

K U\`Zc`[ Yb`]a`C ghYb.`5Z8`i bX`6GK`  
K Ug`ghYW`h`\ ]bhYf`XYa`5i Zhf]YV3

8]Y`5F8!8c\_i`/ ei ch/8]Y`[ fc»Y`5b[ gh`ei ch/i bhYfgi W`h`X]Y  
K U\`YfZc`[ Y`j cb`5Z8`i bX`6GK` ]b`C ghXYi hgW\`UbX`i bX  
XYfYb`[ YgY`gW`UZh`]W`Y`i`c`[ Yb`"

⇒`C ghYb`8Yi hgW\`UbXg`\ Uh`g]W\`X]Y`dc`]h]gW`Y`@UbXgW`UZh`]b`XYb  
`Y`hnhYb`A`cbUhYb`Yf\`YV`]W\`j`Yf`AbXYfh`"6YgcbXYfg`VY`]XYb  
`Øb[ ghYb`K U\`Yb`]b`GUW`gYb`i bX`H\`Øf]b[ Yb`ž`X]Y`Ua`%"  
GYdhYa`VYf`ghUhhZUbXYb`ž`\_cbbhY`X]Y`5`hYfbUh]j`Y`ZØf`8Yi hgW\`UbX  
f5Z8`Ł`g][ b]Z`\_UbhY`;`Yk`]bbY`j`YfnY]W`bYb`ž`k`À`fYbX`X]Y`bYi  
[ Y[ fØbXYhY`6Øf[ Yf`ZØf`GUW`gYb`i bX`H\`Øf]b[ Yb`f6GK`Ł`YVYbZU`g  
ØVYffUgW`YbX`ghUf`\_`UVgW`c`gg`"8]YgY`J`Yf`AbXYfi`b[ Yb`VYhfYZZYb  
b]W`h`bi`f`X]Y`K U\`Yb`gY`Vgh`ž`gcbXYfb`\_`ØbbhYb`k`Y]hfY]W`YbXY  
?cbgYei`YbnYb`ZØf`X]Y`[ YgUa`hY`;`YgY`gW`UZh`i bX`K`]fhgW`UZh`]b  
XYf`FY`[ ]cb`\`UVYb`"

8]Y`K U\`Yb`]a`C ghYb`ž`]bgVYgcbXYfY`]b`H\`Øf]b[ Yb`i bX`GUW`gYb`ž  
k`i`fXYb`a`]h`VUb[ Y`9fk`Ufhi`b[ ]`YfZc`[ h`i`i bX`XUg`b]W`h`bi`f`j`cb  
XYb`6Øf[ Yfb`j`cf`C`fh`"8]Y`5Z8`k`i`fXY`ni`f`gh`Af`\_ghYb`?`fUZh`]b  
H\`Øf]b[ Yb`i bX`ni`f`nk`Y]hgh`Af`\_ghYb`]b`GUW`gYb`[ Yk`À`\`h`"8`Ug`6GK`ž  
XUg`Yfgh`]b`X]YgYa``š`U`f`[ Y[ fØbXYh`k`i`fXY`ž`YffY]W`hY`]b`VY]XYb  
6i bXYg`AbXYfb`XYb`Xf]hYb`D`Um`"8]YgY`K U\`Yf[ YVb]ggY`g]bX  
b]W`h`c`\`bY`6YXYi`hi`b[ /`9l`dYfhYb`j`Yfa`i`hYb`ž`XUgg`g]Y`ni`Y`]bYf  
[ fi`bX`Y[ YbXYb`J`Yf`AbXYfi`b[ `XYg`dc`]h]gW`Yb`GmghYa`g`ZØ`fYb  
\_`ØbbhYb`"Dc`]h`\_k`]ggYbgW`UZh`Yf`K`c`Z[ Ub[ `A`i`bc`VYhcbhY`VYfY]hgž  
XUgg`X]Y`9f[ YVb]ggY`XUg`[ YgUa`hY`@UbX`[ fi`bXg`À`h`]W  
j`Yf`AbXYfb`\_`ØbbhYb`"

8]Y`6Ygcf[ b]g`XYf`A`YbgW`Yb

ϕ·Y]bYf'5F8!8c\_i a YbhUh]cb'a ]h'XYa 'H]hY'' 8]Y '[ fc»Y'5b[ gh'  
NYffY]»dfcVY']a 'CghYb žX]Y'\_i fn'bUW'XYb'K U\`Yb'Ui g[ YghfU\`h  
k ]fXž'k ]fX'XUg'i bVY\U[ Yb'XYf'A YbgW'Yb' ]b'GUW'gYbž'H\Øf]b[ Yb  
i bX'6fUbXYbVi f[ 'h\Ya Uh]g]Yfh''8Yf': ]a žXYf'Ua 'A cbhU[ žXYb' - "  
GYdhYa VYfž'ni f'Df]a Yh]a Y'ni 'gY\Yb'gY]b'k ]fXž'VY'Yi W'hYh'X]Y  
Gcf[ Ybž'Yb[ ghY'i bX'K ØbgW'Y'XYf'6Yj Ò`\_Yfi b[ "'8]Y': ]a Ui hcFYb  
VY[ `Y]hYhYb'ØVYf'a Y\fyfY'A cbUhY'A YbgW'Yb'Ui g'XYf'FY[ ]cbž  
XUfi bhYf'Ui W'`f b[ Y'6Ug\_YhVU`gd]Y'Yf'XYg'Xj YfgYb'HYUa g'XYf  
9fZ fhYf'@Øk Ybž'X]Y ]\fY'6YXYb\_Yb'\]bg]W'h]W'5`hU[ gfUgg]ga i g  
Ài »YfhYb"G]Y'ZØfW'hYbž'XUgg[ YgY`gW'UZh]W'Y'DfcV`Ya Y'k ]Y  
FUgg]ga i g'i bX': fYa XYbZY]bX'W'\_Y]h'U'g'bcfa U`Ub[ YgY\Yb  
k YfXYb'\_ØbbhYb

9]b'I bhYfbY\`a Yf'Ui g'8fYgXYbž'7\`f]gh]Ub'D]YW'b]\_ž'VYf]W'hYh  
Yf[ fY]ZYbX'j cb'XYb'GW'k ]Yf][ \_Y]hYb'gY]bYg'F'cVch]\_!GhUfh'i dg.  
J]Y'Y' ]bhYfbUh]cbU`Y': UW'\_f`ZhY'n]Y\Yb'Yg'j cfž'b]W'h'bUW  
GUW'gYb'ni '\_ca a Ybž'Ui Z[ fi bX'XYf'Xcfh'\YffgW'YbXYb  
I bg]W'Yf\Y]hYb"'8]YgY'k ]fhgW'UZh]W'Yb'DfcV`Ya Y'\_ØbbhYb'g]W  
j YfgW'fZYbž'k Ybb'X]Y '[ YgY`gW'UZh]W'Y'Gh]a a i b[ '\_]ddh"'5i W  
XYf'?i `hi fVYfY]W'g]Y\`h]g]W'a ]h<YfUi gZcfXYfi b[ Yb'\_cbZfcbh]Yfh/  
XUg'?i `hi fnYbhfi a 'GhY]b\`Ui g]b'6Ui hnYb'ghY\`h'Ui Z[ fi bX'XYf  
dc`h]gW'Yb'J Yf\`h]b]ggY'j cf'Z]bUbn]Y`Yb': fU[ Ybž'X]Y'j cb'Y]bYa  
GhUXhfUh[ Ydf`[ h'g]bXž'XYf'a Y\`f\Y]h]W'j cb'XYf'5Z8'VYgYhnh'gh"

ϕ'FYU\_h]cb'Ui Z'X]Y'VYgcf[ b]gYffY[ YbXY'dc`h]gW'Y'G]hi Uh]cb  
\UVYb'j YfgW']YXYbY'?ØbghYf'k ]Y'X]Y'6Yf']bYf'6UbX'6YUghYU\_g  
Gc`XUf]h`h]g\_cbnYfhY' ]b'XYf'FY[ ]cb'[ Y[ YVYbž'i a 'Ui Z'X]Y'dfY\_`fY  
@U[ Y'XYf'?i `hi fgW'UZZYbXYb'Ui Za Yf\_gUa 'ni 'a UW'Yb"'8Yf'5i Zfi Zž  
ZØf'X]Y'8Ya c\_fUh]Y'ni gUa a Ybni \U`hYbž'k ]fX'Y]bXf]b[ `]W  
Zcfa i `]Yfh' 8]Y'@Yi hY'a ØggYb'i bVYX]b[ hini gUa a Yb\_ca a Yb  
i bX'ni gUa a Yb\U`hYb'ZØf'X]Y'8Ya c\_fUh]Y' ]b'X]YgYa '@UbXž'ZØf  
XUgž'k Ug'XU'gc'\_ca ]gW' [ Yk ]hfh[ ]'Ui Zh]Y\`h"

8]Y'5F8!8c\_i `VY'Yi W'hYhž'k ]Y'X]Y'dc`h]gW'Y'I a k `ni b[ ]a  
CghYb'gck c\`X]Y'K ]fhgW'UZh]U'g'Ui W'X]Y'?i `hi f'VYY]bZi ggh'i bX  
cV'X]YgY'J Yf`bXYfi b[ Yb'X]Y'FY[ ]Yfi b[ gZ`\][ \_Y]h'XYf'FY[ ]cb  
[ YZ\`fXYb'\_ØbbYb"'8]Y'9f[ YVb]ggY'XYf'K U\`Yb' ]b'GUW'gYb'i bX  
H\Øf]b[ Yb'ZcggYb'gW'Y]» ]W' ]b'X]Y'8c\_i a YbhUh]cb'Y]bž'X]Y'XYf

A 8 F `V]g'ni f`5i gghfU\`i b[ `ghÅbX][ `U\_hi U`g]YfhY"

9fk Ufhi b[ Yb`i bX`Dfc[ bcgYb`ZØf`X]Y`VYj c fghY\YbXYb`K U\`Yb`]b  
6fUbXYbVi f[ `Ua`&&"GYdhYa VYf`g]bX`Å\b`]W\`XØghYf"6YcVUW\hYf  
i bX`6Øf[ Yf`[ `Y]W\Yfa U»Yb`V`]W\_Yb`VYgc f[ h`Ui Z`XUgž`k Ug  
\_ca a Yb`\_ØbbhYž`k Å\fybX`X]Y`YhUV`]YfhYb`DUfhY]Yb`i bhYf`8fi W\_  
[ YfUhYb`i bX`bYi Y`dc`]h]gW\Y`5``]Ubnyb`bchk YbX][ `k YfXYb  
\_ØbbhYb"8]YgY`9bhk ]W\_`i b[ Yb`\_ØbbhYb`X]Y`dc`]h]gW\Y`GhUV`]hÅh  
gck c\`]b`6fUbXYbVi f[ `U`g`Ui W`]a` [ YgUa hYb`C ghXYi hgW\`UbX  
VYY]bZi ggYb"

8]Y`5F 8!8c\_`i a YbhUh]cb`k ]fX`Y]bY`h]YZfY`9]bg]W\h`]b`X]YgYg  
\_f]h]gW\Y`H\Ya U`V]YhYb`i bX`X]Y` : fU[ Yb`VY`Yi W\hYbž`X]Y`X]Y  
6Yj Ò`\_Yfi b[ `VYk Y[ Yb"8]Y`Gcf[ Yb`i a`Y]b`i bfY[ ]YfVUfYg  
C ghXYi hgW\`UbX`\_ØbbhYb`Y]b`j cf\YffgW\YbXYg`H\Ya U`]b`XYb  
\_ca a YbXYb`K cW\Yb`i bX`A cbUhYb`V`Y]VYb"

8YhU]`g

6Ygi W\Yb`G]Y`i bg`Ui Z.`b!U[ "XY