

I bhci WUV`Yg`[`Y]WYb`<U`VZ]bU`!GYf]Y
a]h'ghUf_Ya`%' .&!G]Y[`Ui g

; i [[YbVYf[Yf`@Y[]cbÅfY`j Yf`YfYb`_`Uf`[Y[Yb`DUXYfVc fb
a]h'&.%' "A UbU[Yf`<Y`a][`V`Y]Vh'cdh]a]gh]gW`ZØf`X]Y
bÅW ghYb`Gd]Y`Y"

⇒Y]bYf`gdUbbYbXYb`6UgYVU`!<U`VZ]bU`gYf]Y`hfUZYb`X]Y
; i [[YbVYf[Yf`@Y[]cbÅfY`F Y[YbgVi f[`Ua`GcbbhU[`Ui ZX]Y
I bhci WUV`Yg`DUXYfVc fb`8Ug`Gd]Y`YbXYhY`a]h'Y]bYf`_`UfYb
B]YXYf`U[Y`ZØf`X]Y`F Y[YbgVi f[Yfž`X]Y`a]h'&.%' `i bhYf`U[Yb"
8]YgYg`9f[YVb]g`k Uf`b]W h`bi f`Ybhh`Åi gW`YbXž`gcbXYfb`a UW`hY
Ui W`_`Ufž`XUgg`X]Y`@Y[]cbÅfY`Ub`X]YgYa`HU[`b]W`h`b`]\fYf
VYghYb`:`cfa`k UfYb`8]Y`DUXYfVc fbYf`nY][hYb`Y]bY`ghUf_Y
@Y]ghi b[`i bX`Xca`b]YfhYb`XUg`Gd]Y`j cb`5bZUb[`Ub"

A UbU[Yf`A Ufh]b`<Y`a][`bU`a`X]Y`B]YXYf`U[Y`[Y`UggYb`i bX
j Yfgi W`hYž`X]Y`A cfU`gY]bYf`A UbbgW`UZh`Ui ZfYW`hni Yf`U`hYb`" K]f
\UVYb`gc`W`Y`8]b[Y`gW`cb`ÒZhYf`[YgW`UZZh`žYf`_`ÀfhY`Yf`]b`Y]bYa
⇒hYfj]Yk`a]h'@Y[]cbÅfYHU`"<Y`a][`VYhc`bhYž`XUgg`XYf`:`c`_i`g`bi`b
XUfUi`Z`]Y[Yž`XUg`bÅW`ghY`Gd]Y`]b`DUXYfVc fb`Ubni [Y`Yb`i`bX`ni
k]ggYbž`XUgg`XUg`HYUa`]b`XYf`@U[Y`]ghž`X]Y`I bhci WUV`Yg`ni
VYg]Y[Yb`8]Y`Ni j Yfg]W`hXYg`HfU]bYfg`k Uf`_`Uf`gdØfVUf"

8 Ug`Gd]Y`[YgW`Y`Yb`i`bX`gY]bY`6YXYi hi b [

⇒`Gd]Y`gY`Vgh`k Uf`X]Y`8ca`b]Ubni`XYf`DUXYfVc fbYf`D]hW`Yf
i bj Yf`_YbbVUf`"Fc`XUb`C W`cUž`XYf`GhUfhYf`ZØf`DUXYfVc fbž`k Uf
VYgcbXYfg`VYY]bXfi W`_YbX`i`bX`VfUW`hY`X]Y`F Y[YbgVi f[Yf`6UhhYf
\Åi`Z[`]b`6YXfÅb[b]g`8]Y`@Y[]cbÅfY`]\b[Y[Yb`ZUbXYb`g]W`
k]YXYf`]b`Y]bYf`i`b[`ØW`_]W`Yb`G]hi`Uh]cbž`XU`g]Y`ja`[YgUa`hYb
Gd]Y`"YX][`]W`ZØbZ`<]hg`Yfn]Y`hYbž`k`Å`fYbX`]fY`]; Y[bYf`XUg

8 fY]ZUWY`XUj cb`Ui ZXUg`GWcfYVcUfX`VfUW`hYb"

6YgcbXYfg`gW`a Yfn`]W`Z0f`X]Y`@Y[]cb`ÅfY`k Uf`X]Y`G]hi Uh]cb`]a
g]YVhYb`b]b[ž`U`g`g]Y`X]Y`7`U`bW`VY]`6UgYg`@UXYX`b]W`h`bi`hnYb
`c`b`b`h`Y`b`" 9g[]Vh`Y]bZUW`Gd]Y`Y]a`6UgYVU`ž`X]Y``c`b`g`Y`e`i`Y`b`h`]`b
Y]b`Y`F]W`h`i`b[`Ui`ZYb`ž`Yf`_`Å`fhY`<`Y`a`][ž`XYf`X]Y`G]hi Uh]cb
UbU`mg]Y`fhY`i`b`X`V`Y`h`c`b`h`Y`ž`X`U`g`g`gc`W`X`Y`F`Ø`W`_`g`W`X`Å[`Y`]a`G`d`c`f`h
i`b`j`Y`f`a`Y`X`]W`_`g]b`X`"H`f`c`h`X`Y`f`B]Y`X`Y`f`U[`Y`\\`Y`h`<`Y`a`][`Ub`X`Y`f
,`V`Y`f`n`Y`i`[`i`b[`ZY`ghž`X`U`g`g`g`Y]b`Y`Gd]Y`Y`f`Ui`g`X`Y`f`9`f`Z`U`\\`f`i`b[`Y`f`b`Y`b
i`b`X`[`Y`gh`Å`f`_`h`i`ni`f`Ø`W`_`_`c`a`a`Y`b`_`Ø`b`b`Y`b`"

8]Y`F`Y`U`_`h]c`b`Ui`Z`X]Y`B`]Y`X`Y`f`U[`Y`

8]Y`K`c`f`h`Y`j`c`b`A`UbU[`Y`f`<`Y`a`][`gd]Y[`Y`b`Y]b`Y`d`c`g]h]j`Y
9]b`ghY`i`b[`k`]X`Y`f`ž`X]Y`]b`G`d`c`f`h`_`f`Y]g`Y`b`c`Z`h`Y`b`h`g`W`X]Y`X`Y`b`X`]gh"
5`b`g`h`U`h`h`g]W`X]b`G`Y`V`g`h`a`]h`Y]X`ni`Y`f[`Y`\\`Y`b`ž`b`i`h`h`Y`<`Y`a`][`X]Y
;`Y`Y[`Y`b`\\`Y]h`ž`i`a`g`Y]b`Y`A`U`b`b`g`W`X`U`Z`h`Ui`Z`X`U`g`b`Å`W`_`g`h`Y`G`d]Y`
j`c`f`n`i`V`Y`f`Y]h`Y`b`"K`]f`a`Ø`g`g`Y`b`b`U`W`X`D`U`X`Y`f`V`c`f`b`Z`U`\\`f`Y`b`i`b`X`k`]g`g`Y`b`ž
X`U`g`g`k`]f`g]Y`g`W`X`U[`Y`b`_`Ø`b`b`Y`b`ž`X`U`g`g`k`]f`g]Y`g`W`X`U[`Y`b`k`Y`f`X`Y`b`ž
Z`Ø`\\`f`h`Y`Y`f`k`Y]h`Y`f`Ui`g`9`g`]gh`Y]b`6`Y]gd]Y`X`U`Z`Ø`f`ž`k`]Y`k`]W`X`h][
a`Y`b`h`U`Y`f`G`h`Å`f`_`Y]a`K`Y`h`_`U`a`d`Z]gh"

8`U`V`Y`]gh`Y`g`Y`f`k`Å`\\`b`Y`b`g`k`Y`f`h`ž`X`U`g`g`6`U`g`Y`V`U`ž`k`]Y`j`]Y`Y`U`b`X`Y`f`Y
G`d`c`f`h`U`f`h`Y`b`ž`b]W`X`h`bi`f`d`\\`mg]g`W`X`Y`:`Å`\\[`Y]h`Y`b`Y`f`Z`c`f`X`Y`f`h`ž`g`c`b`X`Y`f`b
Ui`W`X`Y]b`Y`gh`U`f`_`Y`a`Y`b`h`U`Y`J`Y`f`Z`U`g`g`i`b["G`d`f`Ø`W`X`Y`k`]Y`G`c`a`Y`h]a`Y`g
m`c`i`k`]b`ž`g`c`a`Y`h]a`Y`g`m`c`i`c`g`Y`ž`g`c`a`Y`h]a`Y`g`]h`i`f`U]b`g`j`Y`f`X`Y`i`h]W`X`Y`b
X]Y`i`b`j`c`f`\\`Y`f`g`Y`\\`V`U`f`_`Y]h`X`Y`g`G`d]Y`g`"8]Y`G`d]Y`Y`f`a`Ø`g`g`Y`b`Y`f`b`Y`b`ž
a`]h`B]Y`X`Y`f`U[`Y`b`i`a`ni`[`Y`\\`Y`b`i`b`X`g]W`X`Ui`Z`_`c`a`a`Y`b`X`Y
<`Y`f`Ui`g`Z`c`f`X`Y`f`i`b[`Y`b`ni`_`c`b`n`Y`b`h`f]Y`f`Y`b`"

5`b[`Y`g]W`X`h`g`X`Y`f`G`h`U`h]gh]_`Y`b`X]Y`g`Y`g`G`d]Y`g`k`U`f`Y`g`_`U`f`ž`X`U`g`g`X]Y
@Y[]cb`Å`f`Y`]b`X`Y`f`b`Å`W`_`g`h`Y`b`6`Y[`Y[`b`i`b[`]`\\`f`Y`H`U`_`h]_`i`b`X`@Y]gh`i`b[
U`b`d`U`g`g`Y`b`a`Ø`g`g`Y`b`"8]Y`D`U`X`Y`f`V`c`f`b`Y`f`k`U`f`Y`b`b]W`X`h`bi`f`]a`D]h`W`X]b[ž
g`c`b`X`Y`f`b`Ui`W`X]a`G`W`c`f]b[`Ø`V`Y`f`Y[`Y`b`"9`g[]`h`bi`b`ž`X]Y`Y][`Y`b`Y`b
G`h`Å`f`_`Y`b`ni`Z]b`X`Y`b`i`b`X`g]W`X`Ui`Z`X]Y`b`Å`W`_`g`h`Y`b`G`d]Y`Y`ni
_`c`b`n`Y`b`h`f]Y`f`Y`b`ž`i`a`X]Y`G`Y`f]Y`Ui`g[`Y[`]W`X`Y`b`ni`[`Y`gh`U`h`Y`b`"

5 i`g`V`]W`_`Ui`Z`X]Y`b`Å`W`_`g`h`Y`b`G`d]Y`Y`

8]Y'; i [[YbVYf[Yf'@Y[]cbÅfY'ghY\Yb'j cf'XYf'<YfUi gZcfXYfi b[ž
bUW\Y]bYf'gc`W\gWk YfYb`B]YXYf`U[Y'ni fØW_ni _ca a Yb""8]Y
GYf]Y']gh'bcW`b]W'h`VYYbXYhž'i bX'a]h'XYf'f]W'h][Yb`9]bghY`i b[
i bX`J cfVYfY]hi b[` _ØbbYb`g]Y`g]W`Yf`W`bcW`X]Y`K YbXY
gW`UZZYb"" K]f`XØfZYb`Yhnh[Uf`_Y]bY`bY[Uh]j Y'; YXUb`_Yb
Ui Z_ca a Yb`_UggYb ž`UhhY`<Y`a][`f]W'h][`VYhcbh"8Yf'; `Ui VY`Ub
XUg`HYUa `i bX`X]Y`Y][YbY': Å\][_Y]hž`Gd]Y`Y'ni `[Yk]bbYbž`_ØbbhY
YbhgW`Y]XYbX`ZØf`XYb`k Y]hYfYb`J Yf`Ui Z`XYf`D`Umc`ZZg`gY]b""8 Ug
bÅW`ghY`Gd]Y`V]YhYh`b]W`h`bi f`X]Y`7`UbW`ni f`F`Y`UV]`hUh]cbž
gcbXYfb`Ui W`X]Y`A Ò[`]W`_Y]hž`a]h`j YfY]bhYb`? fÅZhYb
ni fØW_ni gW`U[Yb`i bX`a Ò[`]W`Yfk Y]gY`X]Y`YbhgW`Y]XYbXYb
Di b_hY`ja `<U`VZ]bU`Y`ni `g]W`Yfb"

DUXYfVc fbg`8 ca]bUbn`]b`XYb`D`Umc`ZZg

8]Y`l`bhci W`UV`Yg`Ui g`DUXYfVc fbg`nY][Yb`]b`XYf`Ui ZYbXYb`D`Umc`ZZ
GYf]Y`Y]bY`VYY]bXfi W`_YbXY`@Y]ghi b["A]h`]\fYa`ghUf`_Yb`? UXYf
\UVYb`g]Y`g]W`U`g`Yfbghni bY`a YbXYf'; Y[bYf`\YfUi g_f]ghU``g]Yfh"
8]Y`A`UbbgW`UZh`\Uh`]b`XYf`U_hi Y`Yb`GU]gcb`gck`c`\`]b`XYf
fY[i`ÀfYb`Gd]Y`nY]h`U`g`Ui W`]b`XYb`D`Umc`ZZg`_cbghUbh`\c`Y
@Y]ghi b[Yb`YfVfUW`h"J cf`U`Ya`X]Y`D]hW`Yfž`]bgVYgcbXYfY`F`c`XUb
C`W`c`Už`\UVYb`g]W`U`g`GW`ØggY`gd]Y`Yf`Yfk]YgYbž`X]Y`]b
YbhgW`Y]XYbXYb`A`ca`YbhYb`k]W`h][Y`9fZc`[Y`ZØf`XUg`HYUa
[Yg]W`Yfh`\UVYb"

8]Y`DUXYfVc fbg`Yf`\UVYb`X]Y`\]ghcf]gW`Y`GhÅf`_Y`]fYf`D]hW`Yf
[Ybi hnhž`i`a`]b`XYf`V]g`Yf][Yb`GU]gcb`\c`Y`G]Y[ei`chYb`ni
YffY]W`Yb""GhUh]gh`_Yb`VY`Y[Ybž`XUgg`XUg`D]hW`]b[`XYf
l`bhci W`UV`Yg`ja`J Yf[`Y]W`ni`UbXYfYb`HYUa`g`XYf`@[U`ni`XYb
VYghYb`[Y`Øfh"8]Yg`nY][h`g]W`b]W`h`bi f`]b`XYf`5bnU`\`XYf
[Yk`cbbYbYb`Gd]Y`Yž`gcbXYfb`Ui W`]b`XYf`Fi b!5`ck`YX!GhUh]gh]_ž
X]Y`UbnY][hž`k]Y`j]Y`Y`Di b_hY`X]Y`[Y[bYf]gW`Yb`HYUa`g]ja
8i`fW`gW`b]hh`dfc`Gd]Y`Yfn]Y`Yb`_cbbhYb"

8]Y`6YXYi hi b[`j cb`HYUa [Y]gh`i bX
GhfUhY[]Y

⊕·Y]bYa`HYUa gdcfhk]Y`6UgYVU``]ghXYf`HYUa [Y]gh
YbhgWXY]XYbX"A UbU[Yf`A Ufh]b`<Y`a][`VYhcbhX]YgYf`HU[Y`]a a Yf
k]YXYfž`k]Y`k]W h][`Yg`]ghž`XUgg`gY]bY`Gd]Y`Yf`gck c`][`i hYb`U`g
Ui W`][`b`gW`YW`hYb`NY]hYb`ni gUa a Yb`U`hYb`"Gd]Y`Yf`k]Y`@ci
<Y`a][`i bX`5`YI`GW`a]Xh`UVYb`Xi fW`][`fY`9fZU`fi b[Yb`]b`XYf
@[U`a Y`fZUW`VYk]YgYbž`XUgg`gY]b`YbhgWXY]XYbXYb`Gd]Y`Yb
BYfj Ybgh`f`Y`nY][Yb`_`ObbYbž`k Ug`Z0f`X]Y`A cfU`XYg`[YgUa hYb
HYUa g`j cb`[fc»Yf`6YXYi hi b[`]gh"

8Uf0VYf`][`bUi g`gd]Y`h`X]Y`ghfUHY[]gWXY`D`Ubi b[`Y]bY
YbhgWXY]XYbXY`F c``Y``8]Y`@Y[]cb`fY`a 0ggYb`g]W`VY][`fYf
GhfUHY[]Y`b]W`h`bi f`Ui Z]bX]j]Xi Y`Y`@Y]ghi b[Yb`j Yf`UggYbž
gcbXYfb`Ui W`Ui Z`_ccfX]b]YfhYg`Gd]Y`ž`XUg`XYb`Gh`f`Yb`][`fYf
Gd]Y`Yf`fYW`bi b[`hf`[h`8]Y`: `A`][`_Y]hž`gW`bY``Ui ZX]Y`Gh`f`Yb
i bX`GW`k `W`Yb`XYg`[Y[bYf]gW`Yb`HYUa g`ni `fYU[]YfYbž`]gh`Y]b
YbhgWXY]XYbXYf`: U`_hcf`Z0f`X]Y`9fZc`[gW`UbW`b`]b`XYb
j YfV`Y]VYbXYb`Gd]Y`Yb"

GhUh]gh]_Yb`i bX`U`_hi Y``Y`9f[YVb]ggY

@Ui h`XYb`bYi YghYb`GhUh]gh]_Yb`XYf`6UgYVU``6i bXYg`][U`U`hYb
X]Y`i b`hci W`UV`Yg`]b`XYf`V]g`Yf][Yb`GU]gcb`Y]bY`XYf`VYghYb
C ZYbg]j Yb`i bX`Y]bY`gc`]XY`8YZYbg]j Y``8]Y`@Y]ghi b[gghUh]gh]_Yb
nY][Ybž`XUgg`DUXYfVc`fb`Y]bY`GW`U[Xi fW`gW`b]hh]j cb`0VYf`" \$
`U`hi bX`]b`XYb`Y`mhYb`Gd]Y`Yb`Y]bY`Fi b!DfcXi W]cb`j cb
Xi fW`gW`b]hh]W`Z0bZFi bg`dfc`Gd]Y`YffY]W`h`U`h"

9]bY`k Y]hYfY`fY`Yj UbhY`GhUh]gh]_`]gh`X]Y`Ghf]_Yci h!F UHY`XYf`D]hW`Yf"
DUXYfVc`fbg`D]hW`Yf`UVYb`Y]bY`Ghf]_Yci h!F UHY`j cb`0VYf`-`?#
⊕b]b[gž`k Ug`][`bYb`][`Zhž; Y[bYf`YZZ`_h]j`Ui gni gW`U`hYb`"8]YgY
GhUh]gh]_Yb`i bhYfghfY]W`Yb`X]Y`E i U`]h`h`XYf`A UbbgW`UZh`i bX
`UggYb`j Yfa i hYbž`XUgg`X]Y`i b`hci W`UV`Yg`k Y]hYf`][`b`Y]b`k]W`h][Yf
6YghUbXhY]`XYf`D`Umc`Zg`V`Y]VYb`k YfXYb"

⊕`XYf`U`_hi Y``Yb`GYf]Y`[Y[Yb`X]Y`; i [[YbVYf[Yf`@Y[]cb`fY`V`Y]Vh
UVni k UfhYbž`k]Y`X]Y`VY]XYb`HYUa g`Ui ZY]bUbXYf`fYU[]YfYb`i bX
k Y`W`Y`GhfUHY[]Y`j cb`XYb`HfU]bYfb`k Y]hYfj YfZc`[h`k]fX``8]Y
b`W`ghY`6Y[Y[bi b[`]b`DUXYfVc`fb`k]fX`YbhgWXY]XYbX`gY]bž`i a

XYb`J Yf`Ui ZXYf`GYf]Y`ni `VYY]bZi ggYb"

8YhU]`g

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