

HY`Y_ca `Yfk Y]hYfh'A cV]`Zi b_bYhn.
6YggYfY `J YfV]bXi b[`]a `8U\ a Y!
GdfYYk U`X

8]Y`HY`Y_ca `U`h`X]Y`A cV]`Zi b_j Yfgcf[i b[`]a `@UbX_fY]g
8U\ a Y!GdfYYk U`X`j YfVYggYfh`A]h`b`Yi Yb`@H9!`i bX`); !
GhUbXcfhYb`]b`; fc» `?`Òf]g`i bX`K]`XUi `Yf\`Ò`h`g]W`X]Y
6UbXVfY]hY`i bX`XYf`9a dZUb[`]b`; YV`Ài XYb`"6]g`&\$`*`g]bX
k Y]hYfY`5i gVUi dfc`Y`_hY`[Yd`U`b`h`z`i a `X]Y`9ffY]W`V`Uf`_Y]h`i bX
J Yfgcf[i b[`Ub`Y`b`hg`W`X]Y`X`Y`b`X`Y`b`GhUbXcfhYb`ni`c`d`h]a]YfYb`"
9fZU\ fYb`G]Y`a Y`f`Ø`V`Y`f`X]Y`9`b`h`k]W`_i b[Yb`i bX`X]Y
_ØbZh][Yb`D`À`b`Y`"



A cV]`Zi b_!FYj c`i h]cb`ja` <YfnYb`j cb`8U\`a Y!GdfYYk U`X`°

8]Y`HY`Y`_ca` \`Uh`]b`Y]bYa` `VYY]bXfi W`YbXYb`HYa dc`X]Y
A cV]`Zi b`_UbXgW`UZh`ja` `@UbX`_fY]g`8U\`a Y!GdfYYk U`X`
Ui Z[Ya`]gW`h` `⊕`XYb` ``YmhYb` `nk Y]`A cbUhYb` `k i fXYb` `b]W`h`bi f
bYi Y`@H9!GhUbXcfhY` `U`_hj]Yfhž`gcbXYfb` `Ui W` `Y]b
ni` _i bZh`gk Y]gYbXYf` `) ; !GhUbXcfhY]b[Yf]W`hYhž`XYf` `X]Y` `F Y[]cb
hYW`b]gW` ` \`cW`fØghYh` `8]Y` `6Yj Ò`_Yfi b[` _Ubb` `g]W` `ØVYf` `Y]bY

Zcfa]XUV`Y`J YfVYggYfi b[`XYf`B YhnUVXYW_i b[`ZfYi Yb`

⇒ `8YhU]`\\Y]» h`XUg. `X`hnh`gi fZYb`X]Y`A YbgWXYb`]b` ; fc» `?`Ōf]g`i bX
K]`XUi`]a` `gWk bY`Ya` `BYhn`6YgcbXYfg`YfZfYi` `]Wk`]ghž`XUgg`X]Y
bYi`Y`⇒bZfUghfi`_hi`f`Yb`h`Ub[`XYf`ghUf`_VYZU\`fYbYb`5i`hcVU\`b`5%\$
i`bX`XYf`ghfUhy[]gWk`k`]Wk]h[Yb`6U\`bghfYW_Y`6fUbXYbVi`f[!GØX`ZØf
j`Y`Y`DYbX`Yf`XYb`5`hU[`Yf`Y]Wk`hYfh`8]Y`NY]hYbž`]b`XYbYb`a` Ub
a`]hYb`]a` ; YgdfÅWk`j`ca` `BYhn`[YhfYbb`h`k`i`fXYž`g]bX`bi`b`j`c`fVY]`

B UWk \ U`h][Yf`B Yhn! 5i`gVUi

`8Yf`6YXUfZ`Ub`6UbXVfY]hY`b]a` a`highÅbX][`ni` ` `fi`bX` ` \$`DfcnYbh
dfc`X\`f`ž`XUg`Yf`_`Åfh;` Ycf[`j`cb`K`U[`bYfž`l`bhYfbY\`a` YbggdfYWkYf
XYf`8Yi`hgWkYb`HY`Y`_ca`ž`_Uf`i`bX`XYi`h]Wk`"8Yf`hYWkbc`c[]gWkY
:`cfhgWk]f]h`Zc`fXYfh`gY]bY`F`c`Y`Y]bž`i`bX`X]Y`HY`Y`_ca` ` []Vh`_f`ÅZh][
;`Ug`VY]a` `A`cV]`Z`b`_Ui`gVUi` ` `i`bX`XUg`gWk`bY` `⇒`a` `@UbX`_fY]g
8U\`a` Y!GdfYYk`U`X`g]bX`Y`hnh`VYfY]hg`VYY]bXfi`W`_YbXY`%&%
A`cV]`Z`b`!`GhUbXcfhY`]b`6Yhf]YVž`XUg`a` UWk`hY]bY`b`U\`Yni
ZÅWkYbXYW`_YbXY`<`Ui`g\`U`hgUVXYW_i`b[`j`cb`%\$`\$`DfcnYbh`a` Ō[` `]Wk`

5VYf`XUg`]gh`bc`Wk`b]Wk`h`U`Yg. `6]g`&\$`*`gc`Y`b`k`Y]hYfYž`ghfUhy[]gWk
d`Uhn]YfhY`(`%`GhUbXcfhY` \]bni`_ca`a`Ybž`i`bX`Ub`g]YVYb
Ui`g[Yk`Å`hYb` :`i`b`_a` UghYb`k`YfXYb`9fk`Y]hYfi`b[Yb`a`]h`bYi`YghYf
@H9!`cXYf`);`!HYWkbc`c[]Y`[Yd`Ubh`8]Y`HY`Y`_ca` `]gh`VYfY]hž` \f
BYhn`_cbh]bi`]Yf`]Wk`ni`c`dh]a`]YfYbž`XUa`]h`X]Y`Bi`hYf`]b`XYf`FY[]cb
b]Wk`h`bi`f`gWk`bY`ž`gcbXYfb`Ui`Wk`ni`j`Yf`Ågg][` _ca`a`i`b]n]YfYb
_ŌbbYb"

<]YfVY]`_ca`a`h`XYf`Ni`gUa`a`YbUfVY]h`a`]h`XYb`?`ca`a`i`bYb`Y]bY
Yb`hgWkY]XYbXY`F`c`Y`ni`"8]Y`HY`Y`_ca` `gi`Wk`highYhg`b`UWk`bYi`Yb
: `ÅWkYbž`i`a` `X]Y`BYhn]bZfUghfi`_hi`f`k`Y]hYf`Ui`gni`VUi`Yb`"K`Yf`U`gc
Y]bY`[YY][`bYhY` : `ÅWkY`ZØf`Y]bYb`8UWk!`cXYf`A`Ugh!GhUbXcfh`ni`f
J`YfZØ[i`b[`ghY`Y`b`_Ub`b`ž`k`]fX`Ui`Z[Yfi`ZYbž`g]Wk`X]fY`h`Ub`X]Y
8Yi`hgWkY` :`i`b`_hi`fa` `ni` `k`YbXYb`"9g[Y\`h`gWk`]Y»`]Wk`i`a` `X]Y
Ni`_i`bZi`XYg`A`cV]`Z`b`_g]b`8U\`a` Y!GdfYYk`U`X`

: `YI`]VY` `i`bX`⇒b`Zcfa`Uh]c`b`gfY]Wk

BYi []Yf][[Yk cfXYbž'cV' Æf'K c\bcfh'YVYbZU`g'j cb'XYb
J YfVYggYfi b[Yb'dfcZ]h]Yfh3'Y]b'DfcV'Ya '': Øf'a Y\ f
ÆZcfa Uh]cbYb'ØVYf'X]Y'j YfZØ[VUFY'A cV]'Zi b_] Yfgcf[i b[']'b' ÆfYf
BÀ\Y'_ÒbbYb' ÆhYfYgg]YfhY'Y]bZUW'X]Y'K YVgY]hY'XYf'HY'Y_ca
VYgi WXYb" '8cfh]gh'U`Yg'_ca df]a]Yfhž'gcXUgg'YXYf'gWYbY`
YfZÀ\fhž'cV'Yf'cXYf'g]Y'gWYbY`Yg' ÆhYfbYh'ni f'J YfZØ[i b['\UH"

8]Y'HY'Y_ca]gh'a]h'a Y\ f'U'g' ' *"\$\$\$'A cV]'Zi b_ghUbXcfhYb
Vi bXYgk Y]h[Ubn'j cfbY'Ui Z'XYa 'A Uf_h' 'Ä\ f]WY'_ca a Yb
bcWY a U`g'Yhk U'%) \$\$'bYi Y'\]bni "'9]b'YW hYf': cfhgWY f]h'ZØf'U`Yž
X]Y']b'XYf'X][]hU'Yb'K Y'h'a]h\U'hYb'k c`Yb°

8YhU]`g

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