CHINA2e – a short font report

(Chinese calendar symbols - by UDO HEYL, July 14th, 1997)

Error Reports in case of UNCHANGED versions to
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1 What is CHINA2e?

It is a LaTeX2e - package to produce Chinese calendar symbols of the old Chinese lunisolar calendar. In addition you can use a new fontshape \BLOCK, symbolic letters A... Z, the phases of the Moon and some special symbols (...).

2 How to use the CHINA2e package?

First and foremost you've got to copy the following files

- CHINA10.MF, CHINASYM.ADD, CHINASYM.ALF, CHINASYM.ELE, CHINASYM.NUM, CHINASYM.SBL AND CHINASYM.STA into your Metafont-directory (`\emtex\mfinput\china`)
- CHINA2E.STY into your Style-directory (`\emtex\texinput\china`) and
- CHINA10.TFM into your Tfm-directory (`\emtex\tfm\china`).

Note, however, that the paths may be different in your LaTeX2e implementation (EmTeX for MS-DOS, web2c for UNIX etc.). LaTeX2e is absolutely required, if you want to use CHINA2e, which doesn't run with the **ancient** LaTeX209.

Now you can call this package like seen in the example:

```
\documentclass[12pt]{article}
\usepackage{china2e} %%% to include china2e.sty
\begin{document} ... \end{document}
```

Chinese characters and symbols will appear now in the current size and won't change the current shape. Of course you can input `{\Huge` *chinese symbol* `}` to manage a greater Chinese calendar symbol.

Well, the package is ready, so let's get down to work.

3 I/O List of the Chinese Characters

The following inputs you can use in textmode.
In mathmode you've got to type in `$ \mbox{` *input* `} $`.

Input	$xxx =$	Output	Explanation
`{\uchr`xxx`}`	0 ... 255	子 ... €	all font char's ↗ p. 6
`\TerrEle{` xxx `}`	1 ... 12	子 ... 亥	terrestrial elements
`\terrele{` xxx `}`	1 ... 12	子 ... 亥	terrestrial elements
`\AstrEle{` xxx `}`	1 ... 10	甲 ... 癸	astral elements
`\astrele{` xxx `}`	1 ... 10	甲 ... 癸	astral elements
`\MoonSta{` xxx `}`	1 ... 28	危 ... 虚	Moon stations
`\moonsta{` xxx `}`	1 ... 28	危 ... 虚	Moon stations
`\MoonPha{` xxx `}`	1 ... 4	☻ ... ☾	Moon phases

Warning: In case of an argument out of given area a message like this will appear:

```
!!! See CHINADOC.TEX for explanation !!!
Moon Phases ... Argument xxx = <1 ... 4>
! Warning: Illegal Function argument xxx too small or too large.
\chiprt ...errmessage {Warning: \errmess }
                                          } \else {\advance \chinarg ...
l.96              \MoonPha{5}
                              \> Moon phases \\*
?
```

The correct arguments xxx are explained in the table above.

Input	Output	Explanation
`\CyclYears`	花甲子	the cycle of 60 years
`\Year`	年	the time units year, month, day
`\Month`	月	to be used in the
`\Day`	日	Chinese calendar data
`\Thousand\Year\Book`	千年书	the Chinese calendar
`\MoonStations`	宿	28 stations of the Moon (↗ above)
`\WaxingZodiac`	節	days 1 ... 15 of a zodiac sign
`\WaningZodiac`	氣	days 16 ... 30 of a zodiac sign
`\ZodiacSign`	節氣	zodiac sign
`\New\Month`	新月	the New Moon, the new month
`\TerrElements`	地支	12 terrestrial elements (↗ above)
`\AstrElements`	天干	10 astral elements (↗ above)
`\Solar`	阳	solar, positive, male
`\Lunar`	阴	lunar, negative, female
`\Leap`	闰	leap- (year, month, day)

Input	**Output**	**Explanation**
`\NewGregYear`	元旦	the Gregorian New Year
`\NewChinYear`	新年	the Chinese New Year
`\Lunar\Calendar`	阴历	Chinese lunar calendar
`\Wood`	木	Wood (`\AstrEle{1}`, `\AstrEle{2}`)
`\Fire`	火	Fire (`\AstrEle{3}`, `\AstrEle{4}`)
`\Earth`	土	Earth (`\AstrEle{5}`, `\AstrEle{6}`)
`\Metal`	金	Metal (`\AstrEle{7}`, `\AstrEle{8}`)
`\Water`	水	Water (`\AstrEle{9}`, `\AstrEle{10}`)
`\Nul`	零	Chinese number 0
`\One\Two\Three`	一二三	Chinese numbers 1, 2, 3
`\Four\Five\Six`	四五六	Chinese numbers 4, 5, 6
`\Seven\Eight\Nine`	七八九	Chinese numbers 7, 8, 9
`\Ten`	十	Chinese number 10
`\Eleven`	十一	Chinese number 11
`\Twelve`	十二	Chinese number 12
⋮	⋮	⋮
`\Nineteen`	十九	Chinese number 19
`\Twenty`	二十	Chinese number 20
⋮	⋮	⋮
`\Ninety`	九十	Chinese number 90
`\Hundred`	百	Chinese number 100
`\Thousand`	千	Chinese number 1000
`\FirstMonth`	正月	the 1^{st} lunar month
`\One\Month`	一月	the 1^{st} gregorian month
`\Two\Month`	二月	the 2^{nd} lunar/greg. month
`\Three\Month`	三月	the 3^{rd} lunar/greg. month
⋮	⋮	⋮
`\Twelve\Month`	十二月	the 12^{th} lunar/greg. month

You can construct a Chinese data with the characters described before, e.g. the historic day of taking over Hong Kong from the British Empire to the Chinese Republic:

(Chinese calendar: the year of Fire and Ox, 5^{th} month, 27^{th} day)

```
\AstrEle{4}\TerrEle{2}\Year\Five\Month\Twenty\Seven\Day
```

丁丑年五月二十七日

(Gregorian calendar: the 1997^{th} year, 7^{th} month, 1^{st} day)

```
\Thousand\Nine\Hundred\Ninety\Seven\Year\Seven\Month\One\Day
```

千九百九十七年七月一日

I suppose that you haven't any problem with the Chinese computation of time! Otherwise please see chapter 7 on page 7.

4 Additional Symbols

Input	**Output**	**Explanation**
`\vdots`	⋮	vertical dots
`\Euro`	€	the new European currency *EURO*
`\Greenpoint`	♻	German recycling symbol
`\Info`	ℹ	to mark an information box
`\Request`	?	to mark a question box
`\Postbox`	✉	a letter symbol
`\Pound`	℔	German symbol for pound
`\Telephone`	☎	Phone symbol
`\symA`	𝔸	symbolic letter A
`\symB`	𝔹	symbolic letter B
`\symC`	ℂ	symbolic letter C
⋮	⋮	⋮
`\symZ`	ℤ	symbolic letter Z
`\symAE`	Ä	symbolic umlaut *Ä*
`\symOE`	Ö	symbolic umlaut *Ö*
`\symUE`	Ü	symbolic umlaut *Ü*
`\Chinasym`	CHiNA2e	the font icon

With the command `\BLOCK` you can switch into *BLOCKshape*:

```
{\BLOCK A PROBLEM FOR LUNAR CALENDARS ARISES FROM THE FACT THAT THERE
   ARE NOT EXACTLY 12 SYNODIC PERIODS IN THE SOLAR YEAR.
   SO EVERY YEAR, THE MONTHS START ROUGHLY 11 DAYS EARLIER.
   AN EXTRA ('INTERCALARY') MONTH IS ADDED TO EACH THIRD YEAR TO BRING
   THE LUNAR CALENDAR BACK INTO SYNCHRONY WITH THE YEAR.}
```

A PROBLEM FOR LUNAR CALENDARS ARISES FROM THE FACT THAT THERE ARE NOT EXACTLY 12 SYNODIC PERIODS IN THE SOLAR YEAR. SO EVERY YEAR, THE MONTHS START ROUGHLY 11 DAYS EARLIER. AN EXTRA ('INTERCALARY') MONTH IS ADDED TO EACH THIRD YEAR TO BRING THE LUNAR CALENDAR BACK INTO SYNCHRONY WITH THE YEAR.

Here is another example for German CHiNA2e users:

```
{\BLOCK EINE GUTE STENOTYPISTIN REINIGT T\AE GLICH DIE TYPEN IHRER
   MASCHINE. WENN M\OE GLICH, TUT SIE DAS ST\UE NDLICH.}
```

EINE GUTE STENOTYPISTIN REINIGT TÄGLICH DIE TYPEN IHRER MASCHINE. WENN MÖGLICH, TUT SIE DAS STÜNDLICH.

Note that only upper case letters, numbers and stops are tolerated in the *BLOCK*-environment.

5 Some new math-symbols

A common difficulty for students of mathematics and physics is to produce the symbols of number areas (Integer, Real, Complex...).

Here is the final solution of this problem! Why not type in simply the adequate key words? See this example:

```
\begin{eqnarray*}
   \{ 0, 1, 2, 3\ldots \}                 & \in & \Natural  \\
   \{ \ldots -2, -1, 0, 1\ldots \}        & \in & \Integer  \\
   \{ 3.1415926 \}                        & \in & \Rational \\
   \{ \pi \}                              & \in & \Real     \\
   \{ e^{i\pi /2} \}                      & \in & \Complex
\end{eqnarray*}
```

$$\begin{aligned} \{0,1,2,3\ldots\} &\in \mathbb{N} \\ \{\ldots -2,-1,0,1\ldots\} &\in \mathbb{Z} \\ \{3.1415926\} &\in \mathbb{Q} \\ \{\pi\} &\in \mathbb{R} \\ \{e^{i\pi/2}\} &\in \mathbb{C} \end{aligned}$$

Here is another example in boldmath mode:

```
\boldmath
\begin{eqnarray*}
   \{ 0, 1, 2, 3\ldots \}                 & \in & \NATURAL  \\
   \{ \ldots -2, -1, 0, 1\ldots \}        & \in & \INTEGER  \\
   \{ 3.1415926 \}                        & \in & \RATIONAL \\
   \{ \pi \}                              & \in & \REAL     \\
   \{ e^{i\pi /2} \}                      & \in & \COMPLEX
\end{eqnarray*}
\unboldmath
```

$$\boldsymbol{\begin{aligned} \{0,1,2,3\ldots\} &\in \mathbb{N} \\ \{\ldots -2,-1,0,1\ldots\} &\in \mathbb{Z} \\ \{3.1415926\} &\in \mathbb{Q} \\ \{\pi\} &\in \mathbb{R} \\ \{e^{i\pi/2}\} &\in \mathbb{C} \end{aligned}}$$

The boldmath version of `\Natural` is `\NATURAL`, of `\Integer` is `\INTEGER` etc. pp.

These mathematical signs ain't available in text mode. You can handle them there with `$` *math command* `$`. To use the symbols $\mathbb{A}\ldots\ \mathbb{Z}$ in text mode, the commands `\symA ... \symZ` are disposable.

6 The whole ChiNA2e font

Code	0	1	2	3	4	5	6	7	8	9
000	子	丑	寅	卯	辰	巳	午	未	申	酉
010	戌	亥	甲	乙	丙	丁	戊	己	庚	辛
020	壬	癸	一	正	二	三	四	五	六	七
030	八	九	十	!	”	✉	$	%	¢	’
040	(	)	✡	+	,	-	.	/	o	1
050	2	3	4	5	6	7	8	9	:	;
060	$\boxed{i}$	=	$\boxed{?}$	?	☎	A	B	C	D	E
070	F	G	H	I	J	K	L	M	N	O
080	P	Q	R	S	T	U	V	W	X	Y
090	Z	[	\	]	月	危	室	壁	奎	婁
	0	1	2	3	4	5	6	7	8	9
100	胃	昴	畢	嘴	參	井	鬼	柳	星	張
110	翼	軫	角	亢	氐	房	心	尾	箕	斗
120	牛	女	虛	☻	☽	☺	☾	☯	子	丑
130	寅	卯	辰	巳	午	未	申	酉	戌	亥
140	甲	乙	丙	丁	戊	己	庚	辛	壬	癸
150	一	正	二	三	四	五	六	七	八	九
160	十	花	年	日	千	百	零	新	书	宿
170	節	氣	历	阳	阴	节	元	旦	地	支
180	天	干	木	火	土	金	水	ℂ	ℕ	ℚ
190	ℝ	ℤ	闰	𝔸	𝔹	ℂ	𝔻	𝔼	𝔽	𝔾
	0	1	2	3	4	5	6	7	8	9
200	H	I	J	K	L	M	N	O	P	Q
210	R	S	T	U	V	W	X	Y	Z	Ä
220	Ö	Ü	月	危	室	壁	奎	婁	胃	昴
230	畢	嘴	參	井	鬼	柳	星	張	翼	軫
240	角	亢	氐	房	心	尾	箕	斗	牛	女
250	虛	Ä	Ö	Ü	₠	€				

7 The Chinese computation of time 千年书

The Chinese calendar is a lunisolar one, which is founded on both astronomical phenomenons – the appearing of New Moon and the Sun running through the codiac signs.

Every Chinese year starts with the New Moon in the codiac sign RAT 子 ($\lambda_{\odot} = 300^o \ldots 330^o$).
That is the time between January 20^{th} and February 19^{th}. Just every New Moon will start a new month.

In case of two New Moons during one codiac sign, the first of them will start a leap month (called with the name of the month before and the appendix *jun* 闰月).

Table 1: The Chinese cycle of 60 years (花甲子)

	Wood		Fire		Earth		Metal		Water		
\TerrEle{1}	1		13		25		37		49		子 Rat
\TerrEle{2}		2		14		26		38		50	丑 Ox
\TerrEle{3}	51		3		15		27		39		寅 Tiger
\TerrEle{4}		52		4		16		28		40	卯 Rabbit
\TerrEle{5}	41		53		5		17		29		辰 Dragon
\TerrEle{6}		42		54		6		18		30	巳 Snake
\TerrEle{7}	31		43		55		7		19		午 Horse
\TerrEle{8}		32		44		56		8		20	未 Sheep
\TerrEle{9}	21		33		45		57		9		申 Monkey
\TerrEle{10}		22		34		46		58		10	酉 Cock
\TerrEle{11}	11		23		35		47		59		戌 Dog
\TerrEle{12}		12		24		36		48		60	亥 Pig
	甲	乙	丙	丁	戊	己	庚	辛	壬	癸	
\AstrEle{..}	1	2	3	4	5	6	7	8	9	10	

Every Chinese year is characterized by an astral and a terrestrial element. The first year of the first cycle was in 2637BC.
The names of Chinese years in a cycle of 60 you can take out of the table above (e.g. the year No. 14 = `AstrEle{4}\TerrEle{2}`).

1997 is the year No. 14 of the cycle No. 78 (14/78) = 丁丑
Hence is 1998 = (15/78) 戊寅, 1999 = (16/78) 己卯 and 2000 = (17/78) 庚辰 ...

For more information please consult your Chinese cook! :-)

8 Summa summarum

By the way – this is a ChinA2e introduction and not a manual of Chinese counting of time! If you want to learn more about the Chinese chronology, please read the subject literature!

I hope you are able now, to use the ChinA2e font, and to type out all its characters. Of course these characteres can be used both in headlines (↗ headline of section 7) and also in footnotes [1] (↗ footnote 1).
The font is scaleable and doesn't touch the current font shape.

The next example shows the New Moon in different sizes:

Input		**Output** `[12pt]`
`{\tiny`	`\MoonPha{1}~~\New\Month}`	☻ 新月
`{\scriptsize`	`\MoonPha{1}~~\New\Month}`	☻ 新月
`{\footnotesize`	`\MoonPha{1}~~\New\Month}`	☻ 新月
`{\small`	`\MoonPha{1}~~\New\Month}`	☻ 新月
`{\normalsize`	`\MoonPha{1}~~\New\Month}`	☻ 新月
`{\large`	`\MoonPha{1}~~\New\Month}`	☻ 新月
`{\Large`	`\MoonPha{1}~~\New\Month}`	☻ 新月
`{\LARGE`	`\MoonPha{1}~~\New\Month}`	☻ 新月
`{\huge`	`\MoonPha{1}~~\New\Month}`	☻ 新月
`{\Huge`	`\MoonPha{1}~~\New\Month}`	☻ 新月

Space is running out... So this introduction comes to an end.
Comments and suggestions are welcome.
Since I am curious to know whether the font is useful and how it looks in practice, I would appreciate a short message (with reference) - or even some sample pages - if it is used in a publication.

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Monday, July 14th, 1997

[1] Here come ChinA2e symbols: 嘴✉€,
your Chinese cook knows more of them - call ☎ 9876543210