

; fc » Yb \ U]bYf'C ZYbVUi Yf'hf]i a d \]Yfh VY]a 'Ni _i bZhgdfY]g'XYg'< UbXk Yf_g°</pre>

5a '%+"\$*"&\$&) 'k i fXYb 'VY]a 'Gca a YfZYgh'XYf <UbXk Yf_g_Ua a Yf'8fYgXYb']bbcj Uh]j Y'l bhYfbY\a Yb'a]h XYa 'Ni _i bZhqdfY]g'Ui g[YnY]WXbYh"



A Y]» Ybž8Yi hgWX`UbX'!'9]bʻghfU\`YbXYfʻHU[ʻZØfʻXUgʻ<UbXk Yf_.
5a '8]YbghU[ʻZUbXʻXUgʻGca a YfZYghʻXYfʻ<UbXk Yf_g_Ua a Yf
8fYgXYbʻghUhhžʻi bXʻYgʻ[UVʻ[`Y]WX'a Y\fYfY'; fØbXYʻni a ':Y]Yfb''

*Df[ʻ8]hhf]WXž′XYfʻDfÀg]XYbhʻXYfʻ<UbXk Yf_g_Ua a YfžʻY\fhYʻXfY]
\YfUi gfU[YbXYʻI bhYfbY\a Ybʻa]hʻXYa 'VY[Y\fhYbʻNi_i bZhgdfY]g

&\$&) "'A Y\fʻUʻgʻ(\$\$'; ÀghYʻUi gʻDc`]h]_žʻK]fhgWXUZhžʻ?i `hi fʻi bX

; YgY``gWXUZhʻ_Ua Ybʻni gUa a Ybžʻi a 'X]Yʻ@Y]ghi b[Ybʻi bX

*Dbcj Uh]cbYbʻXYfʻ<UbXk Yf_gVYhf]YVY'ni `k ØfX][Yb"`8Yf

K YhhVYk YfVʻghY\hii bhYfʻXYfʻGWX]fa \YffgWXUZhj cb

A]b]ghYfdfÀg]XYbhʻA]WXUY``?fYhgWXa YfžʻXYfʻX]Yʻ6YXYi hi b[ʻXYg

<UbXk Yf_gʻZØfʻi bgYfY; YgY``gWXUZhj YfXYi h`]WXhY''

 $HY]^bY\a YbXY^6Yhf]YVY^\UhhYb^X]Y^7\UbWYž^g]W^a]h^_fYUh]j Yb$

?cbnYdhYb'Ui g'XYb'6YfY]W\Yb'BUW\ki W\gg]W\Yfi b[\check{z} : UW_f\and f\and ZhYV]bXi b['i bX'BUW\\U'\h][_Y]h'ni 'VYk Y]gYb'' Ni _i bZh _ca a h'j cb'?\ObbYb 'X]YgYg'A chhc \check{z} 'XUg'Ui W\'HY]''XYf =\alpha U[Y_Ua dU[bY'XYg'XYi hg\W\Yb'< UbXk Yf_g']ghz'k i fXY'VY]a \KYhhVYk YfV''\YVYbX][''\dagger X]\f'bU\a Yb'\&\\$ < UbXk Yf_g'yhf]YVY'Ua 'K YhhVYk YfV'\hY]'\Z'k cVY]'X]Y'; fc\rightarrow Yb\U]bYf CZYbVUi Yf'; a V< 'XYb'YfghYb'D`Uhn'VY\Y[hY''\dagref \dagger \delta h\Yfj]Yk'[UV 8]\hf]\W\'ni 'j YfghY\Yb\Z'XUgg' < UbXk Yf_gi bhYfbY\a Yb'Ybcfa Yb < YfUi g\ZcfXYfi b[Yb'[Y[Yb\ØVYfghY\Yb\Z'j cf'U\'Ya']a '\dagger \delta bV\]\U ZX]Y'XYa c[fU\Z]g\W\Y'9bhk]\W\'i b['i bX'XYb': U\W_f\dagger \delta ZhYa Ub[Y\']b i]Y\Yb'\6YfY]\W\Yb''

8]Y'; Yk]bbYf'i bX']\fY']bbcj Uh]j Yb?cbnYdhY

8]Y; fc»Yb\U]bYf'CZYbVUiYf; a V<'kifXY'ZØf']\fY
Ui»Yf[YkÒ\b`]W\Yb'@Y]ghib[Yb']a '6YfY]W\XYfX][]hU`Yb
HYW\bc`c[]Yb'Uig[YnY]W\bYh''; Y[fØbXYh'%-*\$'U`g
DfcXi_h]cbg[YbcggYbgW\UZh'ibX'gY]h'%--\$'U`g'; a V<ž'k]fX'XUg
IbhYfbY\aYb'jcb'<YbXf]_'GW\ØhnY'[Y`Y]hYh'ibX'VYgW\ÀZh][h
]bg[YgUah'bYib'DYfgcbYbž'XUfibhYf'XfY]'5igniV]`XYbXY''
6YgcbXYfg'\Yfjcfni\YVYb']gh'XYf'9]bgUhn'jcb'J]fhiU`'FYU`]hm']b
XYf'CZYbd`Ubib[ž'kUg'b]W\h'bif'ZØf'X]Y'EiU`]hÀh'XYf'DfcXi_hYž
gcbXYfb'UiW\ZØf'X]Y'9ZZ]n]Ybn'XYf'D`Ubib['gcf[h''NiXYa
Yb[U[]Yfh'g]W\X]Y':]faU'U_h]j'ZØf'IakY`hgW\ihn'ibX'gcn]U`Y
Dfc'Y_hY''

 $D`Uhn`nk Y]`g]WX YfhY`g]WX`X]Y`GUWX gYb!GÅ[Y`; a V<`Ui g`6UbbYk]hn" I bhYf`XYf`@Y]hi b['j cb': `cf]Ub'K]YZY`ž`XYa `Gc\b'XYg'; fØbXYfg ?Uf`!C`UZ`K]YZY`ž`VYgWX ÂZh][h`XUg`I bhYfbY\a Yb'' %`A]hUfVY]hYf i bX`\Uh'g]WX`Ui Z`6YhcbVc\fYb'i bX`!gÂ[Yb'gdYn]U`]g]Yfh''<]Yf`k]fX a cXYfbghY`8]Ua UbhhfYbbhYWXb]_`gck]Y'' 8!8fi <math>W$ _Y]b[YgYhnhž`k Ug X]Y`K YhhVYk YfVgZÂ\][_Y]h`ghY][Yfh''

8 Y b 'Xf]hhY b 'D`Uhn 'YffUb['X]Y '6]c_cbX]hcfY] / '6ÀW_YfY]
6i W X Y W_W Y b 'Ui g'8 fYg X Y b ž' X]Y 'Ui Z'fY[]cbU`Y '6]c! Ni hUhY b 'g Y hnh
i b X 'j Y[Ub Y 'gck]Y '`U_hcgY! 'i b X '[`i hY b ZfY]Y 'Dfc X i _hY 'Ub V]Y hY h''
8 Y f'[fØbY 'I a V Ui 'X Y g':]fa Y b g]hn Y g']gh 'V Y f Y]hg']b 'D`Ubi b['i b X

BUWX\U`h][_Y]h'i bX'8][]hU`]g]Yfi b[']a < UbXk Yf_

8 Yf'Ni _i b ZhgdfY]g'k]fX'gY]h'&\$%&'j Yf[YVYb'i bX'\YVh'X]Y

K]W\h][_Y]h']bbcj Uh]j Yf'@Ògi b[Yb']a '< UbXk Yf_'\Yfj cf"'5i W\'XYf

: UW_f\hat{A}\text{ZhY}a Ub[Y\']gh'Y]bY'< YfUi gZcfXYfi b[\text{z}'X]Y'VY]a '< UbXk Yf_

Ub'cVYfghYf'GhY\'YghY\h', VYf'&\$\$"\$\$\$'GhY\'Yb'g]bX']b

8 Yi hgW\\UbX'i bVYgYhnh\text{z}i bX'XUg'< UbXk Yf_'a i gg'g]W\'XYb

< YfUi gZcfXYfi b[Yb'XYf'a cXYfbYb'NY]h'ghY\'Yb"'I bhYfbY\a Yb\text{z}

X]Y']b'bUW\\U'h][Y'HYW\\bc\c[]Yb'i bX'8][]hU\]g]Yfi b[']bj Ygh]YfYb\text{z}

g]bX'VYggYf'Ui Z[YghY\'h\text{z}i a 'k YhhVYk YfVgZ\h\]['ni 'V\Y]VYb"'H\ha[\']W\
]bhYfYgg]YfYb'g]W\'hUi gYbXY'\hat{b}[Yf'A YbgW\Yb'Z\Of'X]YgY

6Yfi Zgnk Y][Y\text{z}'VYgcbXYfg'k Ybb'Yg'i a 'BUW\\U\h][_Y]h'i bX

8][]hU\]g]Yfi b[']Y\h"'

±b`X]YgYa `G]bbY`k YfXYb`Ui W\`ni _ØbZh][`<UbXk Yf_gVYhf]YVY
Ui Z[Yfi ZYbž']\fY`]bbcj Uh]j Yb`?cbnYdhY`ZØf`XYb`bÀW\ghYb
K YhhVYk YfV`Y]bni fY]W\Yb"`8]Y`6Yk YfVi b[gd\UgY`&\$&) `\Uh
VYfY]hg`VY[cbbYbž'i bX`XUg`<UbXk Yf_`V`Y]Vh`Y]b`GW\`ØggY``ni
_fYUh]j Ybž'bUW\\U`h][Yb`@Ògi b[gUbgÀhnYb`ZØf`X]Y; YgY``gW\UZh"

A Y\f'\dagger Zcfa Uh]cbYb'ni 'XYb'; Yk]bbYfb'i bX'XYa 'K YhhVYk YfV Z]bXYb'G]Y'Ui Z'X]YgUW\gYb"XYž\k _!XfYgXYb"XY'i bX' k]fhgW\UZhgdi `g!VUmYfb"XY"

8 Y hU]`g	
Cfh	AY]» Ybž8Yi hgWX`UbX
EiY``Yb	• k k k "X]YgUW\gYb"XY
	k k k "\k _!XfYgXYb"XY
	• k k k "k]fhgVX UZhgdi `g!VUmYfb"XY

6Ygi WXYb G]Y i bg Ui Z b!U["bYh