

D`UmU'XY'DU`a U.'' \$\$ A]``]cbYb'9i fc'ZØf X]Y'[fc»Y'I a [YghU`hi b[°

DU`a Ugʻ6Øf[Yfa Y]ghYfʻdfÀgYbh]YfhʻUa '&, "\$) "&\$&) 'Y]bYb '\$\$`A]``]cbYbʻ9i fcʻi a ZUggYbXYbʻl a VUi d`UbʻZØfʻX]YʻD`UmU XY`DU`a Uʻni fʻ: ÒfXYfi b[ˈj cbˈBUW\\U`h][_Y]hʻi bX @YVYbgei U`]hÀh"



D`UmU`XY`DU`a Už`GdUb]Yb`!`D`UmU`XY`DU`a U`Ui Z`A U``cfWU`ghY\h j cf`Y]bYa ii a ZUggYbXYb`I a VUi ž`XYf'j cb`DU`a Ugʻ6Øf[Yfa Y]ghYf &U]a Y`A UfhÉbYn'j cf[YghY``h'k i fXY"`A]h'Y]bYa =bj Ygh]h]cbgj c`i a Yb j cb`V]gʻni ii \$\$`A]``]cbYb`9i fc`g]bX`X]Y`D`AbY`Ua V]h]cb]Yfh'i bX n]Y`Yb`Ui Z`Y]bY`[fi bX`Y[YbXY`A cXYfb]g]Yfi b[`XYg`VY`]YVhYb I f`Ui Vgn]Y`g`UV"`8Yf`5_h]cbgd`Ub`i a ZUggh'') `A U» bU\a Ybž`X]Y`]a @Ui ZY'j cb`nY\b`&U\fYb`i a [YgYhnhik YfXYb`gc``Yb"`8]Y :]bUbn]Yfi b[`YfZc`[h'Ui g`XYb`Y][YbYb`A]hhY`b`XYf GhUXhj Yfk U`hi b[ž`k UgʻA UfhÉbYn`]b`gY]bYf`DfAgYbhUh]cb`VYhcbhY" 9]bXfi W_gj c```]ghž`XUgg`X]Y`Dfc`Y_hY`]b`Ni gUa a YbUfVY]h'a]h `c_U`Yb`I bhYfbY\a Yfb`i bX`5bk c\bYfj YfVAbXYb`Ybhk]W_Y`h k YfXYb`gc``Ybži a 'X]Y`5_nYdhUbn'i bX`6YhY]`][i b[`XYf

9]b 'nYbhfu`Yf'Di b_h'XYg'Dfc Y_hg']gh'X]Y'J YfgW\ ObYfi b['XYf nk Y]hYb'i bX'Xf]hhYb'A YYfYg`]b]Yž'ZØf'X]Y'VYfY]hg'Y]b'6i X[Yh'j cb fi bX', \$'A]``]cbYb'9i fc'Y]b[Yd`Ubh'k i fXY"'<]YfVY]'g]bX
9fbYi Yfi b[Yb'j cb'GhfU» Yb'i bX'; Y\k Y[Yb'j cf[YgY\Ybž'i a 'X]Y @YVYbgei U`]hÀh'Ua 'GhfUbX'ni 'Yf\O\Yb"Ni XYa ']gh'[Yd`Ubhž'X]Y D`UmU'XY'DU`a U'Ub'XUg'OZZYbh`]W\Y'@Y]\ZU\ffUXbYhn' 6]W]DU`a U Ubni gW\`]Y» Ybž'k Ug'X]Y'bUW\\U`h][Y'A cV]`]hÀh']b'XYf'FY[]cb ZOfXYfb'gc``"

$BUWX \setminus U^h][Y]h^n]a : c_i g$

 $8 \ Yf'5_h]cbgd`Ub`VYZUgghg]WX`bYVYb`XYf' \pm ZfUghfi_hi f'Ui WX`a]h _i`hi fY``Ybž'gdcfh`]WXYb'i bX`ZfY]nY]h`]WXYb'9]bf]WX hi b[Ybž'X]Y`ni f 6Y`YVi b[`XYf'FY[]cb`VY]hfU[Yb'gc``Yb'': ØbZ'[fc>Y'DUf_Ub`U[Yb'g]bX`U`g'[fØbY'@ib[Y'jcf[YgY\Yb'ibX'gc``Yb'GdcfhY]bf]WXhi b[Ybž'k]Y'6YUWXjc``YmVU```ibX'6YUWXZi>VU``ž']bhY[f]YfYb'''8]Y GWXUZZi b['jcb'Kc\bfUia'XifWX'X]Y`IakUbX`ib['jYfU`hYhYf'9]b!ibX`NkY]!GhYfbY!<chY`g'ghY\h`YVYbZU``g']a'A]hhY`dib_h'''8UVY] kYfXYb']bbcjUh]jY'?cbnYdhY'ZØf'XYb'Kc\bib[gVUi']a<<]bhYf`UbX`XYg'6U``YfaUbbg'Ub[YghfYVh''$

A Ufh£bYn'_f]h]g]YfhY']b'X]YgYa 'Ni gUa a Yb\Ub['X]Y'gdUb]gW\Y
NYbhfU`fY[]Yfi b['ZØf']\fY'a Ub[Y`bXY'I bhYfghØhni b['VY]'XYf
9fbYi Yfi b['XYf'Hci f]ghYb\cW\Vi f[Yb"'8]Yg']gh'Y]b'Di b_hž'XYf'k]Y
Y]bY'A U\bi b['k]f_hž'XUgg'X]Y'D`UmU'XY'DU`a U'gY]h'&\$'*\J\fYb'Ui Z
A cXYfb]g]Yfi b['k UfhYh''8]Y'Dc`]h]_Yb'XYf'GhUXhj Yfk U`hi b[ž'X]Y
VYfY]hg'gY]h'nk Y]'\\J\fYb'?UbU`]gUh]cb'i bX'GhfU» YbVY`Yi W\hi b[
Ua 'A YYf'YfbYi Yfhž'ghY\Yb'\]Yf']a 'JcfXYf[fi bX"

=bhY[fUh]cb]b XYb; YgUa hd`Ub

9]b'k Y]hYfYf'6YghUbXhY]`'XYg'D`Ubg']gh'X]Y'GWXUZZi b['Y]bYf Ni [j YfV]bXi b['nk]gWXYb'DU`a U'i bX'@i Wa U'cfž'k cVY] <U`hYghY``Yb'Ub'XYf'D`UmU'XY'DU`a U']bhY[f]Yfh'k YfXYb"'8]YgYf 5gdY_h'j YfV]bXYh'g]WX'a]h'XYb'U_hi Y``Yb'<YfUi gZcfXYfi b[Yb'XYf GhUXhd`Ubi b[ž'X]Y'ni bY\a YbX'Xi fWX'XYb'?`]a Uk UbXY``i bX'X]Y I fVUb]g]Yfi b['[YdfÀ[hˈg]bX"'BUW\\U`h][Y'GhUXhd`Ubi b[ž'k]Y'g]Y Ui W\']b'8Yi hgW\`UbX'i bhYf'XYa 'N]Y`'G8; '%%'dfcdU[]Yfh'k]fXž i a ZUggh'Ò_c`c[]gW\Yž'gcn]U`Y'i bX'k]fhgW\UZh`]W\Y'5gdY_hY"'5i W\ Ui Z'A U``cfWU'k]fX'XUfUi Z'[YUW\hYhž'XYb'Ò_c`c[]gW\Yb': i » UVXfi W_ ni 'fYXi n]YfYb'i bX'i a k Y`hZfYi bX`]W\Y'J Yf_Y\fqa]hhY`ni 'ZÒfXYfb"

8]Y I a gYhni b['XYf'A U» bU\a Yb'k]fX'YXcW\'b]W\h'c\bY
< YfUi gZcfXYfi b[Yb'gY]b"' < c\Y'5bZUb[g]bj Ygh]h]cbYb'g]bX
bchk YbX][ž'i a 'X]Y'Ub[YghfYVhYb'BUW\\U`h][_Y]hgn]Y`Y'ni
YffY]W\Yb"' \delta gVYgcbXYfY'X]Y'6\Øf[YfVYhY]`][i b[']gh'YbhgW\Y]XYbXž
i a 'Y]b'U_nYdh]YfhYg'i bX'Z b_h]cbU'Yg'gh\Xh]gW\Yg'I a ZY`X'ni
gW\UZZYb"'A Ufh\(\frac{L}{D}\Yn'\Uh'Ub[Y_\ObX][h\(\frac{L}{D}\X\Y)'YhnhY'6Ui d\UgY
XYf'U_hi Y``Yb'DfcY_hY'Z\Øf'XYb'_ca a YbXYb'K]bhYf'j cf[YgY\Yb
]gh\(\frac{L}{D}\X\X]Y'GhUXh'd`Ubh'VYfY]hg\(\frac{L}{D}\X\Y\BYi VUi hYb']a
: Yi W\X h[YV]Yh'GYg': cbhUbY``Yg'ni ']bhYbg]j]YfYb"

8]Y'Ni_i bZh'XYf'D`UmU'XY'DU`a U'k]fX'a]h'GdUbbi b['Yfk UfhYhž'XU XYf'I a VUi 'b]W\h'bi f'X]Y'hci f]gh]gW\Y'5hhfU_h]j]h\h'Yf\\O\Yb\z gcbXYfb'Ui W\'`Ub[Zf]gh]['X]Y'@YVYbgei U`]h\h'XYf'5bk c\bYf j YfVYggYfb'gc``"'5i Z'X]Y'\b]h]Uh]j Y'j cb'A UfhEbYn'i bX'gY]b 9b[U[YaYbh'ZØfY]bY']b_`i g]j Y'GhUXhYbhk]W_`i b['k]fX'a]h [fc>Ya'\bhYfYggY'[YgW\Ui h"

: Øf'k Y]hYfY' ±b Zcfa Uh]cbYb'ni 'X]YgYa 'H\Ya U'VYgi W\Yb'G]Y'X]Y 5fh]_Y`'Ui Z'K YgYf!?i f]Yfž'A U``cfWU'NY]hi b['i bX'6Ui !D`Ub 5gY_i fYbUXc"

8 Y hU]`g	
JcfZU``	l a VUi
Cfh	D`UmU`XY`DU`a Už'GdUb]Yb
GWX UXYb ']b '	' \$\$\$\$\$\$\$
EiY``Yb	k k k "k YgYf!_i f]Yf"XY
	k k k "a U``cfWUnY]hi b["Yg
	k k k "VUi !d`Ub!UgY_i fUXc"XY

6 Ygi WX Yb 'G]Y 'i bg 'Ui Z. 'b!U["bYh