THE COCHINEAL FONT PACKAGE

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Cochineal is a fork of Crimson, a remarkable creation of Sebastian Kosch inspired by oldstyle font designers. The name Cochineal is intended to suggest that, while it is crimson, there may be bugs involved. More than 1500 glyphs were added to Crimson, allowing a more than modest chance that some poor spacing or kerning or accent placement might have been introduced. Such problems will occur in the less frequented parts of the fonts, and I would appreciate reports of problems you may discover. You are unlikely to trip over issues if you stay within the bounds of, say, the T1 encoding. I did correct problems in a number of glyphs from Crimson that FontForge uncovered and that could have led to poor rendition on some platforms, especially MAC OS. I also changed the emsize to `1000` (the standard for PostScript-flavored Opentype) from the Crimson value of `1024` and rescaled accordingly.

Cochineal provides `Roman`, `Bold`, `Italic` and `BoldItalic`. (Crimson provided semibold weights but with only limited coverage, which I did not wish to extend as this would have required the creation of about 2000 additional glyphs. Bob Tennent's `Crimson` package does support semibold and the other styles, though without my glyph additions.)

Package Features:
In addition to the encodings `OT1`, `T1`, `TS1`, `LY1` in general use by Western European (and some Eastern European) scripts, the package also offers `LGR` with full support for monotonic, polytonic and some ancient Greek, and `T2A` and `OT2` Cyrillic support. All allow a choice from four figure styles—`TLF` (tabular lining figures, monospaced and uppercase), `LF` (proportional lining figures, uppercase), `TOsF` (tabular oldstyle figures, monospaced and lowercase) and `OsF` (proportional oldstyle figures, lowercase). The encodings `OT1`, `T1`, `TS1`, `LY1` offer Small Caps, even *Italics Small Caps*, and additional figure styles—superiors, inferiors and denominators. These features are available from either `fontspec` or from [pdf]LaTeX. In LaTeX, you access these through the macros `\textsu`, `\textin` and `\textde`, or through their font-switching equivalents `\sufigures`, `\infigures` and `\defigures`. For example:

- `M\textsu{lle} Dupont` and `M{\sufigures lle} Dupont` both produce M$^{\text{lle}}$ Dupont.
- `{\infigures 12345}` and `\textin{12345}` render as $_{12345}$, dipping noticeably below the baseline, while `{\defigures 12345}` and `\textde{12345}` render as 12345, aligned with the baseline.

Package Options and Macros:
The package defines two macros, `\useosf` and `\useproportional`, useable only in the preamble, which determine the default figure style in text. A typical invocation would be something like

```
\usepackage{cochineal} % default figure style is tabular, lining
% load sans and typewriter fonts
% load a math font---it will use tabular lining figures in math
\useosf % switch from lining figures to oldstyle figures
\useproportional % switch from tabular to proportional
```

There is a simpler way to achieve essentially the same result, but with the advantage that the figure styles are not loaded until after the math package (if any) is loaded, so that math always uses the default tabular lining figures.

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```
% If you use babel, load it here, before cochineal
\usepackage[p,osf]{cochineal} % default figure style is proportional, oldstyle
% load sans and typewriter fonts
% load a math font---it will use tabular lining figures in math
```

No matter what the default figure style in text, the package provides switches and macros to use any available figure style.

- `\textlf{}` and `{\lfstyle }` give proportional lining figures; `\texttlf{}` and `{\tlfstyle }` give tabular lining figures; `\textosf{}` and `{\osfstyle }` give proportional oldstyle figures; `\texttosf{}` and `{\tosfstyle }` give tabular oldstyle figures; `\textfrac{3}{4}` uses superior and denominator figures to make the fraction ¾.

The options that can be passed to `cochineal.sty` are the following:

- `scale` or `scaled`: a magnification factor—e.g., `scaled=1.02` enlarges all text controlled by the package by 2%;
- `p`, or `proportional`: make proportional figures the default rather than tabular; `lf`, or `lining`: make lining figures the default (this is already the default); `osf`, or `oldstyle`: make oldstyle figures the default rather than lining;
- `sups`: use superior figures to make footnote markers, rather than the LaTeX's default markers;
- `swashQ`: use Cochineal's swash Q instead of its tamer default version, Q;
- `scosf`: always use oldstyle figures within a small caps block;
- `theoremfont`: for theorem statements in the `plain` style, use a doctored version of italics that has upright figures, braces, brackets, parentheses, exclamation mark, colon and semicolon.

Mathematical accompaniment

The package contains fonts for use as math letters that are derived from Cochineal Roman and Greek glyphs and the newtxmath family. Note that v and ν (Greek nu) are quite distinct. Here's a sample.

```
% preamble should include, in this order:
\usepackage[T1]{fontenc}
% load babel here
\usepackage[p,osf]{cochineal}
\usepackage[varqu,varl,var0]{inconsolata}
\usepackage[scale=.95,type1]{cabin}
\usepackage[cochineal,vvarbb]{newtxmath}
\usepackage[cal=boondoxo]{mathalfa}
```

The typeset math below follows the ISO recommendations that only variables be set in italic. Note the use of upright shapes for d, e and π. (The first two are entered as `\mathrm{d}` and `\mathrm{e}`, and in fonts derived from `mtpro2` or `newtxmath`, the latter is entered as `\uppi`.)

Simplest form of the *Central Limit Theorem*: *Let* $X_1, X_2, \cdots$ *be a sequence of iid random variables with mean* 0 *and variance* 1 *on a probability space* $(\Omega, \mathscr{F}, \mathbb{P})$*. Then*

$$\mathbb{P}\left(\frac{X_1+\cdots+X_n}{\sqrt{n}} \le v\right) \to \mathfrak{N}(v) := \int_{-\infty}^{v} \frac{\mathrm{e}^{-t^2/2}}{\sqrt{2\pi}}\,\mathrm{d}t \quad \text{as } n \to \infty,$$

or, equivalently, letting $S_n \coloneqq \sum_1^n X_k$*,*

$$\mathbb{E} f\left(S_n/\sqrt{n}\right) \to \int_{-\infty}^{\infty} f(t)\frac{\mathrm{e}^{-t^2/2}}{\sqrt{2\pi}}\,\mathrm{d}t \quad \text{as } n \to \infty, \text{ for every } f \in \mathrm{b}\mathcal{C}(\mathbb{R}).$$

Cochineal's TS1 (textcomp)

	´0	´1	´2	´3	´4	´5	´6	´7	
´00x	0	1	2	3	4	5	6	7	″0x
´01x	8	9	10	¸ 11	˛ 12	, 13	14	15	
´02x	16	17	„ 18	19	20	21	22	23	″1x
´03x	← 24	→ 25	26	27	28	29	30	31	
´04x	32	33	34	35	$ 36	37	38	' 39	″2x
´05x	40	41	42	43	, 44	45	. 46	/ 47	
´06x	0 48	1 49	2 50	3 51	4 52	5 53	6 54	7 55	″3x
´07x	8 56	9 57	Q 58	Q 59	60	− 61	62	63	
´12x	80	81	82	83	84	85	86	Ω 87	″5x
´13x	88	89	90	91	92	93	↑ 94	↓ 95	
´20x	128	129	130	131	† 132	‡ 133	134	‰ 135	″8x
´21x	• 136	137	138	139	140	141	142	143	
´22x	144	145	₤ 146	147	148	149	150	™ 151	″9x
´23x	152	153	154	155	156	157	158	159	
´24x	160	161	¢ 162	£ 163	¤ 164	¥ 165	¦ 166	§ 167	″Ax
´25x	168	© 169	ª 170	171	¬ 172	173	® 174	175	
´26x	° 176	± 177	178	179	180	µ 181	¶ 182	· 183	″Bx
´27x	184	185	º 186	√ 187	¼ 188	½ 189	¾ 190	191	
´32x	208	209	210	211	212	213	× 214	215	″Dx
´33x	216	217	218	219	220	221	222	223	
´36x	240	241	242	243	244	245	÷ 246	247	″Fx
´37x	248	249	250	251	252	253	254	255	
	″8	″9	″A	″B	″C	″D	″E	″F	

Typesetting Greek with LaTeX

Cochineal offers a rather complete LGR-encoded glyph collection, lacking just a few ancient symbols.

	´0	´1	´2	´3	´4	´5	´6	´7	
´00x	– 0	⁀ 1	2	3	4	5	ς 6	ς 7	˝0x
´01x	ͺ 8	ᾼ 9	ῌ 10	ῼ 11	Α 12	Ϋ 13	α 14	ϋ 15	
´02x	ˏ 16	ˎ 17	ϟ 18	ϙ 19	‿ 20	Ϙ 21	Ϛ 22	Ϡ 23	˝1x
´03x	€ 24	‰ 25	ə 26	ϡ 27	‘ 28	’ 29	˘ 30	¯ 31	
´04x	῁ 32	! 33	¨ 34	΅ 35	῭ 36	% 37	· 38	ʹ 39	˝2x
´05x	(40	) 41	* 42	+ 43	, 44	- 45	. 46	/ 47	
´06x	0 48	1 49	2 50	3 51	4 52	5 53	6 54	7 55	˝3x
´07x	8 56	9 57	: 58	· 59	῾ 60	= 61	᾿ 62	; 63	
´10x	῟ 64	Α 65	Β 66	῝ 67	Δ 68	Ε 69	Φ 70	Γ 71	˝4x
´11x	Η 72	Ι 73	Θ 74	Κ 75	Λ 76	Μ 77	Ν 78	Ο 79	
´12x	Π 80	Χ 81	Ρ 82	Σ 83	Τ 84	Υ 85	῎ 86	Ω 87	˝5x
´13x	Ξ 88	Ψ 89	Ζ 90	[91	῏ 92	] 93	῞ 94	῍ 95	
´14x	` 96	α 97	β 98	ς 99	δ 100	ε 101	φ 102	γ 103	˝6x
´15x	η 104	ι 105	θ 106	κ 107	λ 108	μ 109	ν 110	ο 111	
´16x	π 112	χ 113	ρ 114	σ 115	τ 116	υ 117	118	ω 119	˝7x
´17x	ξ 120	ψ 121	ζ 122	« 123	ͺ 124	» 125	῀ 126	— 127	
´20x	ὰ 128	ἁ 129	ἀ 130	ἃ 131	ᾲ 132	ᾁ 133	ᾀ 134	ᾃ 135	˝8x
´21x	ά 136	ἅ 137	ἄ 138	ἂ 139	ᾴ 140	ᾅ 141	ᾄ 142	ᾂ 143	
´22x	ᾶ 144	ἇ 145	ἆ 146	ϝ 147	ᾷ 148	ᾇ 149	ᾆ 150	‿ 151	˝9x
´23x	ὴ 152	ἡ 153	ἠ 154	155	ῂ 156	ᾑ 157	ᾐ 158	159	
´24x	ή 160	ἥ 161	ἤ 162	ἢ 163	ῄ 164	ᾕ 165	ᾔ 166	ᾒ 167	˝Ax
´25x	ῆ 168	ἧ 169	ἦ 170	ἣ 171	ῇ 172	ᾗ 173	ᾖ 174	ᾓ 175	
´26x	ὼ 176	ὡ 177	ὠ 178	ὣ 179	ῲ 180	ᾡ 181	ᾠ 182	ᾣ 183	˝Bx
´27x	ώ 184	ὥ 185	ὤ 186	ὢ 187	ῴ 188	ᾥ 189	ᾤ 190	ᾢ 191	
´30x	ῶ 192	ὧ 193	ὦ 194	Ϝ 195	ῷ 196	ᾧ 197	ᾦ 198	199	˝Cx
´31x	ὶ 200	ἱ 201	ἰ 202	ἳ 203	ὺ 204	ὑ 205	ὐ 206	ὓ 207	
´32x	ί 208	ἵ 209	ἴ 210	ἲ 211	ύ 212	ὕ 213	ὔ 214	ὒ 215	˝Dx
´33x	ῖ 216	ἷ 217	ἶ 218	Ϊ 219	ῦ 220	ὗ 221	ὖ 222	Ϋ 223	
´34x	ὲ 224	ἑ 225	ἐ 226	ἓ 227	ὸ 228	ὁ 229	ὀ 230	ὃ 231	˝Ex
´35x	έ 232	ἕ 233	ἔ 234	ἒ 235	ό 236	ὅ 237	ὄ 238	ὂ 239	
´36x	ϊ 240	ῒ 241	ΐ 242	ῗ 243	ϋ 244	ῢ 245	ΰ 246	ῧ 247	˝Fx
´37x	ᾳ 248	ῃ 249	ῳ 250	ῥ 251	ῤ 252	253	ʹ 254	͵ 255	
	˝8	˝9	˝A	˝B	˝C	˝D	˝E	˝F	

Setting up your source file to use LGR usually involves `babel` and `substitutefont`. See the documentation of `nimbus15` for details.

Typesetting Russian

With T2A encoding, the process is the same as with other T2A-encoded fonts, though the gaps in coverage may affect users of a number of non-Russian Cyrillic scripts. The only figure style provided is tabular lining (TLF.)

	´0	´1	´2	´3	´4	´5	´6	´7	
´00x	` 0	´ 1	ˆ 2	˜ 3	¨ 4	˝ 5	˚ 6	ˇ 7	″0x
´01x	˘ 8	¯ 9	˙ 10	¸ 11	˛ 12	13	14	15	
´02x	“ 16	” 17	̑ 18	19	˘ 20	– 21	— 22	23	″1x
´03x	24	ı 25	ȷ 26	ff 27	fi 28	fl 29	ffi 30	ffl 31	
´04x	32	! 33	" 34	# 35	$ 36	% 37	& 38	’ 39	″2x
´05x	(40	) 41	* 42	+ 43	, 44	- 45	. 46	/ 47	
´06x	0 48	1 49	2 50	3 51	4 52	5 53	6 54	7 55	″3x
´07x	8 56	9 57	: 58	; 59	< 60	= 61	> 62	? 63	
´10x	@ 64	A 65	B 66	C 67	D 68	E 69	F 70	G 71	″4x
´11x	H 72	I 73	J 74	K 75	L 76	M 77	N 78	O 79	
´12x	P 80	Q 81	R 82	S 83	T 84	U 85	V 86	W 87	″5x
´13x	X 88	Y 89	Z 90	[91	\ 92	] 93	^ 94	_ 95	
´14x	‘ 96	a 97	b 98	c 99	d 100	e 101	f 102	g 103	″6x
´15x	h 104	i 105	j 106	k 107	l 108	m 109	n 110	o 111	
´16x	p 112	q 113	r 114	s 115	t 116	u 117	v 118	w 119	″7x
´17x	x 120	y 121	z 122	{ 123	| 124	} 125	~ 126	- 127	
´20x	128	129	Ђ 130	Ћ 131	132	133	134	Љ 135	″8x
´21x	Ї 136	137	138	139	140	141	142	Ѕ 143	
´22x	144	145	Ў 146	147	148	149	Џ 150	151	″9x
´23x	152	Є 153	154	Њ 155	Ё 156	№ 157	¤ 158	§ 159	
´24x	160	161	ђ 162	ћ 163	164	165	166	љ 167	″Ax
´25x	ї 168	169	170	171	172	173	174	ѕ 175	
´26x	176	177	ў 178	179	180	181	џ 182	183	″Bx
´27x	184	є 185	ә 186	њ 187	ё 188	„ 189	« 190	» 191	
´30x	А 192	Б 193	В 194	Г 195	Д 196	Е 197	Ж 198	З 199	″Cx
´31x	И 200	Й 201	К 202	Л 203	М 204	Н 205	О 206	П 207	
´32x	Р 208	С 209	Т 210	У 211	Ф 212	Х 213	Ц 214	Ч 215	″Dx
´33x	Ш 216	Щ 217	Ъ 218	Ы 219	Ь 220	Э 221	Ю 222	Я 223	
´34x	а 224	б 225	в 226	г 227	д 228	е 229	ж 230	з 231	″Ex
´35x	и 232	й 233	к 234	л 235	м 236	н 237	о 238	п 239	
´36x	р 240	с 241	т 242	у 243	ф 244	х 245	ц 246	ч 247	″Fx
´37x	ш 248	щ 249	ъ 250	ы 251	ь 252	э 253	ю 254	я 255	
	″8	″9	″A	″B	″C	″D	″E	″F	

The OT2 encoding (supposedly obsolete, but still useful) is intended for limited use in producing Russian characters with a Western keyboard, making by means of TEX a transliteration of ASCII for most characters in the range 33–122, and providing ligatures to generate the rest. See the documentation of `nimbus15` for further details.

	´0	´1	´2	´3	´4	´5	´6	´7	
´00x	Њ 0	Љ 1	Џ 2	Э 3	І 4	Є 5	Ђ 6	Ћ 7	″0x
´01x	њ 8	љ 9	џ 10	э 11	і 12	є 13	ђ 14	ћ 15	
´02x	Ю 16	Ж 17	Й 18	Ё 19	Ѵ 20	Ѳ 21	Ѕ 22	Я 23	″1x
´03x	ю 24	ж 25	й 26	ё 27	ѵ 28	ѳ 29	ѕ 30	я 31	
´04x	¨ 32	! 33	” 34	Ѣ 35	˘ 36	% 37	´ 38	’ 39	″2x
´05x	(40	) 41	* 42	ѣ 43	, 44	- 45	. 46	/ 47	
´06x	0 48	1 49	2 50	3 51	4 52	5 53	6 54	7 55	″3x
´07x	8 56	9 57	: 58	; 59	« 60	1 61	» 62	? 63	
´10x	˘ 64	А 65	Б 66	Ц 67	Д 68	Е 69	Ф 70	Г 71	″4x
´11x	Х 72	И 73	Ј 74	К 75	Л 76	М 77	Н 78	О 79	
´12x	П 80	Ч 81	Р 82	С 83	Т 84	У 85	В 86	Щ 87	″5x
´13x	Ш 88	Ы 89	З 90	[91	“ 92	] 93	Ь 94	Ъ 95	
´14x	‘ 96	а 97	б 98	ц 99	д 100	е 101	ф 102	г 103	″6x
´15x	х 104	и 105	ј 106	к 107	л 108	м 109	н 110	о 111	
´16x	п 112	ч 113	р 114	с 115	т 116	у 117	в 118	щ 119	″7x
´17x	ш 120	ы 121	з 122	– 123	— 124	№ 125	ь 126	ъ 127	
	″8	″9	″A	″B	″C	″D	″E	″F	