

DfcU\_h]j Y' < ]`ZY. 'K Y`h\i b[ Yf\ ]`ZY`ghUfhYh  
=b]h]Uh]j Y`ni f'? UhUghfcd\YbdfÀj Ybh]cb

A YhU!6YgWxfY]Vi b[ ./ ei ch/9fZU\fyb'G]Yž'k ]Y`X]Y  
K Y`h\i b[ Yf\ ]`ZY`a ]hj cfUi ggWUi YbXYf'\i a Ub]hÀfyf'< ]`ZY  
Ui Z'9I hfYa k YhhYfYfY][ b]ggY'fYU[ ]Yfh"8]Y'; `cVU"8]U`c[ i Y  
D`UhZcfa `Vf]b[ h'9I dYfhYb`ni gUa a Ybž'i a `bYi Y`5bgÀhnY`ni f  
? UhUghfcd\YbdfÀj Ybh]cb`ni `X]g\_i h]YfYb"9bhXYW\_Yb'G]Y`X]Y  
6YXYi hi b[ `j cb': fØ\k UfbgmgHYa Yb`i bX`c\_U`Yb  
BchZU`d`ÀbYb`ZØf`VYhfcZYbY'; Ya Y]bgWUZhYb`]b`5Zf]\_U  
gØX`]W`XYf'GU\UfU"/ ei ch/

8]Y`K Y`h]gh]a `5`Ufa ni ghUbX.`9I hfYa k YhhYf\_UhUghfcd\Yb  
bY\`a Yb`ni `i bX`hfYZYb`VYgcbXYfg`X]Y`j Yf`Yhn`]W`ghYb`fY[ ]cbYb  
a ]hj c`Yf`K i W`h"8cW`Yg'[ ]Vh`<cZbi b[ `]a `GW`UhhYb`XYf  
? UhUghfcd\Yb"8]Y`K Y`h\i b[ Yf\ ]`ZY`\_ØbX][ h]\fYb  
YbhgWY]XYbXYb`6Y]hfU[ `ni f' ; `cVU"8]U`c[ i Y`D`UhZcfa `cb  
5bh]W]dUhcfm`5Wh]cb `Ub` `Y]b`cW`\_UfÀh][ Yg`HfYZYbž`XUg`j ca `&&"  
V]g`&( "'C\_hcVYf'&\$&( `]b`6Yf`]b`ghUhhZ]bXYb`k ]fX"

<]Yf`\_ca a Yb`X]Y`<Y`XYb`XYf'\i a Ub]hÀfyb`< ]`ZY`ni gUa a Yb`GY]h  
&\$%) `gYhnYb`9I dYfhYb`i bX`9bhgWY]Xi b[ ghfÀ[ Yf`U`Yg`XUfUbž`Y]b  
bYi Yg`NY]hU`hYf`j cfUi ggWUi YbXYf'< ]`ZY`Y]bni `Y]hYb"8]YgY  
D`UhhZcfa `]gh`b]W`hg`k Yb][ Yf`U`g`XYf`9W\_dZY]Yf`ZØf`Y]bYb`YW`hYb  
K UbXY`]a `l a [ Ub[ `a ]h`<i a Ub]hÀh`UbghUhh`ni `k UfhYbž`V]g`X]Y  
? UhUghfcd\Y`ni gW`À[ hž`k ]fX`5; =f5bh]W]dUhcfm; `cVU`=b]h]Uh]j YgŁ  
dfcU\_h]j [ Y\UbXY`h`

9]b`ghfUhY [ ]gW Yf`5bgUhn`ZØf`X]Y`Ni \_i bZh

=a `NYbhfi a `X]YgYg`]bbcj Uh] Yb`Dfc[ fUa a g`ghY`h`X]Y`Bi hni b[  
j cb': fØ\k UfbgmgHYa Yb"8]YgY`Yfa Ò[ `]W`Yb`Ygž`< ]Zga U» bU\`a Yb

VYfY]hg`Y]bni `Y]hYbž`VYj cf`Y]bY`?UhUghfcd\Y`k ]Y`8ØffY`cXYf`:`i h  
]\f`j Yf\YYfYbXYg`K Yf\_`VY[ ]bbh"A Uhh\]Ug`5a `]b[ ž`HYUa `Y]hYf`ZØf  
5bh]W]dUhcfm`5Wh]cb`VY]`XYf`K Y`h\i b[ Yf\`]ZYž`Vf]b[ h`Yg`Ui ZXYb  
Di b\_h` 5`Y]b`]b`5Zf]\_U`\_ØbbhYb`V]g`&\$' \$`V]g`ni`'%%, `A`]'cbYb  
A YbgWXYb`j`cb`\_UhUghfcd\U`Yb`K YhhYfYfY][ b]ggYb`VYhfcZZYb`gY]b"  
K Ybb`k ]f`i a XYb\_Yb`i bX`U\_h]j`ghUhh`fYU\_h]j` \UbXY`bž`gWØhYb  
k ]f`@YVYb`°

8]Y`K Y`h\i b[ Yf\`]ZY`[ Y`h`bcWXY]bYb`GWf]hh`k Y]hYf`°Ni`\_ØbZh][  
k ]fX`g]Y`]b`bYi b`@AbXYfb`5Zf]\_Ug`gØX`]W`XYf`GU\UfU  
Cf[ Ub]gUh]cbYb`ni a`5i ZVUi`gc`]XYf`:`fØ\k UfbgmghYa Y`i bX  
BchZU`d`AbY`i bhYfghØhYb`"8YfYb`N]Y`.`A YbgWXYb`j cf`XYa  
<i b[ YfhcX`VYk U`fYb`°

< ]`ZgU\_h]cbYbž`X]Y`@YVYb`fYhhYb

Gc`\_cbbhY`X]Y`K Y`h\i b[ Yf\`]ZY`[ Ya Y]bgUa`a`]h`DUfhhYfb`k ]Y  
<cdY`FYghcfUh]cb`Gci h\`Gi XUb`]a`GØXgi XUb`ØVYf`%"\$\$\$\$`:`Ua`]'Yb  
]b`DUbm]`Uf`7ci bhm`a`]h`Xf]b[ YbX`VYbØh][ hYb`<]`Zg[ ØhYfb  
i bhYfghØhYb`"6Uf[ Y`Xž`D`UbYbž`Gc`Uf`Ua`dYb`i bX  
<m[ ]YbYa`UhYf]U`]Yb`k UfYb`XUVY]`b]W`h`bi f`YVYbgk ]W`h][ ž  
gcbXYfb`Ui W`Y]b`gma`Vc`]gWYf`5\_h`XYf`Gc`]XUf]h`h`°

8cW`XUa`]h`b]W`h`[ Ybi [ `°`#`G]a`VUVk Y`\UVYb`X]Y`<Y`ZYf  
K UggYf`Y]hi b[ Yb`]bghU`]Yfhž`i a`(`(\$`:`Ua`]'Yb`]b`XYf  
8ØffY`\_UhUghfcd\Y`XYb`Ni [ Ub[ `ni`K UggYf`ni`g]WXYfb`"Ni XYa  
k i fXYb`J ]Y\]a`dZ`b[ Yb`Xi fW [ YZØ\fhž`i a`X]Y`@YVYbg[ fi bX`U[ Y  
XYf`<]fhYb`ni`gWØhYb`i bX`XYfYb`H]YfY`j cf`XYa`J Yf\i b[ Yfb`ni  
VYk U`fYb`°

⇒a`FUa`Yb`XYf`:`;`cVU`8]U`c[ i Y`D`UhZcfa`k ]fX`X]Y  
K Y`h\i b[ Yf\`]ZY`a`]h`Y]bYa`VYY]bXfi`W\_YbXYb`BYh`k Yf`\_j`cb  
9l`dYfhYb`i bX`DUfhhYfb`Ui`g`8Yi`hgW`UbXž`A`cgUa`V]\_ž`B][ Yf]Už  
Gca`U`]U`i bX`G]a`VUVk Y`ni`gUa`a`YbUfVY]hYbž`i a`X]Y`J`cfhY]`Y  
j`cfUi`ggW`Ui`YbXYf`A`U»bUa`Yb`ZØf`U`Y`g]W`hVUf`ni`a`UWXYb`°

⇒hYfj ]Yk`g`a`]h`A`Uhh\]Ug`5a`]b[ `gck ]Y`J`YfhfYhYfb`i`bgYfYf  
DUfhhYfcf[ Ub]gUh]cbYb`g]bX`Ui`Z`5bZfU[ Y`a`Ø[ `]W`"i`bX`ZØf`U`Y`ž`X]Y

XYb`k U\fyb`9fbgh`XYf`@U[ Y`j YfghY\Yb`k c`Yb.`5\_hi Y`Yg  
6Yk Y[ ha UHYf]U`Ui g`G]a VUVk Y`ghY\h`ni f`J YfZØ[ i b[ °

: Øf`k Y]hYfY`ϕZcfa Uh]cbYb`i bX`5\_h]cbYb`VYgi W\Yb`G]Y`X]Y  
K YVg]hY`XYf`K Y`h\i b[ Yf\`ZY`i bhYf  
k k k "k Y`h\i b[ Yf\`ZY`"XY#dfYggY" `GY]Yb`G]Y`HY]`X]YgYf  
fYj c`i h]cb`ÅfYb`ϕ]h]Uh]j Yž`X]Y`XUg`6`Uhh`]a `?Ua dZ[ Y[ Yb`<i b[ Yf  
i bX`Bch`k YbXYh`

8]Y`K Y`h\i b[ Yf\`ZY.`Y]bY`XYf`[ fØ» hYb`i bX`i bUV\`Åb[ ]] ghYb  
Cf[ Ub]gUh]cbYb`8Yi hgW\`UbXgž`X]Y`ZØf`Y]bY`K Y`h`c\`bY`<i b[ Yf  
\_`Åa dZh` `a i h][ ž`Yb[ U[ ]Yfhi bX`c\`bY`?ca dfca ]ggY`

8YhU]`g

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