# DANIEL JONES INTONATION CURVES

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# INTONATION CURVES

A COLLECTION OF PHONETIC TEXTS, IN WHICH INTONATION IS MARKED THROUGHOUT BY MEANS OF CURVED LINES ON A MUSICAL STAVE

BY

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### INTRODUCTION

- 1. The branch of phonetic science known as Intonation, i. e. the variations in the pitch of the speaking voice, has not hitherto met with adequate treatment in books on pronunciation owing to the want of a satisfactory method of indicating these variations. Intonation, when marked at all, has generally been indicated by signs such as ', ', ', etc. placed at the beginnings and ends of words or sentences. Such marks may give a rough idea of the kind of intonation required, as for instance that the pitch is to rise or fall, but they fail to show with any sort of accuracy the precise points of the sentences at which the changes of pitch begin and end, and they do not profess to indicate the absolute pitch, or the subtle variations of pitch which are oerpetually occurring in speech.
- 2. Accurate records of intonation have, it is true, been produced by means of tracings of voice vibrations, obtained by the use of a kymograph or otherwise. The vibrations may in this way be measured, or the number occurring in short units of time counted, and the results plotted on squared paper, the variations of pitch being thus expressed by curved lines. Such curves are, however, inconveniently large and elaborate, and the phonetic symbols to which the various parts of the curves correspond have to be placed far apart and at irregular intervals, thus rendering the text difficult to read. Besides this the work of preparing curves by this method is so laborious, that no one has ever yet analysed texts of sufficient length to be of any practical value to language students.
  - 3. Evidently the only satisfactory method of representing in-

tonation, whether for scientific or for practical purposes, is by means of curves, and in the present work an attempt has been made to produce by the method hereafter described intonation-curves which may combine as far as possible scientific accuracy with practical utility.

- with practical utility.

  4. In a complete analysis of pronunciation the following elements of speech must be represented: (i) the quality of the various sounds, (ii) the quantity of the sounds (length), (iii) their relative loudness, and (iv) the pitch of the voice in pronouncing them. All these essentials are represented in detail in the English, French and German texts here given. The quality of the sounds is shown by phonetic symbols, their length by the use of the marks: and ', their loudness by the stress mark and by the bar lines on the accompanying musical staves—these bar lines being placed at every point where there is a minimum of loudness (i. e. at the limits of the syllables)—and lastly the pitch of the voice by curves on musical staves.

  5. The pronunciations thus analysed are those of actual Eng-
- 5. The pronunciations thus analysed are those of actual English, French and German speakers, the necessary observations being made by means of a Gramophone. The following explanation will show how the analysis has been obtained.
- 6. If while a Gramophone, Phonograph, or other similar instrument, is in operation, the needle is lifted from the revolving record, the ear will retain the impression of the sound heard at the instant when the needle is lifted. And if the record is of a speaking voice, the impression retained is that of a speech sound or portion of a speech sound, both as regards its quality and, if it is a voiced sound, as regards its pitch, each of which elements may therefore be recorded. In order to obtain accurate results it is generally necessary to take several observations for the quality of a given sound and several more for its pitch. In regard to the latter observations, when the musical note sounded at the given instant has become firmly fixed in the mind of the observer, its absolute pitch may be ascertained by comparison with a tuningfork and then marked on a musical stave. The result may often be further verified by comparison of the note with the principal notes of the syllables preceding and following

the sound under observation. Relative length and loudness may be determined by repeating short groups of sounds several times over.

7. By observing every sound separately in this way, the following gramophone records have been completely analysed, and the results are given in this book (on the right hand pages) side by side with (1) the ordinary spelling of the texts, and (2) transcriptions of average Standard pronunciation for comparison (on the left hand pages).

Gramophone Co's Catalogue number Title			Speaker
	1315 III	Passage from Shake-	
English	,		Sir H. Beerbohm Tree
	1356	Poe's The Bells (verses	
	{	1-3)	Canon Fleming
	1286	Conversation from	
		Langenscheidt's Eng-	
	l	lisch	${\bf MrBernardMac Donald.}$
$\mathbf{French}\{$	(31171 II.	Passage from Rostand's	
	l.	La Samaritaine	Mme Sarah Bernhardt
	31253	Lafontaine's Le Cor-	
	}	beau et le Renard, and	
		Le Loup et l'Agneau	M. Louis Delaunay
	31284	Conversation from Bar-	_
		let and Rippmann's	
		French Life and Ways	(cannot be traced)

<sup>1</sup> Thus in 'dou'mi: \*\* (p. 55, l. 3) the pitch of the beginning of the i was found to be E and that of the \*\* was found to be E

If the word is repeated several times the octave interval

is clearly heard. Again in **di'trs:nè** (p. 73, l. 4) the pitches of the vowels i, s, è were found to be E, C (beginning) changing to A (end), and A respectively. This is confirmed by the fact that if the phrase is repeated several times over the ear perceives distinctly the notes of the chord of A minor.

<sup>2</sup> The choice of records suitable for the purpose of this work is very limited, and those used are the best obtainable. No suitable German conversation record was available.

3 See § 17.

German

- 8. All these records are obtainable from the Gramophone Company with the exception of the English Conversation which is obtainable from Messrs Langenscheidt of Berlin. The Roman numerals added to some of the numbers do not appear in the catalogues but are embossed on the records themselves. They indicate that more than one original record has been made. Thus, while all the records bearing a given catalogue number and with the same Roman numeral embossed are identical, those bearing the same catalogue number but different Roman numerals are not identical but only similar.
- 9. It may be objected that talking machines do not reproduce speech with sufficient distinctness to render possible a minute analysis of the speaker's pronunciation. This objection is a just one in regard to inferior machines and inferior records, but if first-rate machines and first-rate records are used, minute distinctions may be as clearly perceived as in the actual human voice. Modifications in the pronunciation arising from the instrument are few and slight. The principal are (in the case of disc machines) (i) the addition of the scraping sound made by the needle, (ii) a slight modification of sound quality due to the resonance of the horn both in making the record and in reproducing it, (iii) the indistinctness of the sound S. With good machines and good records, however, these modifications are of no great consequence, and even when they are noticeable, the practised car makes allowance for them mechanically.<sup>1</sup>
- 10. The analysis of the sounds can in fact be carried out with greater certainty with the machine than could ever be done with
- <sup>1</sup> It may be added that the echo caused by the horn with which the original record was made may even be of assistance to the observer. Thus in the u: in 'tsu:kunft' (p. 59, l. 10) the note of the vowel (A) and the same note echoed from the original horn are clearly distinguishable, and corroborate each other.

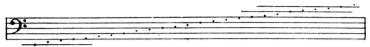
an actual human voice, owing to the fact that observations may be repeated any number of times. If a person is asked to repeat a word or phrase a number of times, he will almost inevitably make slight unintentional variations. Again if we ask a person to stop short at some given point in the middle of a word in such a way that the final sound which he utters shall retain the exact quality, loudness and (especially) pitch that it would have had if the word and sentence were continued, we cannot be sure that he will succeed. In fact in the great majority of cases the chance of his being able to do so is so remote that even approximate success is not to be hoped for. The machine on the other hand always repeats the words in exactly the same way, and if the needle is raised at any point the final sound heard is always exactly that which would have been pronounced had the sentence continued.

11. The following is the process by which the right hand pages of the texts were prepared. The records were first analysed as regards the quality, length and stress of the various sounds, and the phonetic transcriptions thus obtained (the phonetic alphabet used being that of the Association Phonétique Internationale).\(^1\) These were set up in type with blanks between the lines for the subsequent insertion of the staves. The staves were then printed alone in their correct relative positions on sheets of transparent paper. These were then placed on the top of proofs of the transcriptions so that the staves were in their correct positions relative to the lines of transcription. The next step was to draw on the staves bar lines exactly above all the points of syllable division.\(^2\) The staves were then ready for the insertion of the curves. The records were accordingly analysed again, and the absolute pitches

<sup>&</sup>lt;sup>1</sup> The groups of the phonetic symbols in the texts correspond to groups of sounds pronounced without pause (technically known as 'breathgroups'), the blank spaces therefore corresponding to pauses in speech.

The object of these bar lines is not merely to show where the points of syllable division are, but also to diminish the likelihood of inaccuracies in the placing of the different points of the curves, and to render it easier for those who may study the texts to see at a glance the parts of the curve and text which correspond.

of all the vowels and most of the voiced consonants determined 1, and the notes marked on the staves exactly above the symbols to which they correspond. The positions of the points corresponding to the various notes were marked as follows:



E F Gb G Ab A Bb B C Db D Eb E F Gb G Ab A Bb B C Db D Eb E F



G Ab A Bb B C Db D Eb E F Gb G Ab A Bb B C Db D

12. In many cases it was necessary to take observations of pitch at two or three different points of the same sound. Thus for instance, observations taken at the beginning, middle and end of the diphthong uw in 'ðætwil'duw (p. 25, l. 5) gave the notes

F 2 and D 2 . Again, in the syllable

**klay** (p. 67, l. 9) observations of pitch were taken at four points: the pitch in the middle of the  $\mathbf{l}$  was found to be  $A^{\flat}$ , the pitches at the beginning and middle of the  $\alpha$  were found to be  $G^{\flat}$  and A, respectively, and the pitch of the end of the  $\eta$  was found to be F; hence the shape of the curve. Breathed sounds have of course no intonation. Where breathed sounds occur the curve has been dotted, the dotted part representing the intonation which would in all probability have been used had the sound been voiced.

- 13. In this way the complete manuscript of the curves was obtained. The text and curves were then reproduced together on zinc plates, from which the final printing was made.
- <sup>1</sup> The rate of revolution of the record (which affects not only the rate of performance but also the absolute pitch of the sounds produced) was adjusted in each case so as to give what seemed to be the most natural mode of speaking the piece in question.

- 14. It will be seen from the above that great care has been taken to render the curves as accurate as possible. It is not claimed that the curves are absolutely accurate, like those obtained by measuring vibrations (§ 2). In fact in the method here used there are several obvious sources of error. Such inevitable errors are however very slight and are of no consequence from a practical point of view. It is submitted that they are immeasurably more than counterbalanced by the advantage of having long and easily legible texts not occupying an inordinate amount of space, coupled with curves on a scale which is familiar to everyone—an arrangement which it is hoped may prove helpful not only to phonetic specialists, but also to teachers of languages and teachers of elocution.
  - 15. It remains to add a few misdellaneous remarks.
- 16. For representing the speech sounds a very detailed form of phonetic transcription has been adopted, both in the representation of the pronunciation of the various speakers and in the transcriptions of normal average pronunciation given on the left hand pages for reference; that is to say the form of transcription here used is much more complicated than that generally employed in practical phonetic transcriptions (see Explanation of Symbols pp. XII—XVI). This has been found advisable for two reasons, firstly because a more accurate representation of the actual pronunciation of each speaker can be given, and secondly because the use of the same symbols to denote similar but different sounds in different languages, so general (and usually advisable) in books of practical transcriptions1, might be a source of obscurity here when three different languages are compared in detail.2 The principal individual cases in which even the transcription here used does not indicate shades of sound with sufficient accuracy are mentioned in the notes at the end of the book.

<sup>&</sup>lt;sup>1</sup> Thus the French and German ò and and the English n and i are generally all represented by the one symbol a.

<sup>&</sup>lt;sup>2</sup> In one particular the transcription here employed is not quite satisfactory, viz: in having the symbol a to denote both the English and the French neutral vowel. It would perhaps have been better to represent the French sound by **à**.

- 17. In the transcriptions placed on the left hand pages for the sake of comparison, the pronunciation represented is that which may be taken to be the standard pronunciation of each language, viz: the average pronunciation of educated inhabitants of the South of England, the North of France and the North of Germany respectively. In the French pieces unemphatic stress has been given for the sake of consistency, though shifted stress might be used with advantage in many cases. Cases in which shifted stress would be permissible or advisable may be seen in the texts on the right hand pages.
- 18. It will be observed that in both the conversation records the pronunciation is to some extent artificial. This is no doubt due to the exigencies of the process of making the records. In order that a talking record should be really good, the articulation of the speaker must be very clear, far clearer than it usually would be in conversation. The result is that conversational records are generally either indistinct, or they show a somewhat unnatural pronunciation. The two conversational records in question have been chosen for their exceptional distinctness. In judging of the pronunciation therefore due allowance must be made for the fact that the speakers were obliged more or less to 'recite' the conversations. The intonation is however not greatly, if at all, affected by this fact.
- 19. In conclusion the author wishes to express his thanks to Messrs Langenscheidt for permission to reproduce Conversation No. 13 in the kleine Toussaint-Langenscheidt Englisch, to M. Fasquelle for permission to reproduce the passage from Rostand's La Samaritaine, and to the Gramophone Company for permission to reproduce Conversation No. 21 in Barlet and Rippmann's French Life and Ways; also to Miss M. Horn, one of the Principals of the German Governesses' Association for kindly revising the proofs of the transcriptions of German Standard pronunciation. Special thanks are also due to Mr Bernard MacDonald, M. Louis Delaunay, Herr Max Montor and Herr Otto Sommerstorff for furnishing particulars of circumstances which may have influenced their pronunciation (see notes), and to Mr Arthur Finlayson who supplied similar information regarding the late Canon Fleming.

Wimbledon, April 1909.

### EXPLANATION OF PHONETIC SYMBOLS

The alphabet used is that of the Association Phonétique Internationale.

The following tables show the mode of formation of the various sounds occurring in this book (see also pp. XIV—XVI). For detailed explanations students are referred to the text-books of Elementary Phonetics.

1	${f CONSONANTS}$	
1.	COLIBORATIO	

	La Bi- labial	bial Labio- dental	Dental	Palatal	Velar	Uvu- lar	Glot- tal
Plosive	p b		t d d		k g		?
Nasal	m m		'n n	р	ŋ		
Lateral			ļ 1 ł		<b>(1</b> )		
Rolled			ŗrr			R R	
Fricative	u u w w	f v	θð, s z, ∫ 3,   1	ç <b>j</b> (प)	(w) (w) x	R	h fi

### II. VOWELS WITH LIP-ROUNDING

		Mixed	Back
Closed	у, ў	ii	ս, ù -
Half-closed	ø, ờ	ö	o, ò
Half-open	œ	ÿ	<b>9</b>
Орев		1	D Ìù

# Front Mixed Back Closed i, i Half-closed e, è ë Half-open s ä ə Open

### III VOWELS WITHOUT LIP-ROUNDING

: means that the sound denoted by the preceding symbol is long.

'means that the sound denoted by the preceding symbol is half-long. Fully long diphthongs have the mark 'after each element. (The sounds denoted by symbols not followed by : or by are short.)

a

 $\mathbf{a}$ 

- placed under the symbol of a voiced sound means that the sound is devocalized.2
- between two symbols denotes a very short pause.
- placed under a consonant symbol means that the sound is syllabic.
- placed over a symbol means that the sound denoted by the symbol is nasalized.
- placed under a symbol indicates "inversion" of the tip of the tongue.

  means that the syllable immediately following is stressed.

Figures thus 5, 38, refer to notes at the end of the book.

<sup>1</sup> With one unimportant reservation. It has not been considered necessary to mark *consonant* length except in cases where the length is not normal.

<sup>2</sup> In the case of final voiced consonants, which are often partially or completely devocalised, especially in English (e. g. hands hendz or hendz, generally written hendz), has not usually been added. Sounds in such positions are generally weak and it is difficult to tell for certain from the record, whether they were completely devocalised or not in the speaker's pronunciation.

### KEY WORDS

E stands for average educated Southern English. F stands for average educated Northern French. G stands for average educated North German.

a E father ('fa:ðə), F pâte (pa:t), G Vater ('fa:tər)

a F banc (ba)

- a E dry (dra'i'), F patte (pat)
- ã nass.ized a, occasional English branch (brantf, usually bra: ntf)

 $\mathbf{a} \in \mathbf{c} \mathbf{a} \mathbf{b} \ (\mathbf{k} \mathbf{a} \mathbf{b})$ 

- ä a vowel intermediate in acoustic effect between æ and ə,
   E abstain (əb'stèin or æb-stèin)
- mean is a man man man man man
   mean man man man
   mean man
   mean
   mean

A E much (mats)

b E boat (boùt), F bon (b5), G Band (bunt)

ç G ich (Pic)

- d E day (de'i'), F dette (det), G Ding (din)
- d devocalized d
- $\eth$  E then  $(\eth en)$
- e F né (ne), G See (ze:)
- è E let (lèt), F médecin (mèt-'sē), G elf ('èlf')
- ë a vowel intermediate in acoustic effect between è and ə, E moment (generally 'mòùmont, but in declamatory style 'mòùmënt), G bitte ('bìtë)

E E there (dero), F même (me:m), G Herr (her)

Ë E bird (bë:d)

inverted \(\bar{\mathbf{e}}\), i.e. \(\bar{\mathbf{e}}\) pronounced with simultaneous curling back of the tip of the tongue towards the hard palate

 $\tilde{\mathbf{z}}$  F pain  $(\mathbf{p}\tilde{\mathbf{z}})$ 

Θ E above (Θ'bAV), other
 ('Λθθ), G Bruder ('bRu:-dθR)

(The French sound represented by the same symbol, as in premier (pro'mje) differs slightly from the English and German sound, the principal difference being the addition of a little lip-rounding)

e inverted e, i. e. e pronounced with simultaneous curling back of the tip of the tongue towards the hard palate

a very weak a

- f E foot (fut), F femme (fam), G voll (fol)
- g E give (giv), F gant (gã), G gut (qu:t)
- h E hold (hoùld), G Hund (hùnt)
- fi voiced h, F là-haut (la'o, la'ho or la'fio)

- i E queen (kwi:n), F si (si), G mir (mi:R)
- a very weak i
- i devocalized i
- i E sit (sit), G Kind (kint)
- $\mathbf{j} \in yes (\mathbf{jes}), F yeux (\mathbf{j} \mathbf{g}), G \mathbf{ja} (\mathbf{j} \mathbf{u})$
- k E catch (kætf), F cas (ku), G Kohl (ko:l)
- 1 the "clear" l, or l sound formed with simultaneous raising of the front of the tongue in the direction of the hard palate, E leave (li:v), F elle (\$1), G wohl (vo:1)
- devocalized l, F peuple (pepl)
- 1 the "dark" l, or l sound formed with simultaneous raising of the back of the tongue in the direction of the soft palate, E feel (fi:1)
- m E make (meik), F même (me:m), G mit (mit)
- m a very weak devocalized m
- n E not (not), F neuf (not), G Not (no:t)
- n devocalized n
- n F agneau (a'no)
- n E song (son), G klang (klan)
- o F côte (ko:t), G wohl (vo:l)
- ò E boat (bòùt), F comment (kò'mã), G Kopf (kòpf)
- a sound intermediate between
   and ø
- o F port (po:R), G dort (dort)

- ö a vowel intermediate in acoustic effect between of and of Eforget (generally forget but in declamatory style förget)
- 5 F bon (b5)
- D E saw (SD:)
- p inverted n, i. e. n pronounced with simultaneous curling back of the tip of the tongue towards the hard palate
- **r b** E not (**n b t**)
- ø F peu (pø), G hören ('hø:-Ren)
- ð G zwölf (tsvölf or tsvölf)
- œ F neuf (nœf), G Wörter ('vœrtər)
- œ F brun (bræ)
- p E pay (pè'i'), F patte (pat), G Post (pòst)
- r the fully rolled dental sound used by many F and G speakers, and sometimes in E in careful speaking (key words below)
- r the breathed consonant corresponding to the voiced r (key word below)
- f the semi-rolled dental sound (i. e. rolled, but consisting of one single tap of the tongue) frequently heard in E between two vowels, and sometimes in F and G finally (key words below)
- r a very weak I or f.
- I the dental fricative r sound

generally used in E (key words below)

a very weak A

R the rolled uvular sound generally used in F and G (key words below)

R the breathed consonant corresponding to the voiced R (key word below)

b the uvular fricative r sound not unfrequently heard in F and G especially when final

B a very weak B.

Key words for the r sounds: E rest (generally zest, in declamatory style rest), arrive (generally o'ra'i'v or y'xa'i'v, in declamatory style o'ra'i'v), Frare (ru:r, ru:r ru:r, ru:r, ru:r ru:r, ru:r, ru:r quatre (katr or katr), G rot (ru:t or ru:t), wahr (vu:r, vu:r, vu:r, vu:r, vu:r or vu:r)

s E safe (sèif), F sou (su), G was (vas)

f E shop (fop), F chou (fu), G Schuh (fu:) t E ten (tèn), F tôt (to), G tief (ti:f)

 $\theta \to thin (\theta in)$ 

u E rude (ru:d), F tout (tu), G gut (gu:t)

a very weak u

ù E put (pùt), G Mutter ('mùtər)

ü a sound intermediate between u and y, Norwegian hus (hü:s)

v Evain (vein), Fveuve (vœ: v), G wo (vo:)

v South German wo (vo:)

w E well (well), F oui (wi)

M the breathed consonant corresponding to the voiced W, often used in E as the pronunciation of wh, what (Mùt or Wùt)

x G ach ('ax)

y F tu (ty), G über ('y:bər)

y G Hütte ('hytë)

q F huit (qit)

z E zeal (zi:1), F zèle (zɛ:1), G Sohn (zo:n)

3 E measure ('meas), F juge (3y:3), G Loge ('lo:3ë)

? G geöffnet (gë''pfnët)

<sup>1</sup> For convenience the symbol r alone is used in the transcriptions of standard English, and R alone is used in the transcriptions of standard French and German.

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# CONTENTS

	page
Introduction	IV
Introduction	XII
ENGLISH TEXTS	
I. Passage from Shakespeare, Richard II	2
II. E. A. Poe "The Bells" verses 1-3	6
III. Conversation (from kleine Toussaint-Langenscheidt,	
Englisch)	
, " •	
FRENCH TEXTS	
IV. Passage from Rostand "La Samaritaine"	30
V. Lafontaine "Le Corbeau et le Renard"	36
VI. Lafontaine "Le Loup et l'Agneau"	
VII. Conversation (from Barlet and Rippmann, French Life	
and Ways)	
GERMAN TEXTS	
VIII. Passage from Schiller, Wallensteins Tod	56
IX. Passage from Goethe, Faust	
Notes on the pronunciation	74
	101 000