

@UbXfUh'K]hgW\Ug``ÀXh'ni f 6Øf[Yf[YgdfÀW\gfY]\Y']b'? Òb][gk Ufh\U Y]b°

@UbXfUh'l Xc'K]hgWXUg'`ÀXh'Ua '%("'5i [i gh'&\$&) ']b ? Òb][gk Ufh\U'ni f'6Øf[Yf[YgdfÀWXgfY]\Y'Y]b"'H\Ya Yb. 6Øf[YfUb`]Y[Yb'i bX'@Ògi b[Yb"



±0; fc» Xi VfUi ']gh'k]YXYf'k Ug']a '6i gW.° '5a '%("'5i [i gh'&\$&) `AXh'@UbXfUh'I Xc'K]hgW Ug'ni f']bnk]gW Yb'VYk À\fhYb; YgdfÀW gfY]\Y' 5i Z'Y]b'K cfh ']b'XYf'fY]nj c``Yb'FY[]cb'<Y]XY'/HY]W Y'Y]b"'8]YgY'i a ZUggh'X]Y'CfhY'; fc» Xi VfUi ž'? Òb][gk Ufh\Už A U`gWk]hnž'BYgW k]hnž'Di gWk]hn'i bX'FUX]Vcf"'Jcb'%+"' \$'V]g%-"\$\$'I\f'_ÒbbYb'X]Y'6Øf[Yf.]bbYb']a '¾[YbX!'i bX'JYfY]bg\Ui g? Òb][gk Ufh\Už']b'XYf'; i hgghfU» Y'(Wz'ni gUa a Yb_ca a Yb'i bX']\fY 5b`]Y[Yb'X]fY_h'Ub'XYb'@UbXfUh'\YfUbhfU[Yb"'8]Y'HY]`bU\a Y']gh [Ubn'i b_ca d`]n]Yfhz'c\bY'j cf\Yf][Y'5ba Y`Xi b['a Ò[`]W z'gcXUgg k]f_`]W\'YXYf'j cfVY]gW\Ui Yb'_Ubb"'

; UV Ygʻ]bʻXYfʻJ Yf[Ub[Yb\Y]hʻGWk]Yf][_Y]hYbʻcXYfʻ: fU[Yb3 6]g\Yfʻ\UVYbʻZUghʻ) \$\$ '6Øf[Yf]bbYbʻi bX '6Øf[Yfj cbʻXYf A Ò[`]WX_Y]h; YVfUi WX '[Ya UWXhž'VY]ʻXYbʻ; YgdfÀWXYbʻa]hni fYXYb'' 8]YʻH\Ya Ybʻg]bXʻgcʻj]YʻZÀ`h]['k]YʻXUgʻ@YVYbʻgY`Vgh/ʻXUgʻZfYi h @UbXfUhʻK]hgWXUgʻVYgcbXYfgžʻXYbbʻYfʻa ÒWXhYʻX]Yʻ5b`]Y[YbʻXYf 6Yj Ò`_Yfi b['YfbghʻbY\a Ybʻi bX'[Ya Y]bgUaʻ@Ògi b[Yb YfUfVY]hYb''GWX`]Y»`]WX`_cbbhYbʻ]bʻXYbʻj Yf[Ub[YbYbʻ9j Ybhg VYfY]hgʻj]Y`YʻDfcV`Ya Yʻ[Y_`Àfhʻi bXʻ@Ògi b[gUbgÀhnYʻ[YZ bXYb k YfXYb''K Yfʻ@ ghʻ\Uhž'a Y\fʻØVYfʻX]YʻV]g\Yf][Ybʻ; YgdfÀWXY'ni YfZU\fYbžʻZ]bXYhʻU``YʻNi gUa a YbZUggi b[YbʻUi ZʻXYfʻK YVg]hYʻXYf @UbX_fY]gʻ6Ui hnYb.`k k k "`_Vn"XY#Vi Yf[Yf[YgdfUYWX''

6%f[YfVYhY]][ib[']b'XYf'FY[]cb

 $6 \varnothing f [\ YfVYhY]^*] [\ i \ b [\ ']gh']b'XYf' Yi \ h] [\ Yb'NY]h'Y]b'nYbhfU`Yf \\ 6 YghUbXhY]^*XYf'dc^*]h]gWXYb'?caaib]_Uh]cb''8cWX'k]Ygc']gh'Yg \\ [\ YfUXY'Yhnh'k]WXh] [\ z'X]Y'Gh]aaYb'XYf'6 \varnothing f [\ Yf'ni' \OfYb3'9]b'6`]W_ \\ \varnothing VYf'XYb'HY``YffUbX'nY] [\ hz'XUgg'Yg']b'UbXYfYb'6ibXYg`AbXYfbz'k]Y'nia'6Y]gd]Y``F\Y]b`UbX!DZU`nz'Y]b'[ih'XifWXUWXhYg'GmghYanif'9]bV]bXib [\ XYf'6Yj\O`_Yfib[\]b'JYfk\U`hib [\ gfYZcfaYb'[]Vh''8cfh'k ifXYb'6 \varnothing f [\ Yf']b'nk\Y]ghiZ] [\ Yb'JYfZU\fYb'[\ Yn]Y`h']b \\ 9bhgWXY]Xib [\ gdfcnYggY']bhY[\ f]Yfhz'k Ug'nY] [\ hz'XUgg'X]Y \\ 9]bVYn]Y\ib [\ cZh'ni'VYggYfYb'9f [\ YVb]ggYb'Z\O\fh'']$

 $\label{thm:colly} $JYf[\ Y]WXVUfY'6Øf[\ Yf_cbZYfYbnYb'ibX'=XYYbZ]bXib[gk Yf_ghAhhYb \ VYk]YgYbž'XUgg'6Øf[\ YfVYhY]'][ib['b]WXh'bif'Y]b$$ $dc`]h]gWXYg'=bghfia Ybh'XUfghY``hž'gcbXYfb'UiW'Y]bY'k Yfhjc``Y$$ 7\UbW'ZØf'U_h]j Yg'9b[U[YaYbh']b'XYb'Y][YbYb'?caaibYb V]YhYh''8]Y'V]g\Yf][Y'DfUl]g'\Uh'niXYa'[YnY][hž'XUgg'YfZc`[fY]WXY6Øf[YfVYhY]'][ib['Y]bYb'_`UfYb'cf[Ub]gUhcf]gWXYb'FU\aYb VYbOh][h''KYbb'X]YgY'[ih'ghfi_hif]Yfh']ghž'_ObbYb'6Øf[Yf.]bbYb]\fY'5b`]Y[Yb'X]fY_h'Y]bVf]b[Ybž'kUg'cZh'UiWX'ni'Y]bYa'VYggYfYb JYfghAbXb]g'XYf'<YfUigZcfXYfib[Yb']b']\fYb'; YaY]bXYb'ZØ\fhž'gc VYf]WXhYh'X]Y'6ibXYgnYbhfU`Y'ZØf'dc`]h]gWXY'6]`Xib[''$

9]b fY[Y`a À»][Yf 5i ghUi gWX]gh [YZfU[h

 $8\,]Y\,;\,\,Ygdf\grave{A}W\&Y\,'j\,\,cb\,'l\,\,Xc\,'K\,\,]hgW\&Ug\,'g]b\,X\,'Y\,]b\,'k\,\,Yfhj\,\,c\,``Yg\,':\,\,cfi\,\,a\,\,\check{z}'XUg\,''$

[YbUi X]YgYa '6YXUfZ'[YfYW\h'k]fX" <]Yf'k]fX'b]W\h'bi f'[YfYXYhž gcbXYfb'_cb_fYh' < UbX'Ub'X]Y'DfcV`Ya Y'[Y`Y[h''6Øf[Yfa Y]ghYf i bX'A UbXUhghfÀ[Yf']b'XYf'FY[]cb'nY][Yb'g]W\cZZYb'ZØf 5bfY[i b[Yb'i bX'k]ggYbž'XUgg'X]Y'X]fY_hY'?ca a i b]_Uh]cb'a]h XYb'6Øf[Yf.]bbYb'YbhgW\Y]XYbX']gh''8]Y'\Yi h][Y'NY]h'YfZcfXYfh Y]bY'bYi Y'?ca a i b]_Uh]cbg_i `hi fži a 'X]Y'5b`]Y[Yb'XYf A YbgW\Yb'hUhgÀW\`]W\']b'X]Y'dc`]h]gW\Yb'9bhgW\Y]Xi b[gdfcnYggY Y]bZ]Y»Yb'`UggYb'ni '_ObbYb''

K]f ZfYi Yb i bg Ui ZY]bYb fY [Yb 5 i ghUi gW i bX j]Y Y gdUbbYbXY ; YgdfÀW Y ž VYhcbh K]hgW Ug 8 Ug]gh XYf f]W h][Y K Y[° K Yf X]Y A Ò[`]W _Y]h \ Uhž gc ``hY g]W XYb HYfa]b Ua '%(" 5 i [i gh b]W h Ybh[Y\Yb ``UggYb" 9g ``c\bh g]W ž U_h]j a]hni [YghU`hYb i bX X]Y Ni _i bZh XYf Y][YbYb < Y]a Uh a]hni [YghU`hYb "

8 Y hU]`g	
EiY``Yb	• k k k "[fcggXi VfUi "XY
	k k k "`UbX_fY]g!VUi hnYb"XY
	• k k k "VdV"XY

6Ygi WXYb G]Y i bg Ui Z. bU[!gUWXgYb "XY