

6]hWc]b'6i ``7\Ua Uh\ 'DU']\ Ud]h]mU  
VY\ Ui d hY hz' ? fmd hc 'gY]' ]b'5a Yf]\_U'hc h

7\Ua Uh\ 'DU']\ Ud]h]mUž'A cXYfUhc f'XYg'VY`]YVhYb'DcXWUghg'  
5``'b' i bX'YfZU\ fYbYf'F ]g]\_c\_Ud]hU'[ YVYfz'[ 'Ui Vh'gY]h  
'Ub[ Ya 'Ub'† b[ Y' l bhYfbY\ a Yb' i bX'5b`]Y[ Yb'"K Å\ fYbX  
gY]bYf'? Uff]YfY '\Uh'DU']\ Ud]h]mU' ]b'YfZc`[ fY]WXY  
l bhYfbY\ a Yb'k ]Y'G'UW\_ i bX'MJa a Yf' ]bj Ygh]Yfh" 'b'XYb  
'YhnhYb' > \ fYb '\Uh'g]W\ 'DU']\ Ud]h]mU'ZØf'6]hWc]b' i bX'gY]bYb  
A UfgW\ 'Ui Z&\$\$"\$\$\$]b'XYf'K Y'h'XYf'F ]g]\_c\_Ud]hU'[ YVYf  
Y]b[ YgYhnh" '9f'k Uf' ]b'XYb'5bZAb[ Yb'Ui W\ 'Y]b'Y]hYbXYf  
5b[ YghY``hYf'VY]': UWVcc\_žk Y]h'YbhZYfbh'j cb'gY]bYb  
HYYbU[ Yf'U\ fYbž'X]Y'Yf'VY]'6i f[ Yf'? ]b[ 'j YfvfUW\ h'\Uh"  
FY[ i `]Yfi b[ gVY\ ÒfXYb 'VfYa ghYb'K UW\ ghi a 'K ]Y'7B67  
VYf]W\ hY hz' XfØW\_hY 'DU']\ Ud]h]mU'gY]bY'9bhhÅi gW\ i b[ 'ØVYf  
XYb'U\_hi Y``Yb'Ni ghUbX'XYf'? fmd hc]bXi ghf]Y'Ui g"@Ui h  
DU']\ Ud]h]mU``Y[ h'X]Y'Ni \_i bZij cb'? fmd hc'k cUbXYfgž  
/ Ua d^Y``d/



7\Ua Uh\ 'DU']\ Ud]h]mUž'A cXYfUhc f'XYg'VY`]YVhYb'DcXWUghg' 5``'b'  
i bX'YfZU\ fYbYf'F ]g]\_c\_Ud]hU'[ YVYfz'[ 'Ui Vh'gY]h'Ub[ Ya 'Ub'† b[ Y  
l bhYfbY\ a Yb' i bX'5b`]Y[ Yb'"K Å\ fYbX'gY]bYf'? Uff]YfY '\Uh

DU`]\Ud]h]mU`]b`YfZc`[ fY]WXY`I bhYfbY\`a Yb`k ]Y`G`UW`i bX`MUa a Yf  
]bj Ygh]Yfh" `b`XYb`YhnhYb`X\`fYb`\`Uh`g]WXY`DU`]\Ud]h]mU`ZØf`6]hWc`]b  
i bX`gY]bYb`A UfgWXY`Ui Z`&\$\$"\$\$\$\$]b`XYf`K Y`h`XYf  
F]g]\_c`\_Ud]hU`[ YVYf`Y]b[ YgYhnh"

9f`k Uf`]b`XYb`5bZAb[ Yb`Ui WXY`Y]b`Y]hYbXYf`5b[ YghY`hYf`VY]  
: UWVcc`\_ž`k Y]hYbhZYfbhj`cb`gY]bYb`HYbU[ Yf`U\`fYbž`X]Y`Yf`VY]  
6i f[ Yf`?]b[ `j YfvfUW`h`\`Uh"

## F Y [ i ` ]Yfi b [ gVY \ ÒfXYb `VfYa ghYb `K UW`ghi a

K ]Y`7B67`VYf]WXYhž`XfØW`hY`DU`]\Ud]h]mU`gY]bY`9bhhAi gW`i b[  
ØVYf`XYb`U`\_hi Y`Yb`Ni ghUbX`XYf`? fmdhc`]bXi ghf]Y`Ui g" `@Ui h  
DU`]\Ud]h]mU`Y[ h`X]Y`Ni `i bZij`cb`? fmdhc`k`cUbXYfgž`k Ug  
\`Ui dhg`W`]WXY`Ui ZX]Y`A U» bU\`a Yb`XYf`5i Zg]W`hgVY\`ØfXYb  
ni fØW`ni ZØ\`fYb`]gh"

? fmdhc`]gh]b`5a Yf]\_U`hc`h" `; Ybg`Yf`\`Uh`gc[ Uf`? fmdhc`ZØf`X]Y  
6Ub`\_Yb`\_f]gY`j YfUbhk`cfh]WXY`[ Ya UW`h"8]Y`I G!6Y\`ØfXYb`\`UVYb  
]\`fY`K UZZYb`ZYgh`Ui Z`? fmdhc`fi bhYfbY\`a Yb`E`[ Yf]WXYh`G]Y`k UfYb  
k U\`fgWXY]b`]WXY`X]Y`Yb][ Ybž`X]Y`XUg`9ghUV`]g\`a Ybh`Ua`a`Y]ghYb  
VYXfc`\`hYb" `I bX`g]Y`k UfYb`X]Y`Yb][ Ybž`X]Y`ž`i`a`XYb  
F Y [ i ` ]Yfi b [ gVY \ ÒfXYb ` [ Y [ YbØVYf`ZU]f`ni`gY]bž`X]Y` ; fYbnYb`a`Y\`f  
U`g`YXYf`UbXYfY`GY`\_hcf`XYf`GhUfh`i`d!²`\_cbca`]Y`j YfgW`cVYb  
\`UVYb"

7\`Ua`Uh`\`DU`]\Ud]h]mU" `: ]bUbW]U`H]a`Yg

⇒ a a Yf`bcWXY`Y]b` ; `Ai V][ Yf

C V k c`\`DU`]\Ud]h]mU`gY]bY`6YghØfni b[ `ØVYf`XYb`U`\_hi Y`Yb`GhUbX  
XYf`8]b[ Y`ni`a`5i`gXfi`W`\_ [ YVfUW`h`\`Uhž`\`Uh`Yf`XYi`h]WXY`[ Ya UW`hž  
XUgg`Yf`]a`a`Yf`bcWXY`Ub`6]hWc`]b`i bX`? fmdhc`k`Å\`fi b[ Yb`]a  
5`[ Ya`Y]bYb`[ `Ui`Vh"

8 Ug`ni`\_ØbZh][ Y`K UW`ghi`a`XYf`6fUbWXY`Y`Y[ h`YXcWXY`k`cUbXYfgž  
gY]Yg`]b`9i`fcdUž`5g]Yb`cXYf`XYf`[ UbnYb`K`Y`hž`Y]bY`A`Y]bi`b[ ž`X]Y  
Ui`W`j`cb`fYdi`V`\_]Ub]gWXYb`5b\`Ab[ Yfb`k`]Y`XYa`J`cfg]hnYbXYb

XYg: ]bUbW]U`GYfj ]Wg'7ca a ]hhYYž'DUhf]W\_`A Wk Ybfmž [ YÄi » Yfh  
k ]fXž'XYf'XYb'G97!J c f g]hnYbXYb'; Ufm; Ybg`Yf'k Ä\fybX`Y]bYf  
5i ggU[ Y'j c f`XYa `?cb[ fYgg`VYgW]a dZhY`"

F Y [ i `]Yfi b [ `Xi fW `8i fW gYhni b [ `]gh'k YXYf`Ui gfY]WXYbX`bcW  
bUW \U`h][ " G]Y`VYghfUZYb`8][ ]hU`!5ggYh!: ]fa Yb`XUZØfž`XUgg`g]Y  
g]W `Ub[ YV`]W `b]W`h`Ub`XUg'; YgYhn`\U`hYbž`cVkc`\`g]Y`b]W`h  
k ]ggYbž`XUgg`Yg`ZØf`g]Y` [ Y`hYb`k ]fXž`fl `Ł`bcj Uh]cbYb`]a `5i g`UbX  
j c fUbhfY]VYb`i bX`X]Y`Ua Yf]\_Ub]gWXY`K YhVYk YfVgZÄ\][ \_Y]h  
[ YZÄ`fXYb"

æ ; Y [ Ybni [ ` \Uh; Ybg`Yf`VYgW`cggYbž`Ub`gY]bYb`K UZZYb  
ZYghni \U`hYb`i bX`a Y`f`A ]hY`ni `VYUbfU[ Ybž`i a ` XYb`k ]XYb  
K YghYbž`XYf`?fmdhc`]gh ž`ni `ØVYfk UWXYb"

8]Y': c` [ Yb`XYf`A U» bU`a Yb`XYf`G97`nY]W`bYb`g]W`VYfY]hg`UVž`XU  
: ]fa Yb`k ]Y`7c]bVUgY`i bX`6]hfhYI `Ub[ YV`]W`XUa ]h`VY[ cbbYb  
\UVYbž`BchZU`d`ÄbY`ZØf`Y]bYb`l a ni [ `]bg`5i g`UbX`ni `YfghY`Yb"

6Y]XY`l bhYfbY`a Yb` `k ]Y`Ui W`i bnÄ`\`][ Y`UbXYfY`l bhYfbY`a Yb  
]b`XYf`6fUbWY` `UVYb`k ]YXYf`c`h]\fYb`K ]`Yb`VY`i bXYhž  
\_cbZcfa `ni`gY]b`i bX`g]W`XYf`[ fØ» YfYb`K Y`h`XYf  
: ]bUbnX]Ybgh`Y]ghi b [ Yb`U`g; `Y]W`VYfYW`h][ hY`Ubni`gW`]Y» Yb"  
@Y]XYf`\_ØbbYb`g]Y`c`bY`\_`Uf`XYZ]b]YfhY'; YgYhnY`]b`6Yni [ `Ui Z  
?fmdhc`k Ä`fi b [ Yb`\_Y]bY`j c`ghÄ`bX][ Y`9]b`U`hi b [ ` [ Yk Ä`f`Y]ghYb"

...

8YhU]`g

6Ygi WXYb`G]Y`i bg`Ui Z.`\_fmdhc!bYk`g"Uh