

GWk YfYf'I bZU``']b'; fc» 'BcfXYbXY. 6Yhfi b_YbYf': U\fYf'j Yf`Yhnh'g]Wk 'gWk Yf

 $GhUf_{U}_{c}(c)^{g}YfhYf^{*}&\%! \ A^{f}[Yf^{0}VYfgWA^{h}[h^{*}g]WA^{h}]b^{*}; fc \ BcfXYbXY^{a}]h^{*}D_{k} \ "^{G}WAkYf^{h}Yf^{Y}hnh^{*}]bg^{*}?^{h}b]_{i} \ a^{h}[YVfUWAh^{h}]bg^{*}$

\$%"\$, "&\$&(` `%(.&*

 $^{\circ}$ Dc $^{\circ}$]nY]X]fY_h]cb $^{\circ}$ 6UX $^{\circ}$ GY[YVYf[$^{\circ}$

JYf_Y\fgi bZU```]b'; fc» 'BcfXYbXY.
5`_c\c`Y]bZ`i gg'ZØ\fh'ni 'gW\k YfYa 'I bZU``

; fc» 'BcfXYbXY'fbhgŁ

9]b 'gWk YfYf'l bZU```a]h'k Y]hfY]WX Yb XYb ? cbgYei YbnYb

± XYf B UW hini a '%" 5i [i gh & & ('_Ua 'Yg']b 'XYf 8 cf Zghf U "Y'j cb; fc "B cf XYb XY 'ni 'Y]b Ya 'Yf \YV`]W Yb 'J Yf _Y\fgi b ZU``ž'XYf 'b]W h bi f 'X]Y 'VYhf c ZZYb Y 'DYfg cb ž'g cb XYfb 'Ui W 'X]Y '[YgUa hY; Ya Y]b g W \UZh 'Ui Zg W \f Y W Yb '_Obbh Y " 8 Yf '& %! 'À\f][Y : U\f Yf 'Ui g I YhYf g Yb 'k Uf 'gh Uf _'U`_c\c`]g]Yfh ž'U`g 'Yf a]h 'g Y]b Ya 'V`Ui Yb 'J K Dc`c`]a 'Ni g Ua a Yb \Ub['a]h 'Y]b Ya '[YZÀ\f`]W Yb : U\f j Yf\U`h Yb g W k Yf j Yfi b[`Ø W h Y "

8Yf < Yf[Ub[XYg]bZU``g

; Y[Yb`\$\$.&) `I \f`Z \f`XYf`^ b[Y`A Ubb`]b`F]W\hi b[`I YhYfgYb"` \pm b

Y]bYf'@]b_g_i fj Y'j Yf`cf`Yf`X]Y'?cbhfc``Y'ØVYf`gY]b:: U\fnYi [ž [Yf]Yh'j cb`XYf`GhfU» Y'UV'i bX'_c``]X]YfhY'a]h'Y]bYa '6Ui a 'gck]Y Y]bYa 'Ghfca _UghYb"' \(\dagger \text{XYf}: c`[Y'ØVYfgW\text{`i ['g]W\text{XUg'5i hc'i bX} \] _Ua '`Yhnh`]W\text{`Ui Z'XYa '8UW\text{`ni a '@}Y[Ybž'k cVY]'Yg'bcW\text{`[Y[Yb Y]bYb'NUi b'fi hgW\text{hY"}

5'_c\c'Y]bZ'i gg'i bX'gWk YfY'J Yf'Yhni b[Yb

 $8]Y `Dc`]nY] `ghY``hY`Ui Z[fi bX`XYg`XYi h`]WXYb`5hYa U`_c\c`[Yfi WXg i bX`XYf`i b_`UfYb`5i ggdfUWXY`XYg`: U\fYfg`gWXbY```ZYghž`XUgg X]YgYf`i bhYf`XYa `9]bZi gg`j cb`5`_c\c``ghUbX"`9]b`Xi fWX[YZØ\fhYf HYgh`Yf[UV`Y]bYb`YfgWXfYW_YbX`\c\Yb`5`_c\c`k Yfh'j cb`&ž, Dfca]``Y"`5i Z[fi bX`gY]bYf`gWXk YfYb`J Yf`Yhni b[Yb`k i fXY`XYf : U\fYf`]b`XUg`?`]b]_i a `D]bbYVYf[`[YVfUWXhž`k À\fYbX`Y]b GhfUZ] YfZU\fYb`[Y[Yb`]\b`Y]b[Y`Y]hYh`k i fXY"$

8]Y 6YXYi hi b['XYg'J cfZU``g'ZØf'X]Y ; Ya Y]bgWX UZh

Gc`WXY'JcfZÀ``Y'\UVYb'b]WXh'bi f'5i gk]f_i b[Yb'Ui Z'XYb 6YhfcZZYbYbž'gcbXYfb'Ui WX'Ui Z'X]Y'[YgUa hY'; Ya Y]bgWXUZh'j cb; fc» 'BcfXYbXY'''G]Y'Yf]bbYfb'Ub'X]Y'; YZU\fYb'XYg': U\fYbg'i bhYf 5`_c\c`Y]bZi gg'i bX'X]Y'JYfUbhk cfhi b[ž'X]Y''YXYf JYf_Y\fghY]`bY\a Yf'hfÀ[h'''9g']gh'k]WXh][ž'XUgg''YXYf'X]YgYf': À``Y U`g'YfbYi hYf'5i Zfi Z'ni f'GYbg]V]`]g]Yfi b['ZØf'X]Y'F]g]_Yb U`_c\c`VYX]b[hYb': U\fYbg'j YfghUbXYb'k]fX''

?cbhU_h]bZcfa Uh]cbYb ZØf FØW_ZfU[Yb

 $\label{eq:force_force} F \not \boxtimes W \underline{\mbox{\it ZfU[Yb^*V]hhY^*Ub.}}$

Dc`]nY]X]fY_h]cb'6UX'GY[YVYf[
'DfYggYghY``Y'
8cfZghf"'%*!%,
&' +-)'6UX'GY[YVYf[

A]WWUY`6Yf[a Ubb

```
HY`YZcb.'$())%' ',, (!&$&(
<UbXm'$%*$' '-'-)'-&%
9!AU]`.'dfYggYghY``Y"VUXgY[YVYf[4dc`]nY]"`UbXg\"XY
```

 $Cf][\]bU`!7cbhYbh'jcb.`Dc`]nY]X]fY_h]cb`6UX`GY[\ YVYf[\ \check{z}'\emptyset VYfa\]hhY`hXifW.`bYkg`U_hiY``$

B5;

8 Y hU]`g

6Ygi WXYb G]Y i bg Ui Z b!U["XY