The `bgreek` bundle

Luis Rivera*

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Abstract

This bundle provides an interface to use several ascii input encodings to typeset Greek with Claudio Beccari's Greek fonts.

TeX is well known to be an outstanding typesetting engine, and LaTeX is perhaps the most popular macro package based on TeX; yet they are also known to be somewhat demanding on authors, especially those coming from non-TeXnical fields, like biblical or classical scholarship. In these particular fields, many sources come from Greek literary monuments, and several systems have been designed over time to preserve and retrieve Greek texts in digital form, from 6bit encoding schemes to unicode.

This bundle implements several ascii input schemes (hereafter called "dialects") of Greek as subsets of virtual fonts pointing to Claudio Beccari's Greek fonts, used by the standard `Greek` option of the `Babel` package.

1 Encoding

Beta Code was developed by David W. Packard, and has been adopted by the *Thesaurus Linguae Grecae* of the University of California, Irvine, and the *Perseus Project* of Tufts University. It was originally specified as a 6bit transliteration scheme, but 7bit variants are known. *Ibycus* is an 8bit set of fonts and a 7bit transliteration scheme, broadly based on Beta Code, developed by Pierre MacKay at the University of Washington for direct use with LaTeX.

This bundle provides two dialects of Greek implemented as the Babel "languages" `bgreek` (for Beta Code) and `ibygreek` (for Ibycus), and they may be used together and with any other Babel language, including the "standard" polytonic Greek provided by Babel. In fact, this very document uses they all three intertwined. The call, as usual, is `\usepackage[⟨language⟩]{babel}`.

Consequently, the previous `bgreek` package with all its options, commands, and environments are henceforth deprecated, and the previous `\usepackage{bgreek}` call will give you an error message and stop compilation at the spot.

The `bgreek` dialect still sets the `\catcode` of `\` (backslash) to `\other`, to comply with the Beta Code specification, so `@` acts as the escape character inside `bgreek` texts. However, given the technical limitations of reassigning `\catcodes` inside macros, something necessary to use Beta Coded Greek in a full document, this "language" doesn't use the standard Babel interface; instead, you must insert your Beta Coded texts with the `\textbgreek{⟨text⟩}` command. Moreover, this dialect also provides the shorthand kludge provided by the `betababel` package, by Felix Berkemeier, using the ! exclamation mark as a substitute for the `\` backslash to typeset Beta Code within macros like `\section` or `\footnote`.

The `ibygreek` "dialect" implements a partial subset of Beta Code, similar to the encoding of the `ibycus` package, by Pierre MacKay, or the `ibycus` language, by Peter Hesling and Walter Schmidt, using 'backquote and quote' to typeset grave and acute accents. This way, it is no longer necessary to change the catcodes of `\` and `@`, so we don't mess with ordinary LATEX syntax, and the standard Babel commands work as expected. Moreover, with the `ibygreek` dialect there is no need to prefix a star `*` before uppercase letters, for uppercase Greek glyphs are actually mapped into the corresponding slots in the virtual fonts. Finally, as the special Beta Code characters # hash and % percent have no special meaning in Ibycus, you should access the extra characters via the usual commands, as defined below.

These "dialects" will not typeset Greek numerals out of their Arabic or Roman counterparts, so you must use the standard Greek language from Babel to do so. Please check the documentation for the standard implementation of the Greek language for details.

2   Crash course

A text containing the following lines:

```
\documentclass{article}
\usepackage[bgreek,english]{babel}
\let\bcode\textbgreek
\begin{document}
All humans desire to know by nature.\footnote{%
\bcode{*pa/ntes a)/nqrwpoi tou= ei)de/nai o)re/gontai fu/sei.}}
\end{document}
```

will typeset the following:

All humans desire to know by nature.[1]

You may want to see more comprehensive samples as appendixes to this document.

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[1]Πάντες ἄνθρωποι τοῦ εἰδέναι ὀρέγονται φύσει.

3   The Beta Code Encoding

A full description of the Beta Code implemented in the fonts may be found in the following tables, based on "TLG Beta Code Quick Reference Guide", last revised August 23, 2004, available from `http://ptolemy.tlg.uci.edu/quickbeta.pdf/`. Section and table numbers follow the Beta Code Manual.[2]

The black box ▉ denotes a character that is not supported. Use of the corresponding Beta code results in undefined behaviour.

1. Greek, Latin and Coptic Alphabets, Fonts and Punctuation

1.1. Polytonic Greek

1.1.1 The Greek Alphabet

1.1.2 Accents, diacritics and punctuation

Punctuation

Punctuation	Beta Code	Name
.	.	Period
·	:	Colon (Ano Stigme)
;	;	Question Mark
,	,	Apostrophe
-	-	Hyphen
–	-- (??)	Dash

3.   Quotation Marks, Parentheses, Additional Punctuation and Additional Characters

3.1. "—Quotation Marks

Quotation mark ligatures are unsupported. However, the regular «`\guillemetleft` and `\guillemetright`» commands are readily available. (T1 encoding LaTeX 'guillemot's are misleadingly funny typos.)

3.2. [—Parentheses

Beta Code	Character	Name
[	[	Square Bracket (Opening)
]	]	Square Bracket (Closing)
[1	(	Parenthesis (Opening)
]1	)	Parenthesis (Closing)

---

[2]This section was contributed by David Jones.

Table 1: Standard Greek Alphabet with Beta Code equivalents

Upper Case	Beta Code	Character Name	Lower Case	Beta Code
A	*a	Alpha	α	a
B	*b	Beta	β	b
Γ	*g	Gamma	γ	g
Δ	*d	Delta	δ	d
E	*e	Epsilon	ε	e
Z	*z	Zeta	ζ	z
H	*h	Eta	η	h
Θ	*q	Theta	ϑ	q
I	*i	Iota	ι	i
K	*k	Kappa	ϰ	k
Λ	*l	Lambda	λ	l
M	*m	Mu	μ	m
N	*n	Nu	ν	n
Ξ	*c	Xi	ξ	c
O	*o	Omicron	o	o
Π	*p	Pi	π	p
P	*r	Rho	ρ	r
Σ	*s	Medial Sigma	σ	s, s1
Σ	*s	Final Sigma	ς	s, s2
■	*s (*s3)	Lunate Sigma	■	s (s3)
T	*t	Tau	τ	t
Υ	*u	Upsilon	υ	u
Φ	*f	Phi	φ	f
X	*x	Chi	χ	x
Ψ	*y	Psi	ψ	y
Ω	*w	Omega	ω	w

The rest of the parentheses codes are unsupported.

3.3. %—Additional Punctuation and Characters

Beta Code	Character	Name
%	■	Crux (†)
%1	■	Latin Question Mark (?)
%2	*	Asterisk
%3	/	Slash
%4	!	Exclamation Mark
%5	■	Long Vertical Bar (|)
%6	=	Equals Sign
%7	+	Plus Sign
%8	%	Percent Sign
%9	■	Ampersand (&)
%10	:	Dicolon

Table 2: Further Greek Letters

Upper Case	Beta Code	Character Name	Lower Case	Beta Code
F	*v	Digamma	ϝ	v
ϛ	*#2 (*#4)	Stigma	ϛ	#2 (#4)
Ϙ ϟ ϟ	*#3 (*#4) (*#1)	Koppa	ϙ ϟ ϟ	#3 (#4) (#1)
■	*#711	San	■	#711
⅄	*#5	Sampi	⅄	#5

Some technical limitations in the handling of the # hash sign in LaTeX may prevent these characters from being available directly with Beta Code, so the following commands may be used: \anwtonos ('), \katwtonos (‚), \qoppa (ϟ), \Qoppa (Ϙ), \varqoppa (ϙ), \stigma (ϛ), \Sampi (⅄), \sampi (⅄), \vardigamma (ϛ).

Table 3: Polytonic Greek accents and diacritics

Diacritic	Beta Code	Name	Examples	Coded as
᾿	)	Smooth breathing	ἐν	e)n
῾	(	Rough breathing	ὁ, οἱ	o(, oi(
´	/	Acute accent	πρός	pro/s
˜	=	Circumflex accent	τῶν	tw=n
`	\	Grave accent	πρὸς	pro\s
¨	+	Diaeresis	προϊέναι	proi+e/nai
ͺ	|	Iota subscript	τῷ	tw=|
■	?	Subscript dot		
■	%26	Macron		
■	%27	Breve		

Some technical limitations in the handling of the % percent sign in LaTeX may keep these characters from being typeset directly with Beta Code. The rest of the %-codes are unsupported.

4   Caveats and Acknowledgments

The code is working its way into maturity. The input encoding scheme changed slightly from version 0.1, towards completeness (as far as this is possible) and stability, and the Babel Language Definition Files are still simple and likely to be buggy. The next big step shall be the implementation of hyphenation patterns for both (bgreek and ibygreek) "languages". A few glyphs shall be reassigned to support additional characters, like lunate cigma or textual underdot.

Version 1.0 will comply with the LaTeX3 project distribution standards, using a .dtx file for distribution, and a few scripts to make installation easier. Meanwhile, the method of installation is simply by unpacking the zip file into a suitable root texmf tree, like /usr/local/share/texmf, for instance.

Some portions of the documentation and code have been borrowed from Silvio Levy and Timothy Murphy, *Using Greek Fonts with LaTeX*, which is part of the

`lgreek.sty` package, and Apostolos Syropoulos *The Greek Language*, which is part of the distribution of the `Babel` system. The virtual fonts have been generated with the `fontinst` package by Alan Jeffrey.

David Jones found and fixed some broken ligatures, and implemented a lot of ligatures missing in version 0.1. He also provided the text from the Illiad for test driving. Paolo Matteucci suggested maintaining support for the ibycus encoding, for backwards compatibility with version 0.1. He also provided the text from the Odyssey. Special thanks to David Kastrup and Donald Arsenau for suggesting a workable way to preserve `\catcode`s within macros.

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Appendixes

Ἰλίαδος Α

The following text has been transcribed using the Beta Code encoding.

> Μῆνιν ἄειδε θεὰ Πηληϊάδεω ἀχιλῆος
> οὐλομένην, ἣ μυρί’ ἀχαιοῖς ἄλγε’ ἔθηκε,
> πολλὰς δ’ ἰφθίμους ψυχὰς Ἄϊδι προΐαψεν
> ἡρώων, αὐτοὺς δὲ ἑλώρια τεῦχε κύνεσσιν
> οἰωνοῖσί τε πᾶσι, Διὸς δ’ ἐτελείετο βουλή,
> ἐξ οὗ δὴ τὰ πρῶτα διαστήτην ἐρίσαντε
> Ἀτρείδης τε ἄναξ ἀνδρῶν καὶ δῖος ἀχιλλεύς.
> τίς τ’ ἄρ σφωε θεῶν ἔριδι ξυνέηκε μάχεσθαι;
> Λητοῦς καὶ Διὸς υἱός· ὃ γὰρ βασιλῆϊ χολωθεὶς
> νοῦσον ἀνὰ στρατὸν ὄρσε κακήν, ὀλέκοντο δὲ λαοί,
> οὕνεκα τὸν Χρύσην ἠτίμασεν ἀρητῆρα
> Ἀτρείδης· ὃ γὰρ ἦλθε θοὰς ἐπὶ νῆας ἀχαιῶν
> λυσόμενός τε θύγατρα φέρων τ’ ἀπερείσι’ ἄποινα,
> στέμματ’ ἔχων ἐν χερσὶν ἑκηβόλου Ἀπόλλωνος
> χρυσέῳ ἀνὰ σκήπτρῳ, καὶ λίσσετο πάντας ἀχαιούς,
> Ἀτρείδα δὲ μάλιστα δύω, κοσμήτορε λαῶν·
> Ἀτρείδαι τε καὶ ἄλλοι ἐϋκνήμιδες ἀχαιοί,
> ὑμῖν μὲν θεοὶ δοῖεν Ὀλύμπια δώματ’ ἔχοντες
> ἐκπέρσαι Πριάμοιο πόλιν, εὖ δ’ οἴκαδ’ ἱκέσθαι·
> παῖδα δ’ ἐμοὶ λύσαιτε φίλην, τὰ δ’ ἄποινα δέχεσθαι,
> ἁζόμενοι Διὸς υἱὸν ἑκηβόλον Ἀπόλλωνα.

This is the source code:

```
\textbgreek{%
*mh=nin a)/eide qea\ *phlhi+a/dew *)axilh=os@\@relax
```

```
ou)lome/nhn, h(\ muri/' *)axaioi=s a)/lge' e)/qhke,@\@relax
polla\s d' i)fqi/mous yuxa\s *)/ai+di proi/+ayen@\@relax
h(rw/wn, au)tou\s de\ e(lw/ria teu=xe ku/nessin@\@relax
oi)wnoi=si/ te pa=si, *dio\s d' e)telei/eto boulh/,@\@relax
e)c ou(= dh\ ta\ prw=ta diasth/thn e)ri/sante@\@relax
*)atrei/+dhs te a)/nac a)ndrw=n kai\ di=os *)axilleu/s.@\@relax
ti/s t' a)/r sfwe qew=n e)/ridi cune/hke ma/xesqai;@\@relax
*lhtou=s kai\ *dio\s ui(o/s: o(\ ga\r basilh=i+ xolwqei\s@\@relax
nou=son a)na\ strato\n o)/rse kakh/n, o)le/konto de\ laoi/,@\@relax
ou(/neka to\n *xru/shn h)ti/masen a)rhth=ra@\@relax
*)atrei/+dhs: o(\ ga\r h)=lqe qoa\s e)pi\ nh=as *)axaiw=n@\@relax
luso/meno/s te qu/gatra fe/rwn t' a)perei/si' a)/poina,@\@relax
ste/mmat' e)/xwn e)n xersi\n e(khbo/lou *)apo/llwnos@\@relax
xruse/w| a)na\ skh/ptrw|, kai\ li/sseto pa/ntas *)axaiou/s,@\@relax
*)atrei/+da de\ ma/lista du/w, kosmh/tore law=n:@\@relax
*)atrei/+dai te kai\ a)/lloi e)u+knh/mides *)axaioi/,@\@relax
u(mi=n me\n qeoi\ doi=en *)olu/mpia dw/mat' e)/xontes@\@relax
e)kpe/rsai *pria/moio po/lin, eu)= d' oi)/kad' i(ke/sqai:@\@relax
pai=da d' e)moi\ lu/saite fi/lhn, ta\ d' a)/poina de/xesqai,@\@relax
a(zo/menoi *dio\s ui(o\n e(khbo/lon *)apo/llwna.@\@relax
}
```

Odyssey I

The following passage has been transcribed using the Ibycus encoding.

Ἄνδρα μοι ἔννεπε, μοῦσα, πολύτροπον, ὃς μάλα πολλὰ

πλάγχθη, ἐπεὶ Τροίης ἱερὸν πτολίεθρον ἔπερσεν·

πολλῶν δ' ἀνθρώπων ἴδεν ἄστεα καὶ νόον ἔγνω,

πολλὰ δ' ὅ γ' ἐν πόντῳ πάθεν ἄλγεα ὃν κατὰ θυμόν,

ἀρνύμενος ἥν τε ψυχὴν καὶ νόστον ἑταίρων.

Ἀλλ' οὐδ' ὣς ἑτάρους ἐρρύσατο, ἱέμενός περ·

αὐτῶν γὰρ σφετέρῃσιν ἀτασθαλίῃσιν ὄλοντο,

νήπιοι, οἳ κατὰ βοῦς Ὑπερίονος Ἠελίοιο

ἤσθιον· αὐτὰρ ὁ τοῖσιν ἀφείλετο νόστιμον ἦμαρ.

Τῶν ἁμόθεν γε, θεά, θύγατερ Διός, εἰπὲ καὶ ἡμῖν.

Ἔνθ' ἄλλοι μὲν πάντες, ὅσοι φύγον αἰπὺν ὄλεθρον,

οἴκοι ἔσαν, πόλεμόν τε πεφευγότες ἠδὲ θάλασσαν·

τὸν δ' οἶον νόστου κεχρημένον ἠδὲ γυναικὸς

νύμφη πότνί ἔρυκε Καλυψὼ δῖα θεάων

ἐν σπέσσι γλαφυροῖσι, λιλαιομένη πόσιν εἶναι.

Ἀλλ' ὅτε δὴ ἔτος ἦλθε περιπλομένων ἐνιαυτῶν,

τῷ οἱ ἐπεκλώσαντο θεοὶ οἶκόνδε νέεσθαι

εἰς Ἰθάκην, οὐδ' ἔνθα πεφυγμένος ἦεν ἀέθλων

καὶ μετὰ οἷσι φίλοισι. Θεοὶ δ' ἐλέαιρον ἅπαντες

νόσφι Ποσειδάωνος· ὁ δ' ἀσπερχὲς μενέαινεν

ἀντιθέῳ Ὀδυσῆι πάρος ἦν γαῖαν ἱκέσθαι.

This is the corresponding source code:

```
\begin{otherlanguage}{ibygreek}\obeylines
)'Andra moi e)'nnepe, mou=sa, \emph{polu'tropon}, o('s ma'la polla`
pla'gxqh, e)pei` Troi'hs i(ero'n ptoli'eqron e)'persen:
pollw=n d'' a)nqrw'pwn i)'den a)'stea kai` no'on e)'gnw,
polla` d'' o(' g'' e)n po'ntw| pa'qen a)'lgea o('n kata` qumo'n,
a)rnu'menos h('n te yuxh'n kai` no'ston e(tai'rwn.
)All'' ou)d'' w('s e(ta'rous e)rru'sato, i(e'meno's per:
au)tw=n ga`r sfete'rh|sin a)tasqali'h|sin o)'lonto,
nh'pioi, oi(' kata` bou=s (Uperi'onos )Heli'oio
h)'sqion: au)ta`r o( toi=sin a)fei'leto no'stimon h)=mar.
Tw=n a(mo'qen ge,  qea', qu'gater Dio's, ei)pe` kai` h(mi=n.
\medskip
)'Enq'' a)'lloi me`n pa'ntes, o('soi fu'gon ai)pu`n o)'leqron,
oi)'koi e)'san, po'lemo'n te pefeugo'tes h)de` qa'lassan:
to`n d'' oi)=on no'stou kexrhme'non h)de` gunaiko's
nu'mfh po'tni' e)'ruke Kaluyw` di=a qea'wn
e)n spe'ssi glafuroi=si,  lilaiome'nh po'sin ei)=nai.
)All'' o('te dh` e)'tos h)=lqe periplome'nwn e)niautw=n,
tw=| oi( e)peklw'santo qeoi` oi)=ko'nde ne'esqai
ei)s )Iqa'khn, ou)d'' e)'nqa pefugme'nos h)=en a)e'qlwn
kai` meta` oi(=si fi'loisi. Qeoi` d'' e)le'airon a('pantes
no'sfi Poseida'wnos: o( d'' a)sperxe's mene'ainen
a)ntiqe'w| )Odush=i pa'ros h('n gai=an i(ke'sqai.
\end{otherlanguage}
```