

?Y``bYfb']a'?fY]g'; Òf`]hn.'8Ug YfgWXØhhYfbXY'; Y\U`hg[YZÀ``Y']b'XYf ; Ughfcbca]Y

9]bY''\ b[Y'<chY`ZUW\ZfUi']b'N]hhUi'Yf`YVh`XUg'?Y``bYfb'ZØf, \$\$'9ifc'bYhhc"'9fZU\fYb'G]Yž'kUg'g]Y']b'XYf'CVYf`Uig]hn XifW\ a UW\h''@\bYb'g]W\'gc`\\Y'\ \approx Vg'bc\\3

?Y``bYfb'ZØf', \$\$'9i fc'bYhhc.'8]Y <YfUi gZcfXYfi b[Yb''i b[Yf'<chY`ZUWX_fÀZhY]b'XYf'CVYf`Ui g]hn

 $8]Y `b]YXf][Yb `J YfX]YbghY `]a `; Ugh[Yk YfVY `XYg `? fY]gYg `; Òf`]hn k YfZYb `Y]b `GW\ `U[`]W\ h `Ui Z'X]Y `Z]b Ub n]Y ``Yb `< YfUi gZc fXYfi b[Yb ž XYb Yb `^1 b[Y `< c hY `ZUW_f\ ZhY `[Y[Yb ØVYfghY\Yb" `9]b `6`]W_ `Ui Z'X]Y FYU`]h\ h `ZYfb UV `XYf `GhUh]gh]_Yb" `$

Jcb Gcd\]Y'AØ``Yf'

.' 'A]b"

8]Y; YgW,]W, hY; cb; @Ui fUł;]gh;Yl Ya d`Uf]gW, 'ZØf;]Y`Y;'A b[Y < chY`ZUW,_fÀZhY;]b;XYf;CVYf`Ui g]hn;"Hfchn;]\fYf;@Y]XYbgW, UZh;ZØf]\fYb;6Yfi Zi bX;]\fY;: UW,`]W,_Y]h;g]Y\h;g]Y\g]W, '_cbZfcbh]Yfh;a]h Y]bYa 'a cbUh;]W,Yb;BYhhcj YfX]Ybgh;j cb;Xi fW,gW,b]hh;]W,', \$\$ 9i fc; 'a UbW,a U``Ui W,'-\$\$;9i fc;]b;[i hYb;A cbUhYb;'8]YgY;NU\`Yb a UW,Yb;g]Y;cZZ]n]Y```Ufa ž;cVk c\``g]Y;Y]bY;ei U`]Z]n]YfhY;5i gV]`Xi b[i bX;Y]bY;: YghUbghY``i b[i VYg]hnh;

@Ui fU'UfVY]hYh']b'Y]bYa 'VY_UbbhYb'; Ugh\cZ'XYf']\f'XYb

[YgYhn`]W\Yb`A]bXYgh`c\b'jcb'%&ž(%'9ifc'dfc'GhibXY'nU\`h"BYVYb'XYa'Z]bUbn]Y``Yb'5gdY_h'g]bX'Yg'jcf'U``Ya'X]Y'ZY\`YbXYbNigUhn`Y]ghib[Ybž'X]Y'X]Y'6Y`Ughib['ZØf'g]Y'Yf\Ò\Yb"'?Y]bIf`UiVg!'ibX'KY]\bUW\hg[Y`Xž'_Y]bY'NigW\`À[Y'ZØf'KcW\YbYbX!cXYf':Y]YfhU[gUfVY]h'ibX'bif'&%'HU[Y'VYnU\`hYf'If`UiV'ghY``YbX]Y'FYU`]hÀh'XUfž'a]h'XYf'g]Y'hÀ[`]W\'_cbZfcbh]Yfh']gh"

=a ; Ugh[YkYfVY'g]bX'X]Y'<YfUigZcfXYfib[Yb'[fc»

 $\label{thm:converse} Hfchn`XYf`@]YVY`ni`]\ fYa `6Yfi Z`nY][h`@Ui fU`J YfghÅbXb]g`ZØf`X]YFYU`]hÅh`i bX`X]Y`XUa]h'j YfVi bXYbYb`9]bgW\fÅb_i b[Yb"`=\fYNi _i bZhgdYfgdY_h]j Yb`g]bX`[YhfØVhž`XU`Z]bUbn]Y``YIbk Å[VUf_Y]hYb`i bX`XYf`\c\Y`5fVY]hgUi Zk UbX`]\f`Df]j Uh`YVYbVYY]bhfÅW\h][Yb"`8]Y`DfcV`Ya Yž`a]h`XYbYb`g]Y`_cbZfcbh]Yfh`]ghž g]bX`k Y]h'j YfVfY]hYh`]b`XYf`6fUbW\Y"$

8]Y'U_hi Y``Yb'HUf]Zj Yf\UbX`i b[Yb'nk]gW\Yb'XYf'; Yk Yf_gW\UZh i bX'XYa '5fVY]h[YVYfj YfVUbX'8Y\c[U'gc``Yb'Y]bY'J YfVYggYfi b[XYf'G]hi Uh]cb'ZØf'Ui g[YV]`XYhY': UW_fÀZhY'Vf]b[Yb"'8cW\'X]YFYU`]hÀh'nY][hž'XUgg'bi f'k Yb][Y'6Yhf]YVY'hUhgÀW\`]W\'bUW\'HUf]ZnU\`Yb"'8]Yg'k]fZh'Y]b'VYnY]W\bYbXYg'@]W\h'Ui Z'X]Y'A]ggghÀbXY']a; Ugh[Yk YfVY'XYf'C VYf`Ui g]hn"

 $8]Y `b]YXf][Yb `J YfX]YbghY `]b `XYf'; Ughfcbca]Y `ghY\Yb `]a `ghUf_Yb ?cbhfUgh'ni `UbXYfYb `6fUbW\Yb'' K À\fYbX `XYf'Xi fW\gW\b]hh`]W\Y A cbUhgj YfX]Ybgh']b `GUW\gYb `VY]'' "+- %'9i fc `Vfi hhc ``]Y[hž j YfX]YbYb `5fVY]hbY\a Yf']a `; Ugh[Yk YfVY ``YX][`]W\ `&"+' $ '9i fc `]a A cbUh" 8]Y `8]g_fYdUbn'j YfXYi h`]W\h'X]Y `dfY_ÀfY `G]hi Uh]cbž']b `XYf g]W\'j]Y`Y' < chY`ZUW_fÀZhY `VYZ]bXYb''$

@Ui fUgʻdYgg]a]gh]gW\Yʻ9]bgW\Ahni b[`XYfʻni _ØbZh][Ybʻ9bhk]W_`i b[gd]Y[Y`hʻg]W\`Ui W\`]b`XYb`U_hi Y``Yb`HfYbXgʻk]XYf"ʻ9]bʻgdØfVUfYf FØW_[Ub[`XYf'; AghYnU\`Yb`Vf]b[hʻZ]bUbn]Y``Yʻ9]bVi » YbʻZØf`X]Y 6fUbW\Y`a]hʻg]W\"`GhY][YbXYʻ? cghYbʻi bX`DfY]gYf\O\i b[YbʻZØ\fYb XUni žʻXUggʻXUgʻFYghUi fUbhžʻ]b`XYa `@Ui fU`UfVY]hYhža]hʻY]bYf [Yf]b[YfYb`BUW\ZfU[Y`_cbZfcbh]Yfh`]gh"

 $8] Y F Y U`] h A h`Z Ø f`' A b [Y ' < c h Y`Z U W _f A Z h Y`] b`X Y f`C V Y f`U i g] h n`] g h$

[YdfÀ[hˈj cbˈZ]bUbn]Y``YfʻI bg]WXYf\Y]hˈi bX'VYfi Z`]WXYb < YfUi gZcfXYfi b[Yb"'8]Y'8]g_fYdUbnˈnk]gWXYbʻ@Y]XYbgWXUZhʻZØf XYbʻ6Yfi Zʻi bX'XYbʻZ]bUbn]Y``YbʻFYU`]hÀhYbʻk]fZhʻY]bʻGWX`U[`]WXh Ui ZʻX]YʻA]ggghÀbXYʻ]a '; Ugh[YkYfVYžʻX]YʻXf]b[YbX'Y]bYfʻ@Ògi b[VYXØfZYb"

B5;

8 Y hU]`c

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