneticians disagreed widely on the location of the tonic in a tone unit – a disagreement that translates into disagreement about the units themselves, obviously. (See fn. 1.) 'Onset' needs rethinking.

As for *focus*, in prosodics it appears to float somewhere between an acoustical and a semantic interpretation, with the more or less clear adoption of one seeming to lay claim secretly to the benefits of the other. Altenberg speaks of 'focus of information' (p. 84), which implies the semantic end, but also uses wording such as this: 'In these patterns [e.g. the simplest case, an SV clause], which provide two focal options, there are two main possibilities. If both elements convey new information, at least the

[1] The Svartvik-Quirk notation leaves plenty of room for disagreement in marking the features, and there are instances where one wonders if whoever scored the onsets has heard or analyzed the rendition correctly. Such a case is example 196 (p. 113), in which, according to the author, 'the information structure and the prosodic structure are at odds with each other':

we ||used to 'have to ʌRÌDE■ on the ||PRÁM■ there were ||*three of ÚS*■ and ||as we ▷got TÍRED■ ||one ▷popped ÍN■ and the ||other 'popped ÒUT■

Here the *onset* is marked on *three* and the nucleus on *us*, which (and this is presumably Altenberg's objection to it) would make sense only if the context involved something like 'three of ús and two of thém'. In this context, however, the supposed onset is rhematic: 'we were three', and furthermore 'we' has already been mentioned, making 'us' old information. My guess is that the speaker has intentionally highlighted *three* as the nucleus, since it bears the new information, and that the terminal rise on *us* has been mislabeled. It is easy to hear a rising tail as an accent, and Altenberg himself is well aware of the commutability, much of the time, between such a tail and a string of low-pitched terminal unaccented syllables. See pp. 189–190 and (*4*) below in this review. What needs discussion is the status of the onset as one accent among other accents, made prominent for the sake of the informational content of the word it falls on rather than, or in addition to, its function as an annunciatory signal.

second, and optionally the first, will receive focus. A TU boundary is needed only if both elements are brought into focus. If only one of them conveys new information, both are likely to be contained in the same TU' (p. 85). And the author adds that in such clauses there has to be 'a prosodic division if there are two focal elements in the clause'. In the first place, 'receive focus' is suspiciously like 'get an accent'. In the second place, if there has to be a prosodic division when there are two focal elements, then focus takes on the guise of nucleus, one per TU – and nucleus is the physical side. Add to this the fact that nucleus is actually defined (p. 30) as coinciding 'with the communicatively most important part of the TU'. In the third place, the author adds that 'reduced speed may give the speaker time for a greater number of foci'; this makes better sense if taken to mean that the speaker is able to put in more accents than if taken to mean that slowing down will change the information structure of the utterance. To clear this up we need at the very least some discussion of the relationship between nucleus (the physical side?) and focus (the semantic?). As for the author's concept of 'focal territory' (pp. 165, 176–177), I thought for a moment I had grasped it, but then it went glimmering.

My remaining questions are of a less fundamental nature, mostly minor annoyances as likely to reflect some incapacity of mine as any unclarity on the part of the author.

(*1*) What is 'restrictive'? This is one of the standard props for illustrating prosodic division, with restrictive elements supposedly calling for closer juncture than non-restrictive, e.g.

A police force which has less authority than an army ...
A police force, which has less authority than an army ...

In three of the places where the matter comes up it is not clear that the example cited actually has the feature claimed for it. In example 88 (p. 72) (I mark only the TU divisions)

the cat farm/where she used to breed those cats/is on the site of ...

it is not obvious that the clause is really restrictive – one could add *incidentally* after *where*; more context is needed to decide. Example 4 (p. 105),

the man/in a raincoat/came towards me

is supposed to illustrate a 'medial nonrestrictive phrase' marked off by the separations. Though the example is from Crystal, Altenberg does not question its supposed nonrestrictiveness, which is either a mistake or a bad choice of example; for non-restrictiveness one would expect something like

the man/all in a tizzy/came towards me

And example 186 (p. 109)

we ... TÙRN■ to that ''||LÒVELY MÁNSION■ · the ||Manor HÒUSE■

labels as nonrestrictive the appositive *the Manor House*. If nonrestrictiveness is to be defined independently of the prosody (as it must be if the notion is to be used for *predicting* the prosody), then this is surely restrictive. If the speaker were to stop after the word *Mansion*, the listener, given the cataphoric use of *that*, would be impelled to ask, 'What mansion?' – and the need to answer such a question is a definition of restrictiveness. The restrictiveness of an appositive after *that* rather than *the* can be seen in a set like

I saw that fool Jones. (restrictive)
I saw that fool, Jones. (restrictive)
*I saw the fool Jones.
I saw the fool, Jones.

– the prosody is not decisive with appositives. (Nor, really, elsewhere – what is more decisive is whether the element is treated as an afterthought. Some restrictives are afterthoughts. Most nonrestrictives are by nature afterthoughts.)

(*2*) What is a 'simple main clause'? This is defined (pp. 80–81) as 'a clause not containing or contained in another clause', and they number, in the corpus, from one to 23 words, the 23-word example being *The Penn family lived here for over two hundred years, that is about six or seven generations, father to son, father to son* (punctuation supplied). But doesn't this 'contain another clause'?

(*3*) What modifies what? In the example (146, p. 96)

and ||*to my AS*▵*TÒNISHMENT* one DÁY■ I ||looked on the ▵company ÓRDERS■

'the segmentation sounds rather unnatural, mainly because it runs counter to the relationship between the clause elements'. This refers to the fact that 'the first adverbial is prosodically integrated with the second', the first, I take it, being *to my astonishment* and the second *one day*. But *one day* belongs as much to the event signaled by the deverbal *astonishment* as to the verb *looked* – there is nothing unnatural here.

(*4*) What restrictions apply in word-to-unit alignment? Altenberg states that compound tones are 'quite impossible in one-word TUs' (p. 40) (compare also '"onset %" excludes one-word TUs', p. 155). Does this not depend on the length of the word? A contour such as might be applied to the one-word *Tintinnabulation!?* uttered in questioning astonishment surely could have at least one compound tone, at least as far

as the phonetics goes. This problem of single words and compound tones rekindles an old debate: the near impossibility of distinguishing between a succession of two tones, fall plus rise, and one compound tone, fall-rise. Altenberg elects to lump them together, but then has to wrestle with an ambiguity: is the rising segment of the 'compound' tone just a variant of a terminal low level (pp. 189–90), or does it carry some additional weight? In other words, what difference is there if any between two such utterances as

I to_{ld} him I wou^{ld}. I to_{ld} him I would.

If they are equivalent, then the rising segment in the first utterance confers no special status on the word *would*, and could as easily occur on some *part* of a word, as happens in

That fel_{low} Ab $\text{er}^{\text{na}}\text{th}^{\text{y}}$ is a g_{e} stran typ^{e}.

where *-nathy* takes the rise, and then *type* takes it. The compound tone has aligned itself with the single word *Abernathy*. There is no easy way out of this prosodic trap, but it needs at least to be recognized as one.

(5) What makes prepositions accentable? Prepositions are such little things that it is difficult to view them as content items, and when one is accented the tendency is to look for a non-semantic reason. The class of 'prepositional verbs' Altenberg treats as a 'regular exception' to the normal unaccentability of prepositions (pp. 173–174), e.g. example 56:

...my mother went WITH them.

The question is whether from a prosodic standpoint a class of prepositional verbs needs to be set up separately from a recognition of the word semantics of verb and preposition. In this example the meaning is 'accompany', and the withness is precisely the point. Similarly an example (58, p. 173) that the author views as 'perhaps ... a result of a performance slip':

I myself can't speak more highly OF it.

If *reGARding it* or *conCERNing it* replaced *of it*, there would be little question of accentability. Similarly example 59:

... their family really kept people FROM us.

– the preposition *from* signals 'away', and indeed if the concept were analyzed into *away from* the accent would quite naturally fall on the explicit *away*. In the example (60)

BeHIND it is a three-storeyed ...

the accent on *behind* is supposed to be by default, since 'it' is given. But would this argument have been used if the wording had been

At the REAR is a three-storeyed ...

If what is 'behind' is the point, then *behind* gets the accent. The antonym of *behind* shows this more clearly:

In FRONT of it is a ...
In FRONT is a ...

It is a lexical accident that *behind* is less used as an adverb.

(6) Do certain premodifiers tighten the union between a noun and a postmodifying clause, making it 'more restrictive'? Altenberg offers as a general rule for rhematic restrictive clauses that the antecedent is 'brought into focus and separated from the relative clause' (p. 70). He is then compelled to deal with a number of exceptions (not so exceptional if there is any value to the old notion that *not* being separated is what marks a restrictive clause), which he attempts to do in grammatical terms: 'When the antecedent is itself a prepositional postmodifier or apposition of a rhematic element, the focus and the following break are attracted (fronted) to this earlier element. In other words, the break before the postmodifying clause is cancelled by a previous "higher-level" boundary' (pp. 70–71). But an examination of the examples suggests a stronger reason for there being no prosodic break between antecedent and clause. All seven of them have antecedents that call for a high degree of restriction, and all but one include premodifiers akin to the superlative, to wit: *first* (three examples), *all* (two), and *one of*. We do not expect a break in a sequence like

the best time I ever had

and we likewise do not expect one in a case like 86:

and all I had to do was ...

One of Altenberg's examples with *first* (85) does have the break,

the first time/I ever saw ...

and here he I think correctly identifies speed of delivery as one of the factors. (I also suspect that *it was the first time* may be functioning as a collocation.) If the nature of the premodifiers is the reason for the close juncture, the eventual algorithm should have an easier time than with Altenberg's syntactic explanation.

(7) How accentable are the compound indefinite pronouns? The treatment of this point (pp. 135–140) is complicated by the fact that it is introduced under the rubric 'compound pronouns' five pages before we are told what they are, and cannot be sure that the class referred to is that of the *-body, -one,* and *-thing* set and does not include the reciprocal (*each other, one another*) or the relative (*he who, whoever*). With that settled in favor of *-body, -one,* and *-thing*, there are two claims to evaluate. The first is that these pronouns 'tend to attract a nuclear tone'. That is probably true when the pronoun is thematic, e.g.

SOMEthing was very much amiss.
NObody's going to believe you.

But a more striking characteristic of these pronouns is the reverse: when they are complements they normally do not carry the accent:

What's John doing? – He's TALKing to somebody.
An ignorant person is one who doesn't KNOW anything.
You'll have to OFfer something before I'll make a counter offer.

In the second example, an accent on *anything* would be clearly intensive. For this same reason (inherent intensiveness) the *every-* compounds (including the adverbial *everywhere* as well as the pronouns *everybody, everyone, everything*) do tend to take the accent, though not necessarily:

The trouble with John is that he HATES everybody.
The trouble with John is that he HATES EVerybody.

The second claim is that these pronouns are not followed by *of* phrases (it is not clear whether this is to be interpreted that they cannot be, or simply are not as far as this corpus is concerned). Such combinations are normal enough: *something of a fool, none (no one) of them, anyone of that persuasion.* Both claims of course are undoubtedly true of the corpus, but not taking note of the grammar in general leads to overlooking what may be a significant restriction: are most of the compound indefinites in these materials thematic? Are they used intensively when they are verb complements?

Here and there are instances that look like simple failures of analysis. Examples 37 and 40 (p. 63) are supposed to show the effect of length on segmentation before an *if* clause:

My father was trusted by all these gentry and had to really let them know/if there was any of the villagers in want. (with break)
I don't know if anybody has seen that. (without break)

Actually the second *if* is a 'whether' and the first *if* is an 'in case that' – two distinct functions of *if*, the first being less cohesive: the sentence could be worded

... and if there was any of the villagers in want, to let them know.

Altenberg fully accomplishes his purpose, which is to demonstrate the possibility of inferring a prosody from the grammar and lexis of a text. He is well aware of the secondary role played by these factors in the actual spoken production of a prosody: speech segmentation is 'basically cognitive' (p. 48) and decisions about accent are 'less determined by grammatical factors ... than by what [the speaker] judges to be "of interest"' (p. 166); but the speaker's mind is not accessible and the words and grammar are, so the choice from a practical standpoint is an obvious one. In view of these caveats the frequent reference to the choices being 'grammatically constrained' is a little disconcerting – one must continually remind oneself that what is referred to is a sophisticated and highly informed guesswork. More power to it.

The author is to be thanked for providing a truly excellent index, and for his clear and logical layout of chapters and sections. The publisher too: the binding is strong, the pages lie reasonably flat, and there are only a dozen or so misprints, mostly trivial. I list the ones that might be distracting: Page 41 top, *single* should be *simple*. Page 100 bottom, *(166)* and *(167)* should be *(168)* and *(169)*. Page 140 bottom, the *22%* mentioned in the text is absent from the table. Page 150 bottom, the *100%* assigned to lexical verbs becomes *98%* in the table on p. 151. Page 170 has *postdeterminer* twice where *predeterminer* is intended.

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