

G]W\ YfY`X]f`XUg`dYfZY\_hY`HUhhcc.`=b\_`UVg  
]b`8fYgXYb`V]YhYh`9I`dYfhYbVYfUhi`b[

/`ei`ch/9fZU\ fYž`k`Ufi`a`Y]bY`Z]`bX]YfhY`F`YW\YfW\Y`i`bX  
i`bUV\`Äb[ ] [ Y`6YfUhi`b[ `VY]`XYf`K`U\`XY]bYg`HÄhck`]YfYfg  
Y`bhgW\Y]XYbX`g]bX" `=b\_`UVg`V]YhYh`Ni` [ Ub[ `ni`ØVYf" `\$\$  
Yfgh\_`Ugg][ Yb`?`Øbgh`Yfb`i`bX`\`]`Zh`X]fž`XUg`dYfZY\_hY`HUhhcc`ni  
Z]bXYbž`XUg`XY]bYb`J`cfghY``i`b[ Yb`Y`bhgdf]W\h" `J`Yfa`Y]XY  
: Y\`Y`bhgW\Y]Xi`b[ Yb`i`bX`a`UW\Y`XY]b`HUhhcc`ni`a  
?`i`bghk`Yf`\_/`ei`ch/

<`Ugh`Xi`g`W\cb`a`U`XUfØVYf`bUW\`[`YXUW\hž`Y]b`HUhhcc`gh`YW\Yb`ni  
`UggYb3`J`]Y`Y`A`YbgW\Yb`hfÄi`a`Yb`XUj`cbž`\fY`<`Ui`h`a`]h  
Y]bn][`Ufh][`Yb`?`i`bghk`Yf`\_`Yb`ni`j`Yfn]YfYb" `8`cW\`X]Y`K`U\`XYg  
f]W\h][`Yb`HÄhck`]YfYfg`]gh`Y]bY`Y`bhgW\Y]XYbXY`9`bhgW\Y]Xi`b[ `"]`J`]Y`  
ni`c`Zh`Y`bhgW\Y]XYb`g]W\`i`bYfZU\`fYbY`DYfgcbYb`ZØf`XYb  
bÄW\gh[`Y`Y[`YbYb`?`Øbgh`Yf`i`bX`UbXYb`XUbb`j`]Y`Y]W\h`VY]  
Y]bYa`9f[`YVb]gž`XUg`g]Y`]\f`@YVYb`Ub[ `VYfYi`Yb" `<`]Yf`\_`ca`a`h  
=b\_`UVg`]bg`Gd]Y`

A`Ub[`Y`bXY`F`YW\YfW\Y`i`bX`f]g\_`UbhY`9`bhgW\Y]Xi`b[`Yb`g]bX`XUg  
F`YnYdh`ZØf`Yb`hÄi`gW\hY`9fk`Ufhi`b[`Yb" `I`a`XYa`j`cfni`VYi`[`Ybž`\`Uh  
=b\_`UVg`Y]bY`]bbcj`Uh]j`Y`@Ögi`b[`Y`bhk`]W`\_`Y`h`I`bUV\`Äb[ ] [ Y  
6YfUhi`b[ `i`bX`XYf`Ni` [ Ub[ `ni`Y]bYa`]bhYfbUh]cbU`Yb`BYhmk`Yf\_  
hU`Ybh]YfhYf`HÄhck`]YfYf" `Gc`k`]fX`XUg`HUhhcc`ni`Y]bYf":`cfa`XYf  
?`i`bghž`X]Y`b]W\h`bi`f`[`i`h`Ui`gg]Y\`hž`gcbXYfb`Ui`W\`ZØf`]a`a`Yf`V`Y]Vh`

8]Y` ;` YZU\`fYb`Y]bYf`i`bØVYf`Y[`hYb`K`U\`

J`]Y`Y`V`YbXYb`X]Y`F`]g]\_`Yb`Ui`gž`k`Ybb`g]Y`ni`a`YfghYb`A`U`ØVYf`Y]b  
HUhhcc`bUW\XYb`\_`Yb" `=b`]\fYf`I`b`\_`Yb`bh]g]j`Yf`UggYb`g]Y`g]W\`V`]bX  
Ui`Z`XYb`YfghYb`HÄhck`]YfYfž`XYf`]b`G]W\`hk`Y]hY`]gh" `9]b`[`YZÄ`\`f`]W\Yg  
Gd]Y`ž`XYbb`XUg`HUhhcc`]gh`ZØf`]a`a`Yf`c`Zh`ZY`\`h`Y]bZUW\`XUg`b`Öh][`Y

K ]ggYb`ØVYf`Gh]f]W\hi b[ Ybž`HYW\ b]\_Yb`i bX`X]Y : Å\][ \_Y]hYb`XYg  
?Øbgh`Yfg"8 UVY][ ]Vh`Yg`gc`j ]Y`Y`A Ò[ `]W\ \_Y]hYbž`i bX`i a ` ]\fY  
J c fgh`Y`i b[ Yb`dYfZY`\_h`i a ni gYhnYbž`]gh`Y]bY`Z bX]YfhY  
9bhgW\Y]Xi b[ `i bYf`Ägg`]W\ "

⇒ \_`UVg`V]YhYhgY]h`ØVYf`UW\h`X\ fYb`XYb`?i bXYb`[ YbUi `X]YgY  
l bhYfghØhni b[ "A ]h`Y]bYf`Xi fW\gW\ b]h`]W\Yb` ; cc[ `Y!6Yk Yfhi b[  
j cb`( ž `]gh`bUW\ ni j c`n]Y\Ybž`k ]Y`j ]Y`Y`A YbgW\Yb`VYfY]hg`j cb  
]\fYa ` : UW\k ]ggYb`dfcZ]h]Yfh`\UVYb` , VYf`) "\$\$\$`ni Zf]YXYbY  
?i bXYb`\_ØbbYb`VYfY]hg`Ui Z?i bghk Yf`\_Y`V`]W`Ybž`X]Y`Xi fW\  
gc f[ Z`h][ Y`5i gk U\`XYg`?Øbgh`Yfg`Yb`hghUbXYb`g]bX"8 Ua ]h`k ]fX  
YXYg`HUhhcc`ni f`]bX]j ]Xi Y`Y`b`?i bghZcfa` °

⇒ bX]j ]Xi Y`Y`6YfUhi b[ `ZØf`XY]b`HfUi a hUhhcc

8]Y`Gi W\Y`bUW\`XYa`dYfZY`\_hYb`HÅhck ]YfYf`a`i gg`b]W\h`k ]Y`Y]b  
@chYf]Ygd]Y`gY]b" ⇒ \_`UVg`\Uh`Y]bYb`Xi fW\XUW\hYb`DfcnYgg  
Yb`h ]W`Y`hž`XYf`Yg`Yfa Ò[ `]W\hž`XYb`f]W\h][ Yb`?Øbgh`Yf`ZØf`YXYg  
Dfc`Y`\_h`ni `Z]bXYb`"G]Y`UfVY]hYb`XUVY]`b]W\h`bi f`bUW\  
J YfZØ[ VUf`\_Y]h`i bX`DfY]gž`gcbXYfb`df]cf]g]YfYb`Ui W\`X]Y  
\_Øbgh`Yf]gW\Yb` : Å\][ \_Y]hYb`i bX`X]Y`dUggYbXY`Gh]f]W\hi b[ `XYg  
HÅhck ]YfYfg" `Gc`\_Ubbgh`Xi`g]W\Yf`gY]bž`XUgg`XY]b`Ni`\_i bZhgl`HUhhcc  
[ Ubn`bUW\`XY]bYb`9fk Ufhi b[ Yb`i a [ YgYhnh`k ]fX"

A ]h`Y]bYa`BYhmk Yf`\_j cb`ØVYf` "\$\$]bhYfbUh]cbU`Yb`?Øbgh`Yfbž`X]Y  
g]W\`Ui Zj YfgW\]YXYbY`Gh`Y`j cb`fYU`]gh]gW\Yb`Dcfhf`Åhg`V]g`\]b`ni  
Z][ ]fUbYb`[ Yca`Yhf]gW\Yb`A`i ghYfb`gdYn]U`]g]Yfh`\UVYbž`]gh`X]Y  
5i gk U\`f]Yg][ "J cb`XYf`YfghYb`6YfUhi b[ `V]g`ni f`BUW\gc f[ Y  
VY[ `Y]hYh`⇒ \_`UVg`X]Y`?i bXYb`Xi fW\`YXYb`GW\ f]h`8Y]b`HUhhcc  
k ]fX`b]W\h`bi f`Y]b`?i bghk Yf`\_ž`gcbXYfb`Ui W\`Y]bY`Ub[ `YV][ Y  
9f]bbYfi b[ ž`X]Y`]a`a`Yf`ZØf`X]W\`gdf]W\h`

A UW\`GW\`i gg`a ]h`XYf`l b[ Yk ]gg`Y]h`i bX`ØVYf`UggY`XY]b  
HUhhcc`b]W\h`XYa`Ni ZU` ``@Ugg`X]W\`j cb`9l dYfhYb`VYfUhYb  
i bX`j Yfk UbX`Y`XY]bY`<Ui h`]b`Y]b`?i bghk Yf`\_`J YfY]bVUfY  
Yhnh`Y]bYb`HYfa ]b`ZØf`Y]b`J cf[ Ygdf`ÅW\`VY]`⇒ \_`UVg`8 Ug  
@YVYb`]gh`ni`\_i fn`ZØf`a ]hhY`a`Å»][ Y`HUhhcc`g`°

8YhU]g

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