

: Y\`U`Ufa`]b`?`Y]ba UW bck .`Gi WY`bUW @Ok]b`VYYbXYh

8]Y`Gi WY`bUW`Y]bYf`j Yfa Y]bh]WYb`@Ok]b`]b
?`Y]ba UW bck žgØX`]W`j cb`6Yf`]bž`]gh`VYYbXYh"8]Y
6Y\`ØfXYb`[UVYb`Ua` :`fY]hU[`9bhk Ufbi b[`i`bX`ghY`hYb`X]Y
Gi WY`Y]b"9g`ghY`hY`g]WY`YfUi gž`XUgg`Yg`g]WY`VY]`XYa`H]Yf
Ui Z`XYa`<`UbXmj`]XYcž`XUg`X]Y`Gi WY`Ui g[`Y`Øgh`\UhhY`ž`i`a
Y]b`K`j`XgWk`Y]b`\UbXY`h"8]Y`Gi WY`\UhhY`Y]bYb`[`fc»`Yb
5i`Zk`UbX`a`]h`g]WY`[`YVfUW`h`<`i`bXYfhY`Dc`nY]VYUa`hYž`XUg
J`YhYf]b`ÅfUa`hi`bX`>U[`Xd`ÅW`hYf`k`UfYb`]a`9]bgUhn`[`Yk`YgYbž
<`i`VgW`fUi`VYf`i`bX`8fc`\bYb`k`i`fXYb`Y]b[`YgYhhi`bX
GhfU»`Yb`i`bX`K`Å`XYf`_`cbhfc`]]Yfh"8]Y`Gi WY`k`i`fXY`Ua
8`cb`bYfghU[`Ui`g[`Y`Øghž`U`g`Y]b`NYi`[`Y`Y]b`J`]XYc`j`cb`XYa
H]Yf`nk`]gWYb`6ØgWYb`i`bX`6`Å`i`a`Yb`[`Ya`UW`h`\UhhY"8]Y
9fa`]hhi`b[`gVY\`ØfXYb`\`Y`hYb`XUg`J`]XYc`/`Ua`d`Λ`Y`]]d`/



8]Y`Gi WY`bUW`Y]bYf`j Yfa Y]bh]WYb`@Ok]b`]b`?`Y]ba UW bck ž
gØX`]W`j cb`6Yf`]bž`]gh`VYYbXYh"8]Y`6Y\`ØfXYb`[UVYb`Ua` :`fY]hU[
9bhk Ufbi b[`i`bX`ghY`hYb`X]Y`Gi WY`Y]b"9g`ghY`hY`g]WY`\`YfUi gž
XUgg`Yg`g]WY`VY]`XYa`H]Yf`Ui Z`XYa`<`UbXmj`]XYcž`XUg`X]Y`Gi WY`Y
Ui g[`Y`Øgh`\UhhY`ž`i`a`Y]b`K`j`XgWk`Y]b`\UbXY`h"8]Y`Gi WY`\UhhY
Y]bYb`[`fc»`Yb`5i`Zk`UbX`a`]h`g]WY`[`YVfUW`h`<`i`bXYfhY
Dc`nY]VYUa`hYž`XUg`J`YhYf]b`ÅfUa`hi`bX`>U[`Xd`ÅW`hYf`k`UfYb`]a

9]bgUhn[Yk YgYbž<i VgWfUi VYf'i bX'8fc\bYb'k i fXYb'Y]b[YgYhnh
i bX'GhfU»Yb'i bX'K Ä`XYf'_cbhfc``Yfh"

8]Y'Gi WY'k i fXY'Ua '8cbbYfghU['Ui g[Y'Öghž'U'g'Y]b'NYi [Y'Y]b
J]XYc'j cb'XYa 'H]Yf'nk]gWYb'6ØgWYb'i bX'6Äi a Yb'[Ya UWXh
\UhhY''8]Y'9fa]h'i b[gVY\ÖfXYb'\]Y'hYb'XUg'J]XYc'ZØf'YW'h'i bX
j Yfa i hYhYb'ni bÄWghž'XUgg'Yg'g]W' i a 'Y]bY'Yb'h'Ui ZYbY'@Ök]b
\UbXY'h''8cW'VYfY]hg'ZfØ'\Äi »YfhYb'9i dYfhYb'Nk Y]ZY''Ub'X]YgYf
5bbU\ a Y''K YXYf'6'i h'bcW' ?ch'cXYf'DZchYbUVXfØW_Y'XYi hYhYb
XUfUi Z\]bž'XUgg'XUg'H]Yf'g]W']b'XYf'FY[]cb'Ui Z]Y'h''8Yf
JYhYf]bÄfa YX]n]bYf'5W]a ' ; fi VYf'j cb'XYf' : fY]Yb'i b]j Yfg]hÄh
6Yf]b'Äi »YfhY'YVYbZU''g'Nk Y]ZY''Ub'XYf'@Ök]b!H\Ycf]Y"

5a ' : fY]hU['[UVYb'X]Y'6Y\ÖfXYb'XUbb'cZ]n]Y''9bhk Ufbi b[''9g
\UVY'_Y]bY'U_i hY' ; YZU\ f'VYghUbXYb'i bX'X]Y'6Yj Ö'_Yfi b['gY]
b]W'h]b' ; YZU\ f'[Yk YgYbž'Yf'_ÄfhY'XYf'6Øf[Yfa Y]ghYf'j cb
'Y]ba UWXbck ''Nk Y]9i dYfhYb'\UhhYb'XUg'J]XYca UhYf]U'
i bUV\Äb[] []cbY]bUbXYf'[YdfØZhi bX'_Ua Yb'ni 'XYa 'GW' i ggž
XUgg'Yg'g]W' i a 'Y]b'K]XgW'k Y]b'\UbXY'h''5i W'XYf'J cfg]hnYbXY
XYg'BUhi fgW'i hnVi bXYg'6Yf']bž'FU]bYf'5'hYb_Ua dž['Ui Vhž'XUgg
Yg'g]W'Y\Yf'i a 'Y]b'K]XgW'k Y]b'\UbXY'h''8]Y'Gdi fYb'Y]bYg
K]XgW'k Y]bg'gY]Yb'Ui ZXYb'J]XYcUi ZbU\ a Yb'Y]bXYi h['ni
Yf_YbbYb"

8]Y'Gi WY'bUW'XYf'j Yfa Y]b'h]WYb'@Ök]b'\UhhY'ZØf'j]Y''5i ZgY\Yb
[Ygcf[h'i bX'\c\Y' ?cghYb'j Yfi fgUW'h''8]Y'Dc`nY][Yk Yf_gWUZh
_f]h]g]YfhY'XYb'9]bgUhn'U'g'hYi fY' GUZUf] 'i bX'Zc'fXYfhY'Y]b
Vi bXYgk Y]h[Y'hYbXYg'JYfVch'XYf'df]j UhYb'<U'hi b['[YZÄ\ f']WYf
K]Xh]YfY''8]Y'Dc`nY]'j YfhY]X][hY'XYb'9]bgUhn'i bX'VYhc'bHž'XUgg
<]bk Y]gY'Ui ZY]bY'U_i hY' ; YZU\ fYb'U[Y'j cf[Y'Y[Yb'\ÄhhYb"

8]Y'6Y\ÖfXYb'fYW'hZYfh][hYb'g]W'ZØf'XYb'ZU'gWYb'5'Ufa 'i bX
Yf'_ÄfhYbž'XUgg'X]Y' ; YZÄ\ fXi b[g'U[Y'XYb'9]bgUhn'XYf'Dc`nY]
[YfYW'hZYfh][h'\UVY''8]Y'Dc`nY]'k]''Ui W'k Y]hYf\]b']b'XYf'FY[]cb
dfÄgYbh'gY]bž'cVkc\''_Y]bY'U_i hY' ; YZU\ f'a Y\ f'VYghY'h''9]bY
<UUfUbU'mgY'gc``bi b'_ÄfYbž'cV'Yg'g]W' hUhgÄW']W' i a 'Y]bY
@Ök]b[Y\UbXY'h'\Uh''9]b' ðgh]hi h'ZØf'H]YfdUh'c`c[]Y]b'6Yf']b
i bhYfgi W'h<UUfYž'X]Y'Ub'Y]bYa '6Ui a '[YZ] bXYb'k i fXYb'i bX

j ca [Ygi W hYb`H]Yf`ghUa a Yb`gc``Yb""8 Ug`9f[YVb]g`k]fX`]b`XYf`
_ca a YbXYb`K cWXY`Yfk UfhYh"

ϕg[YgUa h`k Uf`X]Y`Gi WXY`bUWXY`f`j Yfa Y]bh`]WXYb`@Ok]b`Y]b
Ui Zk YbX][Yf`9]bgUhnž`XYf`g]WXY`YhnYbX`]WXY`U`g`ZU`gWXYf`5`Ufa
Ybhd i ddhY""8]Y`6Y\`ØfXYb`g]bX`YXcWXY`ØVYfnYi [hž`XUgg`g]Y`f]W h][
[Y\`UbXY`h`\`UVYb`i bX`XUgg`X]Y`G]WXYf`\Y]h`XYf`6Yj`Ø`_Yfi b[`Ub
YfghYf`GhY``Y`ghUbX""Bi b`_ØbbYb`g]WXY`U``Y`k]YXYf`VYfi \][h`ZØ`\`Yb
i bX`X]Y`Gi WXY`bUWXY`f`j Yfa Y]bh`]WXYb`@Ok]b`U`g`_i f]cgYg
9fY][b]g`UV\`U`_Yb"

8YhU]`g

6Ygi WXYb`G]Y`i bg`Ui Z.`a Y]b!VYf`]b"bYh