

A c`XUk]Yb YbhXYW_Yb. BUhi fž'?i `hi f'i bX j YfVcf[YbY'; Y\Y]a b]ggY

9bhXYW_Yb^G]Y^A c`XUk]Yb.^5hYa VYfUi VYbXY^BUhi fž _Ògh`]WXY^?@WXYž^\]ghcf]gWXY^GhÀhhYbž^[Y\Y]a Y^FY]gYn]Y^Y i bX^ZUgn]b]YfYbXYf^K Y]bhci f]ga i g^k UfhYb^Ui Z^G]Y^

K Ybb 'Xi 'Ub 'C ghYi fcdU 'XYb_ghž'_ca a h'X]f'j]Y``Y]W\h'b]W\h'gcZcfh A c`XUk]Yb']b'XYb'G]bb"'8cW\X]YgYg'j YfghY $W_hY' \Rightarrow k Y`` \Uh'gc'j]Y`$ ni 'V]YhYb°'Jcb'XYb'UhYa VYfUi VYbXYb'@UbXgW\UZhYb'XYf'7cXfi! i bX '6B`]!FY[]cbYb'V]g'\]b'ni 'XYb'_i`]bUf]gW\Yb'? Ògh`]W_Y]hYbž $X]Y^Ub^XYf^GWXb]hhghY^Y^nk]gWXYb^6U^Ub^ibX^G^UkYb^Y[Ybž^[]Vh$ Ygʻ]bʻA c`XUk]YbʻnU\`fY]WXYʻ5VYbhYi Yfʻni 'YbhXYW_Yb"`Ni XYa k UfhYh'Y]bY'fY]WXY'; YgWX]WXhY'XUfUi Zž'j cb'X]f'YfZcfgWXh'ni k YfXYb' 'X]Y'U`hYb'?`ÒghYf'i bX'6i f[Yb'YfnÀ\`Yb'; YgW\]W\hYb jcb'_Ø\bYb'?Òb][Yb'ibX'[`Y]W\nY]h]['VYgW\Y]XYbYb 8 cfZVYk c bYfb"IbX:XUg:6YghY3:J]Y`Y:XYf:ZUgn]b]YfYbXYb:N]Y`Yg]bX`bcW\`i bYbhXYW_hz`k Ug`A c`XUk]Yb`ni 'Y]bYa 'dYfZY_hYb`Cfh ZØf[·]FY]gYbXY[·]a UWkhž[·]X]Y[·]XUg[·]5i h\Ybh]gWkY[·]gi WkYb["]·@Ugg[·]X]Wk ØVYffUgWXYb j cb XYb j YfghYW_hYb GWX AhnYb X]YgYg _ `Y]bYb @UbXYqžXYfVYfØ\a hYghYb K Y]b[ØhYfibX XYb VibhYb: YghYbž ibX`X]Y`\Yfn`]W\Y; UghZfYibXgW\UZh`Ac`XUk]Ybg`Y]bnihUiW\Yb°

9bhXYW_i b['XYf'UhYa VYfUi VYbXYb BUhi f A c`XUk]Ybg

A c`XUk]YbžY]b`cZhØVYfgY\YbYg`¾ k Y``]b`CghYi fcdUžV]YhYhY]bYZUgn]b]YfYbXY`@UbXgW\UZh'j c``Yf`K]YgYbž'<Ø[Y``i bX'i bVYfØ\fhYfBUhi f"`K À\fYbX`XYf'; fc»hY]``XYf`FY]gYbXYb`gY]bY`NY]h`]b`XYb_`Ugg]gW\Yb`GhÀXhYb`k]Y`7\]]bßi `cXYf`6ß`]'j YfVf]b[hž'[]Vh`YgY]bY`[UbnY`K Y`h`XU`XfUi »YbžX]Y`YbhXYW_h`k YfXYb`k]``"'Jcb

 $\label{liming} \hbox{Ui g[YXY\bhYb^KY]bghOW_Yb^V]g^N}b^ni^UhYa~VYfUi~VYbXYb~BUhi~fgWi~hn[YV]YhYb^*^A~c^XUk~]Ybg^BUhi~f^NUh^gc^*j~]Y^ni^V]YhYb^*^$

9]bY'XYf'\YfUi gfU[YbXghYb'FY[]cbYb']gh'XUg'BUhi ffYgYfj Uh
7cXfi "'8]YgYg'GWXi hn[YV]Yh'YfghfYW_h'g]WX'ØVYf'Y]bY': `ÀWXY
j cb'a Y\f'U`g') "\$\$\$'< Y_hUf'i bX']gh'Y]b'dUfUX]Yg]gWXYf'Cfh'ZØf
K UbXYfYf'i bX'BUhi f`]YV\UVYf"'<]Yf'_Ubbgh'Xi 'X]Y'fY]WXY': `cfU
i bX': Ui bU'_YbbYb`YfbYb"'8Ug'; YV]Yh']gh'< Y]a Uh'ZØf'j]Y'Y'gY`hYbY
5fhYbž'XUfi bhYf.

- 8Yb'9i fcdÀ]gWXYb'K c'Z
- 8]Y'K]`X_UhnY
- 9]bY'J]Y`nU\`'j cb'; fY]Zj Ò[Y`b

=a '< YfnYb 'XYf'FY[]cb 'Z]bXYgh'Xi 'X]Y 'k Y]h'Ài Z][Yb 'K À`XYfž'X]Y 'a]h Y]bYf'J]Y`nU\`'j cb 'DZ'UbnYbUfhYb'[YgWka ØW_h'g]bX"'5i Z'XYb K UbXYfi b[Yb'_Ubbgh'Xi 'X]Wk'Ui Z'X]Y '9bhXYW_i b['j cb'YggVUfYb K]`XdZ'UbnYb'i bX'?fÀi hYfb'ZfYi Ybž'X]Y '\Ài Z][']b'XYf a c`XUi]gWkYb'?ØWkY'j Yfk YbXYh'k YfXYb"'9g']gh'XYf'dYfZY_hY'Cfhži a 'g]Wk'a]h'XYf'BUhi f'ni 'j YfV]bXYb'i bX'X]Y'Gh]``Y'ni '[Yb]Y»Yb"

K Y]hYf'bÒfX`]WX ``]Y[h'XUg' @UW' ``A UbhU ž'Y]b'a U`Yf]gWXYf'GYYž'XYf j cb'gUbZhYb'< Ø[Y`b'i a [YVYb']gh''8]YgYf'Cfh']gh']XYU``ZØf'Y]bYb HU[YgUi gZi ["'<]Yf'_Ubbgh'Xi 'b]WXh'bi f'Ub[Y`bž'gcbXYfb'Ui WX 6cch'ZU\fYb'cXYf'Y]bZUWX'bi f'Ua 'I ZYf'YbhgdUbbYb'i bX'X]Y 5i gg]WXh'[Yb]Y»Yb"'8]Y'i a `]Y[YbXYb'K À`XYf'`UXYb'ni GdUn]Yf[Àb[Yb'Y]bž'i bX'X]Y'Jc[Y`kY`h']gh'VYgcbXYfg'j]Y`ZÀ`h]["'9g]gh'Y]b'[fc»Ufh][Yf'D`Uhnži a 'X]Y'GYY`Y'VUi a Y`b'ni ``UggYb"

A c`XUk]Ybg'B Uhi f']gh'Ui W\'j cb'Ui ZfY[YbXYb'hcdc[fUZ]gW\Yb?cbhfUghYb'[YdfÀ[h"8Yf'GØXYb'XYg'@UbXYg'k Y]gh'gUbZhY'< \emptyset [Y`Ui Zz'k À\fYbX'Xi ']a 'BcfXYb'Ui Z'ghY]`YfY'5b\Ò\Yb'hf]ZZgh"'9]bYg XYf'VYY]bXfi W_YbXghYb'B Uhi fk i bXYf']gh'X]Y' Cf\Y]i `JYW\] !FY[]cb"'8]Y'h]YZYb'GW\`i W\hYb'i bX'X]Y'\]ghcf]gW\Yb?`ÒghYfž'X]Y']b'X]Y': Y`gYb'[Y\Ui Yb'k i fXYbž'V]YhYb UhYa VYfUi VYbXY'5i gV`]W_Y"'8]YgY'FY[]cb']gh'VYgcbXYfg'VY_Ubbh Z \emptyset f']\fY': Y`gYbZcfa Uh]cbYb'i bX'X]Y'fY]W\\U`h][Y'6]cX]j Yfg]hÀh"

I a `X]Y`bUhØf`]W\Y`GW\`Ob\Y]h`A c`XUk]Ybg`ni `Yf`YVYbž`gc``hYgh`Xi i bVYX]b[h`X]Y` 6Ug_Ub ž`XUg`BUhi fgW\i hn[YV]Yh`]a `; U[Ui n]Yb! ; YV]Yhž`VYgi W\Yb"`9g`X]Ybh`b]W\h`bi f`XYa `GW\i hn`VYXfc\hYf 5fhYbž`gcbXYfb`nY][h`Ui W\`X]Y`GW\`Ob\Y]h`XYf`i a [YVYbXYb @UbXgW\UZhYb"`8]Y`U`hYb`6Ài a Yž`X]Y`\]Yf`k UW\gYbž`YfnÀ\`Yb ; YgW\]W\hYb`j cb`\$U\f\i bXYfhYbž`k À\fYbX`Xi `Xi fW\`X]Y K UbXYfk Y[Y`gW\`YbXYfqh"

8]Y' 8Y hYdhUfYU!<cW\YVYbY']gh'Y]b'k Y]hYfYg'Aigg'ZØf
B Uhi fVY[Y]ghYfhY"'<]Yf'Yfk UfhYb'X]W\'k Y]h\AiZ][Y'5igV\]W_Y'ibX
Y]bY'fY]W\Y'Jc[Y\kY\h"'\=\XYU\'ZØf'Jc[Y_ibX\Yf'ibX':chc[fUZYb/Xi\Ugh'X]Y'; Y\Y[Yb\Y]h\z'gY\hYbY'5fhYb']b']\fYa'bUh\Øf\]W\Yb
@YVYbgfUia'ni'VYcVUW\hYb"'9g']gh'XYf'dYfZY_hY'Cfh'ZØf'Y]b
D]W_b]W_a]h':fYibXYb'cXYf'XYf':Ua]\]Y"'8]Y'Zf]gW\Y'@iZh'ibX'X]Y
UhYa VYfUiVYbXY'?i\]ggY'jYf\Y]\Yb'YXYa'AcaYbh'Y]bYb
VYgcbXYfYb'7\UfaY"

6Y`]YVhY'BUhifn]Y`Y	6YgcbXYfY	$5_h]j]hAhYb$
]b A c`XUk]Yb	A Yf_a U`Y	
BUhi ffYgYfj Uh [.] 7cXfi	FY]WXY': `cfU'i bX	K UbXYfbž
	: Ui bU	BUhifVYcVUW\hib[Y
		b
@UW ``A UbhU	D]hhcfYg_Yf*GYYž	5b[Y`bž'6cch'ZU\fYbž
	ia[YVYbjcb	9bhgd UbbYb
	<Ø[Y`b	
Cf\Y]i `JYW\]	<pre><]ghc f]gW\ Y '? `ÒghY fž</pre>	K UbXYfbž
	UhYa VYfUi VYbXY	:chc[fUZ]YfYb
	5i gV`]W <u></u> Y	
6Ug_Ub	GWXi hn VYXfc\hYf	K UbXYfi b[Ybž
BUhifgWXihn[YV]Yh	5fhYb	BUhifYf_ibXib[Yb
8Y hYdhUfYU	FY]WXY'Jc[Y`kY`h	Jc[Y`VYcVUW\hib[ž
< c WX Y V Y b Y		D]W_b]W_g

8]Y'GW\Ob\Y]h'Ac`XUk]Ybg']gh'b]W\h'bif']b'X]YgYb'N]Y`Yb'ni Z]bXYbž'gcbXYfb']b'XYf'[YgUahYb'@UbXYggW\UZh'jYfhY]`h''8]Y \U\fYgnY]hYb'Vf]b[Yb']\fY'Y][YbYb': UfVYb'ibX'5hacgd\AfYbž'X]Y YXY'FY]gY'ni'Y]bYa'Y]bn][Ufh][Yb'9f`YVb]g'aUW\Yb'''JYfa]ggY b]W\h'X]Y'7\UbW'ž'X]Y'UhYaVYfUiVYbXYb'GcbbYbibhYf[Ab[Y'ibX X]Y'fi\][Yb'GcbbYbUiZ[Àb[Y'ni'VYcVUW\hYb \check{z} X]Y'ØVYf'XYb:Y`XYfb'ibX'<Ø[Y`b'jYfghfYih'g]bX"

K Ybb`Xi `bUW\`Y]bYa `C fh`gi W\ghž`Ub`XYa `Xi `XYf`<Y_h]_`XYg
@YVYbg`YbhZ]Y\Yb`i bX`X]Y`BUhi f`]b`]\fYf`fY]bghYb`: cfa `[Yb]Y» Yb
_Ubbghž`k]fX`A c`XUk]Yb`X]W\`b]W\hYbhAi gW\Yb"`6YfY]gY`X]Y
j YfghYW_hYb`DZUXYž`[Yb]Y» Y`X]Y`5i gg]W\h`i bX``Ugg`X]W\`j cb`XYf
6]cX]j Yfg]hAh`i bX`XYf`GW\Ob\Y]h`X]YgYg`Y]bn][Ufh][Yb`@UbXYg
j YfnUi VYfb"

? i `]bUf]gW\Y'< O\Ydi b_hY. '8]Y'? \emptyset W\Y A c`XUk]Ybg'[Yb]Y» Yb

8]Y?@WXYAc`XUk]Ybg`]gh`Y]b`gWXaUW_\UZhYg`NigUaaYbgd]Y`
j cb`5fcaYb`ibX`9]bZ`ØggYbž`X]Y`j cb`XYb`j YfgWX]YXYbYb`?i`hifYb
XYg`@UbXYg`[YdfÀ[h`g]bX"'8]Y`NihUhYb`g]bX`Zf]gWX`ibX`cZh``c_U`
dfcXin]Yfhž`kUg`X]Y`; Yf]WXhY`VYgcbXYfg`UfcaUh]gWX`aUWXh"`\D
X]YgYf`FY[]cb`hfYZZYb`g]WX`hfUX]h]cbY``Y`FYnYdhY`a]h`Y]bYf
acXYfbYb`BchYž`ibX`X]Y`; ÀghY`Yf`YVYb`Y]b`kU\fYg`:Ygh`ZØf`X]Y
G]bbY"

 $9]b`VY`]YVhYg`< Ui dh[Yf]Wkh']gh`A Ba B`][BžY]b`WfYa][Yf`A U]gVfY]ž\\ XYf`cZh`U`g`6Y]`U[Y`ni :: `Y]gWk[Yf]WkhYb`cXYf`U`g`< Ui dh[Yf]Wkh'a]h\\ ?AgY`i bX`GUi YffU\a `gYfj]Yfh`k]fX"`A Ub`Z]bXYh`]\b']b`bU\Yni\\ YXYf`a c`XUk]gWkYb:: Ua]`]Y`i bX`]b`j]Y`Yb`FYghUi fUbhg"`A Ba B`][Bk]fX`\Ai Z][`U`g`6Ug]g`ZØf'j YfgWk]YXYbY`9]bhÒdZY`[Ybi hnh`i bX`]ghY]b`i bj Yfn]WkhVUfYf`6YghUbXhY]``XYf`a c`XUk]gWkYb`? ØWkY"$

9]b'k Y]hYfYg'<][\`][\h'g]bX'X]Y'D`BW]bhYž'[YZØ``hY'HY][hUgW\YbžX]Y'gØ» 'cXYf'\Yfn\UZh'gY]b'_ObbYb"'8]Y'\Ài Z][ghYb': Ø``i b[Yb'g]bX?UfhcZZY`bž'?ÀgYž'?ØfV]g'cXYf'GUi Yf_fUi h"'8]YgY'[YZfU[hYb'GbUW_ggW\a YW_Yb'Zf]gW\'[YVUW_Yb'Ua 'VYghYb'i bX'k YfXYb'cZh'a]h'Y]bYf6Y]`U[Y'j cb' \times [\i fh'cXYf'GU\bY'gYfj]Yfh"

B UhØf`]W\ 'XØfZYb 'X]Y : `Y]gW\ [Yf]W\ hY 'b]W\ h'ZY\`Yb" '8 Ug`@UbX ']gh
VY_Ubbh'ZØf`gY]bY 'K i fghk UfYbž'VYgcbXYfg'X]Y 'a c`XUk]gW\ Yb
K ØfghYž'X]Y 'Ui g`GW\ k Y]bY! 'i bX 'F]bXZY]gW\ 'ni VYfY]hYh'k YfXYb"

\D 'j]Y`Yb '8 OfZYfb 'k YfXYb 'X]Y 'K ØfghY 'bUW\ 'hfUX]h]cbY``Yb

 $FYnYdhYb``\Uig[Ya\UW\&h`ibX`g]bX`Y]b`ZYghYf`6YghUbXhY]``YXYf : Y]Yf`]W\&_Y]h"$

6Y`]YVhY'A c`XUk]gWXY'; Yf]WXhY

; Yf]W\h	6YgWkfY]Vib[
A ßa ß`][ß	7fYa][YfAU]gVfY]žcZhU`g
	6Y]`U[Y'ni ': `Y]gWX[Yf]WX hYb
D`ßW]bhY	; YZØ``hY'HY][hUgW\Ybž'gckc\`
	gØ» 'U`g'Ui W\'\Yfn\UZh
GUfa U`Y	?c\`fci `UXYb'[YZØ``h'a]h
	< UW_ZY]gWX i bX FY]g
NYUa U	GUi YfZY]gWX gi ddY a]h' <i \b<="" td=""></i>
	i bX'; Ya ØgY
: f]dhi fß	; Y[f]``hYg'cXYf'[YVfUhYbYg
	: `Y]gW\ž'\Ài Z]['a Uf]b]Yfh

: Øf Y]b 'Ui h\Ybh]gW\Yg'_i `]bUf]gW\Yg'9f`YVb]g'`c\bh'Yg'g]W\Z'XUg
X]Y 'fY[]cbU`Y 'GdYn]U`]hÀh'GUfa U`Y 'ni 'dfcV]YfYbZ'k Y`W\Y'Ui g
?c\`V`ÀhhYfbZ'[YZØ``h'a]h'Y]bYf'\Yfn\UZhYb'A]gW\i b['Ui g': `Y]gW\i bX'FY]gZ'ni VYfY]hYh'k]fX"'8]YgY'k YfXYb'cZh'a]h'Y]bYf'GY]hY
A Ba B`][B'gYfj]Yfh'i bX'g]bX'Y]b'VY`]YVhYg': YghYggYb'VY]
<cW\nY]hYb'i bX': Y]YfhU[Yb"</pre>

8]Y'Ac`XUk]Yf'g]bX'Ui W\'ghc`n'Ui Z']\fY'K Y]bhfUX]h]cbž'X]Y'Yb[a]h'XYf'; Ughfcbca]Y'XYg'@UbXYg'j YfVi bXYb']gh''J]Y'Y'; Yf]W\hYkYfXYb'a]h'Y]bYf'5i gk U\`'Ub'`c_U`Yb'K Y]bYb'VY[`Y]hYhž'X]Y'XYb5fcaYb'XYf'GdY]gYb'Y]b'ni gÀhn`]W\Yg': `U]f'j Yf`Y]\Yb'''CV'hfcW_YbcXYf'gØ» ž'X]Y'ac`XUk]gW\Yb'K Y]bY'g]bX'j]Y`ZÀ`h]['i bX'j cb'\c\YfEi U`]hÀh''

9]b 'k Y]hYfYg'A i gg'g]b X 'X]Y 'hfUX]h]c b Y ``Yb'8 Y ggYfhg ž'X]Y 'c Zh'C Vghž B ØggY i b X '< cb]['Ybh\U`hYb"'7 c nc b UW * Y]b '_Ògh`]W\Yf' < YZY_i W\Yb [YZØ``h'a]h'B ØggYb 'c XYf'? U_Uc ž']gh'VYgc b XYfg'ni f'K Y]\b UW\hgnY]h gY\f'VY`]YVh"'8]Y'8 YggYfhg'g]b X 'Y]b 'k U\fYf'; Ybi gg'i b X'fi b XYb YXYg'A U\`'dYfZY_h'UV"

 $\texttt{K Ybb `G]Y `g]W ``Ui Z`X]Y `\texttt{F Y}]gY `\texttt{b} UW `\texttt{A} \ \texttt{c`X} Uk \]Yb ``VY[\ YVYb \check{\textbf{z}}`[\ \grave{\textbf{O}}bb Yb \ \texttt{b}) \\$

G]Y'g]W\'X]Y'; Y`Y[Yb\Y]hž']b'Y]bYa 'XYf'`c_U`Yb'FYghUi fUbhg'cXYf]b'XYb'_`Y]bYb'8 OfZYfb'hfUX]h]cbY``Y'GdY]gYb'ni '[Yb]Y»Yb"'8]Y; UghZfYi bXgW\UZh'XYf'A c`XUk]Yf'k]fX'G]Y'i a \Ui Ybž'i bX'G]Y k YfXYb'k i bXYfgW\ObY'5fca Yb'i bX'9f]bbYfi b[Yb'a]h'bUW\ <Ui gY'bY\a Yb"

9]b'Y]bn][Ufh][Yg'9f`YVb]g'V]YhYh'Ui WX 'XYf'6Ygi WX 'Y]bYg' a c`XUk]gWX Yb'A Uf_hYgž'k c'G]Y'Zf]gWX Yg'C Vghž'; Ya ØgYž\Ui g[Ya UWXhY'DfcXi _hY'i bX'gc[Uf'hfUX]h]cbY``Yg'< UbXk Yf_YbhXYW_Yb'_ObbYb"'<]Yf``YfbYb'G]Y'b]WXh'bi f'X]Y'`c_U`Y'?ØWXY_YbbYbž'gcbXYfb'Ui WX'X]Y'?i `hi f'i bX'HfUX]h]cbYb'XYg'@UbXYgX]fY_h'j cb'XYb'9]b\Y]a]gWXYb"

: Øf`X]Y Yb][Ybž`X]Y`[YfbY`gY`Vgh`]b`XYf`? ØWXY`U_h]j``k YfXYb
a ÒWX hYbž`[]Vh`Yg`Ui WX`?cWX_i fgYž`]b`XYbYb`G]Y``YfbYb`_ÒbbYbž
k]Y`a Ub`hfUX]h]cbY``Y`a c`XUk]gWXY`; Yf]WX hY`ni VYfY]hYh''`8]YgY
?i fgY`g]bX`cZh`gY\f`i bhYf\U`hgUa `i bX`V]YhYb`Y]bYb`h]YZYb`9]bV`]W_
]b`X]Y`9gg_i `hi f`XYg`@UbXYg"

 $8]Y'_i `]bUf]gWXY'FY]gY'Xi fWX'A c`XUk]Yb']gh'b]WXh'bi f'Y]bY \\ 9]b`UXi b[ž'X]Y'j]Y`ZÀ`h][Yb'; YgWXa ÀW_Yf'ni 'YbhXYW_Ybž'gcbXYfb Ui WX ž'X]Y'\Yfn`]WXY'; UghZfYi bXgWXUZh'i bX'X]Y'fY]WX\U`h][Y; YgWX]WXhY'X]YgYg'VYY]bXfi W_YbXYb'@UbXYg'ni 'Yf`YVYb''\XXYg ; Yf]WXh'YfnÀ\`h'Y]bY'Y][YbY'; YgWX]WXhYž'i bX'YXY'A U\`nY]h']gh Y]bY'A <math>O[`]WX_Y]h$ z'X]Y'?i `hi f'A c`XUk]Ybg'VYggYf'ni 'j YfghY\Yb''

$<]ghcf]gWXY'GhÀhhYb'ibX']\fY'; YgWX]WXhYb$

A c`XUk]YbžY]b`@UbX`a]hY]bYf`fY]WXYb'i bX`cZh'VYk Y[hYb; YgWX]WXhYž'V]YhYhY]bY: Ø``Y'j cb'\]ghcf]gWXYb'GhÀhhYbž'X]Y'Y]bYb 6`]W_']b'X]Y'JYf[Ub[Yb\Y]h'k YfZYb"8]Y'j YfgWX]YXYbYb'?i `hi fYb i bX'9]bZØggYž'X]Y'ØVYf'X]Y'JU\f\i bXYfhY'\]bk Y['Ui Z'A c`XUk]Yb Y]b[Yk]f_h'\UVYbž'gd]Y[Y`b'g]WX']b'XYf'5fWX]hY_hi fž'XYb\]ghcf]gWXYb'GhÀhhYb'i bX'XYb'ZUgn]b]YfYbXYb'; YgWX]WXhYb'k]XYfžX]Y'g]WX'i a 'g]Y'fUb_Yb"'<]Yf'g]bX'Y]b][Y'XYf'\YfUi gfU[YbXghYb\]ghcf]gWXYb'GY\Ybgk ØfX][_Y]hYbž'X]Y'a Ub'VY]'Y]bYa '6Ygi WX']b A c`XUk]Yb'b]WXh'j YfdUqqYb'qc``hY"

8]Y: Yghi b['j cb'6YbXYfž'Ui W. 'U`g'H][\]bU'VY_Ubbhž']gh'Y]bY'XYf VYY]bXfi W_YbXghYb'A]`]hÀfZYghi b[Yb'A c`XUk]Ybg"'G]Y'k i fXY']a %* "'*\J\f\i bXYfh'YfVUi h'i bX'j YfZØ[h'ØVYf'Y]bY'ghfUhY[]gW\Y'@U[YUa '8b]ghYfZi gg"'8]Y: Yghi b['\Uh'j]Y'Y'?f]Y[Y'i bX'GW\`UW\hYb ØVYfghUbXYb'i bX'nYi [h'j cb'XYf'hi fVi `YbhYb'; YgW\]W\hY'XYf FY[]cb"'8]Y'A Ui Yfb'i bX'HØfa Y'XYf': Yghi b['g]bX'\Yfj cffU[YbX Yf\U`hYb'i bX'XYf'6Ygi W\'V]YhYh'UhYa VYfUi VYbXY'5i gV`]W_Y gck]Y']bhYfYggUbhY'9]bV`]W_Y']b'X]Y'A]`]hÀfUfW\]hY_hi f'XYf'NY]h"

&"'8]Y'? `cghYfUb`U[Y'GU\UfbU

 $\label{eq:continuous} J Y f V c f [Yb] b : X Y f : a U : Y f] g W : Y b : @ Ub X g W U Z h : A c : X U k] Y b g : V Y Z] b : X Y f : G U : U f b U z : k Y : W : Y g : g c k c \ : Y] b : g d] f] hi Y : Y f : U : g U i W : V] g h c f] g h : Y f : C f h :] g h : ; Y [f Ø b X Y h :] a : : %) " : $ J Y : k i b X Y f h z : [] : h : X U g ? : c g h Y f : U : g : Y] b Y g : X Y f : À : h Y g h Y b :] b : A c : X U k] Y b " : 8] Y : k i W : h] [Y b G h Y] b Z c f a U h] c b : i b X : X] Y : V Y Y] b X f i W _ Y b X Y b :: f Y g _ Y b : a U W : Y b ' Y g : n i Y] b Y a : k] W : h] [Y : 5 h a c g d \ À f Y : i b X : X] Y : b U h Ø f :] W : Y i a [Y V i b [: a U W : Y b X] Y : g Y b : C f h : n i Y] b Y a :] X Y U : Y b : F Ø W _ n i [g c f h "]$

' "'8]Y'5`hghUXh'jcb'7\]]bßi

8]Y'<Ui dhghUXh'A c`XUk]Ybgž'7\]]bBi ž'V]YhYh'Y]bY']bhYfYggUbhY
A]gWXib['Ui g'_ca a i b]gh]gWXYfi bX'j cf_ca a i b]gh]gWXYf
5fWX]hY_hi f"'8]Y'5`hghUXh']gh'Y]b'A cgU]_'Ui g'U`hYb'; YVÀi XYbž'X]Y
; YgWX]WXhYb'YfnÀ\`Yb"'6YgcbXYfg'gY\Ybgk Yfh'g]bX'X]Y
VYY]bXfi W_YbXYb'?]fWXYb'k]Y'X]Y'; fcggYf'J cfcbYhn'?]fWXY
i bX'X]Y'?Uh\YXfU`Y'XYf'; YVi fh'7\f]gh]"'6Y]'Y]bYa
GdUn]Yf[Ub['Xi fWX'X]Y'GhfU»Yb'j cb'7\]]bBi '_Ubb'a Ub'b]WXh'bi f
X]Y'5fWX]hY_hi f'VYk i bXYfbž'gcbXYfb'Ui WX'XYf'; YgWX]WXhY'i bX
XYf'?i 'hi f'XYq'@UbXYq'bÀ\Yf ca a Yb"

	GY\Ybgk	ØfX][_Y]h	划\f'XYf';	fØbXi b[Cfh
--	---------	-----------	-----------	----------	-----

: Yghi b['j cb '6YbXYf	%* "`划\f\i bXYfh	6YbXYf
?`cghYf`GU\UfbU	%) "˙刬\f\i bXYfh	GU\UfbU
?Uh\YXfU`Y`XYf	%, ' \$	7\]]bßi

GY\Ybgk ØfX][_Y]h \\\J\f'XYf'; fØbXi b[Cfh \\; YVi fh'7\f]gh]

("'C f\ Y]i `'J YWX]

Cf\Y]i ``JYW\]`]gh'Y]b :: fY]`]W\ha i gYi a `i bX`Y]b `UfW\Ac`c[]gW\Yf?ca d`YI ž`XYf`Yhk U`* \$ '?]`ca YhYf`j cb '7\]]bßi `YbhZYfbh``]Y[h'' <]Yfhf]ZZh`a Ub `Ui Z`FY`]_hY `Ya Ubn]d]YfhYf`?i `hi fYbž`XUfi bhYf`XUg@Y[YbXAfY`; Yhc!8U_]Ub `J c`_`gck]Y `XUg`9fVY`XYf`A ÒbW\Yž`X]Y`]b XYb :: Y`gYb ``YVhYb"`8]Y `VYY]bXfi W_YbXYb '?`ÒghYf`i bX`Fi]bYb `g]bXb]W\h'bi f`\]ghcf]gW\`VYXYi hYbXž`gcbXYfb`V]YhYb`Ui W\gdY_hU_i `ÀfY`5i gV`]W_Y`Ui Z`X]Y`i a `]Y[YbXY`@UbXgW\UZh"

) " 8]Y 6 B hB`]U XY ``U 7 B`B fU]

 $9]b Yg 'XYf 'GWX `UWX hZY `XYf Z'XUg 'g]WX ']b 'A c `XUk]Yb 'VYZ]b XYhz ']gh'X]YGhÀhhY 'XYf '6 BhB`]U 'XY `U '7 B`BfU]"' <]Yf 'ZUb X '%(+' 'Y]bYYbhgWXY]XYb XY 'GWX `UWX hink]gWX Yb 'XYb 'A c `XUi Yfb 'i b X 'XYb C ga Ub Yb 'ghUhh" '8 Ug '\]ghc f]gWX Y '9 fVY 'X]YgYf 'GhÀhhY 'k]fX 'Xi fWX 8 Yb_a À `Yf 'i b X'; YXYb_ghÀhhYb' [Yk U\fhz X]Y 'Ub 'X]Y 'hUd ZYfYb ?f]Y [Yf 'Yf]b b Yfb "'9]b '6 Ygi WX '\]Yf 'j Yfa]hhY`h'b]WX h'bi f ; YgWX]WX hgk]ggYb z gc b XYfb 'Ui WX 'Y]b'; YZØ\`'ZØf 'X]Y 'b Uh]c b U 'Y <math>\Rightarrow$ Yb h]hÀh"

* " '8 Ug'? `c ghYf'7 ßdf]UbU

8 Ug'?`cghYf'7ßdf]UbUž'Y]bYg'XYf'À`hYghYb'?`ÒghYf'Ac`XUk]YbgžkifXY']a'%) "'\J\f\ibXYfh'[Y[fØbXYh''8Ug'?`cghYf']gh'Y]b'fi\][YfCfhžia[YVYb'jcb'KÀ`XYfb'ibX'Y]bYa':`iggž'kc'6YgiWXYf'X]YGd]f]hiU`]hÀh'ibX'X]Y'Fi\Y'XYf'BUhif'[Yb]Y»Yb'_ÒbbYb''8Ug?`cghYf']gh'b]W\h'bif'UfW\]hY_hcb]gW\'VYY]bXfiW_YbXž'gcbXYfbUiW\'Y]b'k]W\h][Yf'Cfh'ZØf'X]Y'cfh\cXclY'; YaY]bXY']b'XYfFY[]cb"

+"'8]Y'Fi]bYb'jcb'C`X'GcfcWU

6Yg]YX`i b['\]bk Y]gh"8]YgY`Fi]bYb`g]bX`j cb`_i `hi fY``Ya `K Yfh i bX`Yf\U`hYb`]bhYfYggUbhY`\DZcfa Uh]cbYb`ØVYf`XUg`@YVYb`XYf A YbgWXYb`]b`XYf`FY[]cb`]b`ZfØ\YfYb`NY]hYb"`8Ug`; YV]Yhii a GcfcWU`]gh'Ui WX`VY_Ubbh`ZØf`gY]bY`: Yghi b[Yb`i bX`X]Y VYY]bXfi W_YbXY`UfWX]hY_hcb]gWXY`J]Y`ZU`h"

%XY'X]YgYf'\]ghcf]gWXYb'GhÀhhYb']b'A c`XUk]Yb'YfnÀ\`h']\fY'Y][YbY
; YgWX]WXhY'i bX']gh'Y]b': YbghYf'ni f'; YgWX]WXhY'i bX'?i `hi f'XYg
@UbXYg"'9]b'6Ygi WX'X]YgYf'CfhY'k]fX'b]WXh'bi f'XUg'K]ggYb'ØVYf
A c`XUk]Yb'j Yfh]YZYbž'gcbXYfb'Ui WX'Y]bY'Ya ch]cbU`Y'JYfV]bXi b[
ni f'JYf[Ub[Yb\Y]h'\YfghY``Ybž'X]Y'cZh'i bj Yf[Ygg`]WX'V`Y]Vh"

J YfVcf[YbYg'; Y\Y]a b]ggY. I bVY_UbbhY FY]gYn]Y`Y']b'A c`XUk]Yb

A c`XUk]Yb']gh'Y]b'@UbXž'XUg'cZh']a 'GW\UhhYb'gY]bYf'VY_UbbhYfYb B UW\VUfb'ghY\hž'XcW\'Yg'[]Vh'nU\`fY]W\Y'i bVY_UbbhY'FY]gYn]Y`Yž X]Y'XUfUi Z'k UfhYbž'YbhXYW_h'ni 'k YfXYb"'5VgY]hg'XYf'ØV`]W\Yb Hci f]ghYbdZUXY'j YfghYW_h'g]W\'Y]bY': Ø``Y'j cb'; Y\Y]a b]ggYb'i bX bUhi fgW\\ObYb'CfhYbž'X]Y'UVYbhYi Yf`i gh][Y'FY]gYbXY'VY[Y]ghYfb k YfXYb"'<]Yf'g]bX'Y]b][Y'XYf'ZUgn]b]YfYbXghYb'i bVY_UbbhYb FY]gYn]Y`Y']b'A c`XUk]Yb"

%" `C f\Y]i ``J YW\]. `9]b `\]ghcf]gW\Yg`: fY]`i Zha i gYi a

Cf\Y]i ``J YW\]']gh'Y]bY'XYf'VYY]bXfi W_YbXghYb'UfW\Ac`c[]gW\YbGh\Ah\Yb'A c`XUk]Ybg'i bX'V]YhYh'b]W\h'bi f'fY]W\`]W\Y'; YgW\]W\h\Z' gcbXYfb'Ui W\'UhYa VYfUi VYbXY'@UbXgW\UZ\Yb"8]YgY'; Y[YbX\Z'X]Yg]W\']b'XYf'B\A\Y'XYg': `i ggYg'F\Bi h'YfghfYW_h\Z'VY\YfVYf[h

< O\`Yb_`OghYf'i bX'FYghY'Ubh]_Yf'G]YX`i b[Yb"'8]Y'gi ffYU'Yb</td>

: Y`gZcfa Uh]cbYb'i bX'XUg'_`UfY'K UggYf'XYg': `i ggYg'gW\UZZYb'Y]bY

Y]bn][Ufh][Y'?i`]ggY'Z\Zof'K UbXYfi b[Yb'i bX': chchci fYb"'J]Y`Y

FY]gYbXY'][bcf]YfYb'X]YgYb'Cfh\Z'cVk c\`Yf'Y]bY'XYf'VYghYb

A O[`]W_Y]hYb'V]YhYh\Z'X]Y'h]YZYfY'; YgW\]W\hY'i bX'?i`hi f

A c`XUk]Ybg'ni 'Yf`YVYb"

&"'8]Y'8 OfZYf']a '7cXf]]!K U`X

8 Y f '7 c X f]]! K U 'X ']gh'Y]bY 'X]WX hY 'K U 'X `Ub X g WX U Zhž X]Y 'j]Y `Y '_ `Y]bY ž a U 'Y f]g WX Y '8 O f ZY f 'i a []V h" 8]Y g Y '8 O f ZY f '\ UV Y b 'j]Y `'j c b ']\ f Y a h f U X]h]c b Y ``Y b '7 \ U f a Y 'V Y k U \ f h 'i b X 'g]b X 'd Y f Z Y _h 'ZØ f 'F Y]g Y b X Y ž 'X]Y X]Y 'Ui h\ Y b h]g WX Y 'a c `X Ui]g WX Y '@ Y V Y b g k Y]g Y 'Y f Z U \ f Y b 'a O WX h Y b " <]Y f '_ O b b Y b '6 Y g i WX Y f 'X]Y '`c _U `Y '; Ug h Z f Y i b X g WX U Z h 'Y f `Y V Y b ž h f U X]h]c b Y ``Y 'G d Y]g Y b 'd f c V]Y f Y b 'i b X 'X U g '< Ub X k Y f _ 'X Y f 'F Y []c b _Y b Y f b Y b "'9]b][Y 'X Y f 'V Y a Y f _Y b g k Y f h Y g h Y b '8 O f Z Y f 'g]b X.

- 6i hi WYb] ''6Y_Ubbh'ZØf'gY]bY': fYi XY'Ua '< UbXk Yf_'i bX gY]bY'<Y]a Uh'ZØf'Ui h\Ybh]gW\Y'a c`XUi]gW\Y'<Ài gYf"
- < c`YfWUb]' '6YfØ\a h'ZØf'gY]bY'fi \][Yb'D`ÀhnY'Ua ': `i gg
 i bX'hfUX]h]cbY``Yb': Y]Yf`]W_Y]hYb"</pre>
- xcfU'XY'Gi g' '9]b'nUi VYf\UZhYg'8cfZž']b'XYa 'X]Y'NY]h ghY\Yb[YV`]YVYb'ni 'gY]b'gW\Y]bh"

' "'8]Y'< Ò\`Yb'j cb'7f]j U

 $8]Y' < \grave{O} \land Yb'j \ cb' 7f]j \ U'g]b X'Y]b'k \ U \land fYg'B \ Uhi \ fk \ i \ b XYf'i \ b X'Y]bY'XYf j \ YfVcf[YbYb'5hhfU_h]cbYbž'X]Y'A c`XUk]Yb'ni 'V]YhYb'\ Uh''8]YgY < \grave{O} \land Yb'g]b X'ZØf'] \ fY'gd Y_hU_i `\AfYb'GhU`U_h]hYb'i \ b X'GhU`U[a]hYb \ VY_Ubbh'i \ b X'YfghfY W_Yb'g]W\ '\ØVYf'a \ Y\fYfY'?]`ca \ YhYf''8]Y' < \Ø[Y`fi \ b X'i \ a 'X]Y' < \grave{O} \ `Yb'g]b X']XYU''ZØf'K \ Ub XYfi \ b[Yb'i \ b X'V]YhYb \ Y]bYb'gd Y_hU_i `\AfYb'6`]W_'Ui \ Z'X]Y'i \ a `]Y[YbXY'@Ub XgW\ UZh''8]Y \ HYa \ dYfUhi \ fYb']b'XYb' < \grave{O} \ `Yb'g]b X'XUg'[UbnY'\s\J\f'\ØVYf'_\@\`\ž'k Ug \ g]Y'ni 'Y]bYa 'Ub[YbY\aYb'N]Y`'ZØf'Gca \ a \ YfhU[Y'a \ UW\h''$

("'8Yf'6]cgd\ÀfYbfYgYfj Uh'j cb'DUXi fYU'8ca bYUgWU

8 Ug·6]cgd\àfYbfYgYfj Uh·j cb·DuXi fYU·8 ca bYUgWU·]gh·Y]b·k Yb][
VY_UbbhYgž·UVYf·UhYa VYfUi VYbXYg·B Uhi fdUfUX]Ygž·XUg·g]W.·]XYU`
ZØf·B Uhi f`]YV\UVYfi bX·J c[Y`VYcVUW.hYf·Y][bYh"A]h·nu\`fY]W&Yb
K UbXYfk Y[Yb·i bX·Y]bYf·J]Y`nU\`j cb·: `cfU·i bX·: Ui bU·[]Vh·Yg
\]Yf·j]Y`Y·A Ò[`]W&_Y]hYbž·X]Y·i bVYfØ\fhY·B Uhi f·ni ·Yf_i bXYb"
Gh]Zhi b[A c`Xcj U·J YfXY ·Yb[U[]Yfh·g]W&·ZØf·XYb·GW&i hn·X]YgYf
FY[]cb·i bX·V]YhYh·[YZØ\fhY·Hci fYb·Ubž·i a ·X]Y·j YfghYW_hYb
GWA`Ob\Y]hYb·XYf·B Uhi f·ni ·YbhXYW_Yb"·6Ygi W&Yf·_ObbYb·Ui Z·XYa
; YV]Yh·XYf·J]Y`ZU`h·j cb·K]`Xh]YfYb·i bX·gW&`ObYb·@UbXgW&UZhYb·XUg
[UbnY·*J\f`ØVYf·5VYbhYi Yf·Yf`YVYb"

) " 8]Y 'Ubh]_Y 'GhUXh'H][\]bU

* " 8]Y A c`XUi]gWXY GU\UfbU!? `cghYf

8 Ug'?`cghYf'GU\UfbUž'Y]b'k Yb][Yf'VY_UbbhYgž'UVYfki bXYfgW\ObYg'?`cghYfž'`]Y[h']b'Y]bYf'UhYa VYfUi VYbXYbža U`Yf]gW\Yb'I a [YVi b["'9g'V]YhYh'gd]f]hi Y``Y
FØW_ni [ga O[`]W_Y]hYb'i bX'Y]bYb'9]bV`]W_']b'X]Y'cfh\cXcIY
HfUX]h]cb'A c`XUk]Ybg"'8]Y'?`cghYf_]fW\Yž'X]Y'j cb'Y]bYf'gW\ObYb
BUhi fi a [YVi b['i a [YVYb']ghž'n]Y\h'b]W\h'bi f'; 'Ài V][Yž'gcbXYfb
Ui W\BUhi f`]YV\UVYf'Ubž'X]Y'X]Y'Fi \Y'i bX'Gh]``Y'XYf'BUhi f
[Yb]Y»Yb'a OW\hYb"'6YgcbXYfY'D]`[YfZU\fhYb'i bX': YghY'Z]bXYb
\]Yf'fY[Y`a À»]['ghUhhž'k Ug'XYb'6Ygi W\'bcW\']bhYfYggUbhYf
a UW\h"

8]Y'[YbUbbhYb'CfhY'g]bX'bif'Y]b][Y'XYf'j]Y`Yb'jYfVcf[YbYbGW\AhnY'Ac`XUk]Ybg"'9g'[]Vh'bcW\Y]bY'J]Y`nU\`'Ub'ibYfZcfgW\hYb@UbXgW\UZhYbž'W\UfaUbhYb'8\OfZYfb'ibX'\]ghcf]gW\Yb'Gh\AhnYbž'X]YXUfUiZkUfhYbž'YbhXYW_h'ni'k\YfXYb"'Ac`XUk]Yb']gh'Y]b'@UbXjc``Yf', VYffUgW\ib[Ybž'XUg'FY]gYbXY'XUni'Y]b`\Axhž'gY]bY; Y\Y]ab]ggY'ni'Ybh\Ø``Yb'ibX'h]YZ']b'X]Y'?i`hif'ibX'BUhifY]bnihUiW\Yb"'9[U'ž'cV'G]Y'Y]b'5VYbhYiYf']b'XYf'BUhif'giW\YbcXYf'g]W\ZØf'X]Y'; YgW\]W\hY'ibX'HfUX]h]cbYb'XYg'@UbXYg]bhYfYgg]YfYbž'Ac`XUk]Yb'\Uh'kY]h'aY\f'ni'V]YhYbž'U`g'aUb'UiZXYb'YfqhYb'6`]W_'jYfaihYb'_ObbhY'"

K Y]bhci f]ga i g`]b`A c`XUk]Yb. 8]Y`VYghYb K Y]b[ØhYf`Yf_i bXYb A c`XUk]YbžY]b @UbX'a]hY]bYf'`Ub[Yb'HfUX]h]cb']a 'K Y]bUbVUi ž \UhY]b][Yg'ni 'V]YhYbž'k Ybb'Yg'i a 'K Y]bhci f]ga i g'[Y\h"'8]Y gUbZhYb' < Ø[Y`i bX'XUg'a]`XY'?`]a U'X]YgYf'FY[]cb'gWXUZZYb']XYU'Y 6YX]b[i b[Yb'ZØf'XYb'K Y]bVUi "'HUi WXYb'k]f'Y]b']b'X]Y'K Y`h'XYf a c`XUk]gWXYb'K Y]bY'i bX'YbhXYW_Yb'X]Y'VYghYb'K Y]b[ØhYf'XYg @UbXYg°

8]Y'K Y]b]bXi ghf]Y']b'A c`XUk]Yb'\Uh'Y]bY''U\f\i bXYfhYU`hY
; YgW\]W\hYž'X]Y'V]g']b'X]Y'5bh]_Y'ni fØW_fY]W\h''< Yi hY'[]Vh'Yg'ØVYf
%) \$'VY_UbbhY'K Y]b[ØhYfž'X]Y'K Y]bY'j cb'\c\Yf'Ei U`]hÀh
dfcXi n]YfYb"'8UVY]'gd]Y`h'X]Y'Ui hcW\h\cbY'FYVgcfhY': YhYUgWU
BYU[fU 'Y]bY'VYgcbXYfg'k]W\h][Y'Fc``Y' 'g]Y'[]`h'U`g'XUg
5i g\Àb[YgW\]`X'XYf'a c`XUk]gW\Yb'K Y]bdfcXi _h]cb"

Hcd!K Y]b[ØhYfžX]Y Y]bYb 6Ygi W k Yfhg]bX

<]Yf`g]bX`Y]b][Y`XYf`VYghYb`K Y]b[ØhYfž`X]Y`G]Y`VY]`\Rightarrow fYa `6Ygi W\
]b`A c`XUk]Yb`b]W\h'j YfdUggYb`gc``hYb.</pre>

- A]`Ygh]]`A]W]. '9]b`I B 9G7C!K Y`h_i `hi fYfVYž'XUg'XYb
 k Y`h[fÒ» hYb`K Y]b_Y``Yf'VY\YfVYf[h"'8]Y`K Y]b[i hgZØ\fi b[
 ZØ\fh'Xi fWX '_]`ca YhYf`Ub[Y'?Y``Yf'i bX`V]YhYh
 J Yf_cghi b[Yb`YX`Yf'K Y]bY`Ub"
- 7fUa U'6UgUfUV]Y]. :: Ua cg'ZØf']\fY'hfUX]h]cbY``Yb'K Y]bY'' <]Yf'_ÒbbYb'6Ygi W\Yf'b]W\h'bi f'X]Y'K Y]bY'dfcV]YfYbž gcbXYfb'Ui W\'X]Y'`c_U`Y'?ØW\Y'[Yb]Y»Yb"
- 7f]Wcj U. '6YfØ\a h'ZØf'gY]bY'gW\Ai a YbXYb'K Y]bY'i bX VYY]bXfi W_YbXY'K Y]b_Y``Yf"'7f]Wcj U'V]YhYh'Y]bY Y]bn][Ufh][Y'I bhYfk Y`hž'X]Y']b'Y]bYa 'Hi bbY`gmghYa Ub[Y`Y[h']gh"
- HYj U'K]bYfm '9]bY'XYf'bYi Yb'; YbYfUh]cb'j cb
 K Y]b[ØhYfbž'X]Y']bbcj Uh]j Y'HYWXb]_Yb'j Yfk YbXYb"'8Ug
 K Y]b[i h'\Uh'g]WX'Ui Z'V]c`c[]gWXY'K Y]bY'gdYn]U`]g]Yfh'i bX
 V]YhYhYI _`i q]j Y'JYf_cqhi b[Yb'Ub"

8]Y'K Y]bj Yf_cghi b[gYfZU\fi b[

9]bY'K Y]bj Yf_cghi b[']b'A c`XUk]Yb']gh'a Y\f'U`g'bi f'XUg'Hf]b_Yb

K Y]b[ih	6YgcbXYf\Y]h	JYf_cghi b[gUb[YVch
A]`Ygh]]'A]W]	; fÒ» hYf'K Y]b_Y``Yf	'!) K Y]bYa]h
	XYf'K Y`h	fY[]cbU`Yb'GbUW_g
7f]Wcj U	⇒a dcgUbhY '? Y``Yf)!%\$`K Y]bY`]b_`"
		GY_h
7fUa Uʻ6UgUfUV]Y]	HfUX]h]cbY``Y'KY]bY) KY]bYa]h
		hfUX]h]cbY``Ya '6fch

%XYg'K Y]b[i h'\Uh'gY]bY'Y][YbY'; YgWk]WkhY'i bX'D\]'cgcd\]YžX]Y
Yg']b'X]Y'< YfghY``i b['gY]bYf'K Y]bY'Y]bZ]Y» Yb'`Aggh"'8]Y
J Yf_cghi b[Yb'g]bX'cZh'VY['Y]hYh'j cb'`c_U`Yb'? AgYgcfhYbž
K i fghk UfYb'i bX'UbXYfYb'hmd]gWkYb'; Yf]WkhYb"'Gc'YbhghY\h'Y]bY
\Ufa cb]gWkY'?ca V]bUh]cb'Ui g'K Y]b'i bX'_i `]bUf]gWkYa'; Ybi ggž
X]Y'XUg'9f`YVb]g'UVfi bXYh"</pre>

: YghY fi bX i a XYb K Y]b

A c`XUk]Yb'ZY]Yfh'gY]bY'K Y]bhfUX]h]cb'a]h'j YfgWX]YXYbYb : Ygh]j U`gž'X]Y']a '\\J\f'ghUhhZ]bXYb"'9]b][Y'XYf'VY_UbbhYghYb'g]bX.

- K Y]bZYgh']b'7\]g]bUi.'9]b''A\f`]W\'ghUhhZ]bXYbXYg': Ygh
]a 'C_hcVYfž'XUg'K Y]bj Yf_cghi b[Ybž'@j Y!A i g]_'i bX
 hfUX]h]cbY``Y'HAbnY'V]YhYh"
- B Uh]cbU`Yg`K Y]bZYgh. '8]YgY': Y]Yf']a 'GYdhYa VYf'n]Y\h
 K Y]b`]YV\UVYf'Ui g'XYa '[UbnYb'@UbX'Ub"'9g']gh'Y]bY
 [fc» Ufh][Y'; Y`Y[Yb\Y]hž'X]Y'J]Y`ZU`h'XYf'a c`XUk]gW\Yb
 K Y]bY'ni 'YbhXYW_Yb"
- JYf_cghi b[Yb'ni 'VYgcbXYfYb'5b`AggYb.'J]Y`Y
 KY]b[ØhYf'V]YhYb'gdYn]Y``Y'JYfUbghU`hi b[Yb'Ubž'Yhk U'ni f
 KY]b`YgY'cXYf'ni a 'BYi 'U\fgZYgh"

FY]gYd`Ubi b[i bX H]ddg

K Ybb `G]Y `Y]bY `K Y]bhci f`]b `A c`XUk]Yb `d`UbYbž']gh `Yg`fUhgUa ž']a

JcfUi gʻni 'Vi W\Ybž']bgVYgcbXYfYʻk Ybb'G]Y´Ub'Y]bYf'[YZØ\fhYbHci fʻhY]`bY\a Ybʻa ÒW\hYb"'8]Yʻa Y]ghYbʻK Y]b[ØhYfʻcZZYf]YfYbgdYn]Y``Y`DU_YhYž'X]Y´Y]bYʻi a ZUggYbXYʻ9fZU\fi b['[Yk À\f`Y]ghYb" JYf[YggYb'G]Yʻb]W\hž'Òfh`]W\Yʻ: Ø\fYfʻcXYfʻK Y]b_YbbYfʻi a 'FUh'ni ZfU[Yb'ʻg]Y`_ÒbbYbʻk Yfhj c``Yʻ \pm bZcfa Uh]cbYbʻi bXʻ9]bV`]W_Y[YVYb"

8 Y b _ Y b 'G]Y 'X U f U b ž' X U g g 'X]Y '5 b f Y]g Y 'ni 'X Y b 'K Y]b [ØhY f b 'c Zh 'U b X g W U Zh] W 'g Y \ f 'f Y]nj c `` ']gh" '9]b Y 'Sa c `X U k]g W Y S 'Ghf U » Y b Z U \ f h X i f W X 'X]Y 'a U `Y f]g W Y b 'K Y]b V Y f[Y ']gh 'Y]b Y '9 f Z U \ f i b ['Z Ø f 'g] W 'i b X `A g g h 'G]Y 'X]Y '\ Y f n `] W Y '; U g h Z f Y i b X g W U Z h 'X Y f '9]b \ Y]a]g W Y b Y f `Y V Y b "

: Øf`X]Y Yb][Ybž`X]Y 'bUW\ 'Y]bYf`YbhgdUbbYbXYb`5i gnY]h`gi W\Ybž g]bX`j]Y`Y`K Y]b[ØhYf`Ui W\ 'a]h`[Ya Øh`]W\Yb`I bhYf_ØbZhYb Ui g[YghUhhYhž`X]Y`Y]bYb`6`]W_`Ui Z`X]Y`K Y]bVYf[Y`V]YhYb"`GW\`UZYb G]Y`]ba]hhYb`XYf`K Y]bfYVYb`i bX`[Yb]Y»Yb`G]Y`X]Y`Fi \Y`XYf BUhi f"

6Ygi W.Yb'G]Y'A c`XUk]Yb'i bX'Yf`YVYb'G]Y'X]Y'J]Y`ZU`hi bX
Ei U`]hÀh'gY]bYf'K Y]bY"'8]Y'K Y]bhci f]ga i gUb[YVchY'g]bX'b]W\h
bi f'ZØf'YfZU\fYbY'K Y]bhf]b_Yf'[Ya UW\hž'gcbXYfb'Ui W\'ZØf
X]Y'Yb][Ybž'X]Y'Zf]gW\']b'X]Y'K Y`h'XYg'K Y]bg'Y]bhUi W\Yb'a ÒW\hYb''
DfcV]YfYb'G]Y'X]Y'`c_U`Yb'?Ògh`]W_Y]hYbž'YbhXYW_Yb'G]Y'X]Y
K Y]bhfUX]h]cbYb'i bX'`UggYb'G]Y'g]W\'j cb'XYf'a c`XUk]gW\Yb
; UghZfYi bXgW\UZhj YfnUi VYfb''

@c_U`Y': YghY'i bX'HfUX]h]cbYb.'8]Y'?i `hi f \Ui hbU\'Yf`YVYb

A c`XUk]Yb']gh'Y]b'@UbXž'XUg'fY]W\'Ub'HfUX]h]cbYb'i bX'_i `hi fY``Yb
: Y]Yf`]W_Y]hYb']gh'' \(\forall XYg'\) \(\forall T]bXYb'nU\`fY]W\Y': YghY'i bX

J YfUbghU'hi b[Yb'ghUhhž'X]Y'X]Y'`c_U`Y'?i `hi f'ni a '@YVYb'Yfk YW_Yb
i bX'XYb'6Ygi W\Yfb'X]Y'A \(\otal D[`]W_Y]h'V]YhYbž'h]YZ']b'X]Y
a c`XUk]gW\Y'@YVYbgk Y]gY'Y]bni hUi W\Yb''Jcb'Zf\O\`]W\Yb
9fbhYZYghYb'V]g'\]b'ni 'VYY]bXfi W_YbXYb': c`_`cfYUi ZZ\O\fi b[Yb
[]Vh'Yg'j]Y`'ni 'YbhXYW_Yb''

9]bYg'XYf'k]W\h][ghYb::YghY']b'Ac`XUk]Yb']gh'XUg'AUfh]gcfž'XUgUa'%"AÀfn'[YZY]Yfh'k]fX"'8]YgYg':Ygh'gmaVc`]g]Yfh'XYb':fØ\`]b[ibX'X]Y'K]YXYf[YVifh'XYf'BUhif"5b'X]YgYa'HU['gW\Yb_Yb'g]W\X]Y'AYbgW\Yb'_`Y]bYž'\UbX[YZYfh][hY'5b\Àb[Yf'Uig'fchYa'ibXkY]»Ya':UXYbž'X]Y'AUfh]gcf'[YbUbbh'kYfXYb"'8]YgY'HfUX]h]cbk]fX'\ÀiZ]['jcb'@]YXYfb'ibX'HÀbnYb'VY[`Y]hYhž'kcVY]'X]YAYbgW\Yb']b'ZUfVYbZfc\Yb'HfUW\hYb']\fY'?i`hif'nY`YVf]YfYb"'

9]b'k Y]hYfYg'VYXYi hYbXYg': Ygh']gh'XUg'9UghYf': Ygh]j U'ž'XUg'Ui Z X]Y'cfh\cXcI Y'CghYfhfUX]h]cb'ni fØW_[Y\h"'<]Yf'k YfXYb'X]Y Yi W\hYbX'Vi bhYb'CghYfY]Yfž'[Y_cW\hY'i bX'[YZ\hYb'Y]Yf'gck]Y j YfgW\]YXYbY'hfUX]h]cbY``Y'6UW_k UfYb'Ub[YVchYb'': Ua]`]Yb _ca a Yb'ni gUa a Ybž'i a 'XUg': Ygh'ni 'ZY]Yfbž'Ub'XYa 'Ui W\fY`][]\OgY'NYfYa cb]Yb'Y]bY'nYbhfU`Y'Fc``Y'gd]Y`Yb''8]Y'JcfZfYi XY Ui Z'X]Y': Y]Yf`]W_Y]hYb'n]Y\h'gck c\``9]b\Y]a]gW\Y'U`g'Ui W\Hci f]ghYb']b']\fYb'6Ubb''

9]b: YghžiXUgib]WXhij YfdUgghik YfXYbigciihYži]ghiXUgi: Ygh]j UiiXYf: ci_icfYžiXUgi]a i < YfnYbij cbi7\]]bBi žiXYfi < Ui dhghUXh

A cixuk]YbgžighUhhZ]bXYh" <]YfinY][YbihUiYbh]YfhYi: ci_icfY[fi ddYb

Ui giXYa i [UbnYbi@UbXi]\fYi: À\][_Y]hYbi]bi; YgUb[ii bXiHUbn" 8]Y

GÀb[Yfii bXiHÀbnYfihfU[YbiVi bhYžihfUX]h]cbYiiYi?iY]Xi b[ii bX

Vf]b[YbiX]YiUihYbi6fÀi WXYii bXi; YgWX]WXhYbiA cixuk]Ybgini fØW_

]bgi; YXÀWXhb]g" 9gi]ghiY]bYik i bXYfVUfYi; YiY[Yb\Y]hžiX]Y
; UghZfYi bXgWXUZhiXYfiA cixui Yfini YfiYVYbii bXiX]YiJ]YiZUihiXYf

fY[]cbUiYbi?iihi fYbini i [Yb]Y» Yb"

 $8 \ Yg'K \ Y]hYfYb'k \]fX'XUg'BYi \ 'U\backslash fgZYgh'a \]h'[fc \ Ya'Dcad'[YZY]Yfh''$

9g'VY[]bbh'a]h'XYa & ("'8YnYa VYfž'k Ybb'X]Y'A YbgWXYbhfUX]h]cbY``Y'@]YXYf'g]b[Yb'i bX'cZh'Y]bYb'GWX]b_Yb'cXYf'[YZØ``hYHY][hUgWXYb'ni VYfY]hYbž'i a 'Ui Z'XYb'\\\J\fYgk YW\gY``Ubni ghc\\Yb''\\5b'G]`j YghYf'j YfgUa a Y`b'g]WX': fYi bXY'i bX': Ua]`]Ybž'i a [Ya Y]bgUa 'ni 'ZY]Yfbž'k Ug'cZha U`g'a]h': Yi Yfk Yf_'i bX'ZYgh`]WXYbBUgWXYfY]Yb'j YfVi bXYb']gh''

9]b'k Y]hYfYg'gWX ObYg'i bX'gd]f]hi Y``Yg': Ygh']gh'XUg'NUk 'Už'XUg'X]Y FØW__Y\f'XYf'<]fhYb'ni 'XYb'8 OfZYfb'bUWX'XYa 'K Y]XYVYhf]YV']a Gca a Yf'ZY]Yfh''K À\fYbX'X]YgYf'NY]h'j YfgUa a Y`b'g]WX'X]Y 8cfZVYk c\bYfž'i a 'X]Y': Ua]`]Yb'i bX': fYi bXY'a]h'hfUX]h]cbY``Yb GdY]gYb'ni 'VYk]fhYbž'X]Y'Ui g'`c_U`Yb'Ni hUhYb'ni VYfY]hYh'k YfXYb''

 $<]Yf^*g]bX^*Y]b][Y^*XYf^*VY^*]YVhYghYb^*a c^*XUk]gWkYb^*; Y]YfhU[Y^*]bYf^*Y]bZUWkYb^*, VYfg]Wkh$

: Ygh	8 Uhi a	6YXYi hi b[
A Ufh]gcf	%" ⁻ AÀfn	: fØ\`]b[gVY[]bbž
		Gma Vc`'ZØf' <czzbib[< td=""></czzbib[<>
		i bX [.] 9fbYi Yfi b[
C ghY fb	JUf]UVY`fbdf]`Ł	: Y]Yf [·] XYf
		5i ZYfghY∖i b[ˈ≯gi ž
		hfUX]h]cbY``Y
		6fÀi WXY
BUh]cbU`Yg	9fghYg [*] K cWXYbYbXY	: Y]Yf [·] XYf
K Y]bZYgh]j U`]a [·] C_hcVYf	a c`XUk]gWXYb
		KY]b_i`hif'ibX
		!hfUX]h]cb
: c`_`cfYZYgh]j U`	J Uf]UVY`'fは`]Ł	DfÀgYbhUh]cb XYf
		a c`XUk]gWXYb
		:c`_`cfY`XifW
		; YgUb[i bX HUbn
BYi ′U\fgZYgh	'%" [.] 8YnYa VYf	: Y]Yf [·] XYg
		メJ∖fYgk YW∖gY`gž
		HfUX]h]cbYb^i bX^: Ua
]`]Ybni gUa a Yb_ØbZh
		Υ
NUK ~U	J Uf]UVY`	la X]YFØWY\f

: Ygh	8 Uhi a	6YXYi hi b[
	fGYdhYa VYfŁ	XYf'<]fhYb'ni'ZY]Yfbž
		`c_U`Y`GdY]gYb`i bX
		HfUX]h]cbYb

8]Y'a c`XUk]gW\Y'?i`hi f'k]fX'b]W\h'bi f'Xi fW\': YghYžgcbXYfb
Ui W\'Xi fW\'< UbXk Yf_g_i bgh'i bX'A i g]_'[YdfÀ[h''K À\fYbX'XYf
: Ygh`]W_Y]hYb'_ObbYb'X]Y'; ÀghY'cZh'`c_U`Y'?i bgh\UbXk Yf_Yf
VYcVUW\hYbž'X]Y'hfUX]h]cbY``Y'< UbXUfVY]hYb'k]Y'HOdZYfk UfYb'i bX
K YVYfY]Yb'\YfghY``Yb''8]YgY'?i bghZcfa Yb'\UVYb']b'A c`XUk]Yb
Y]bY``Ub[Y'; YgW\]W\hY'i bX'g]bX'Y]b'k]W\h][Yf'6YghUbXhY]``XYg
_i`hi fY``Yb'9fVYg"

Ni gUa a YbZUggYbX``Àgghig]W\`gU[Ybž'XUgg`Ac`XUk]Yb`Y]bY Y]bn][Ufh][Y`DU`YhhY`jcb: YghYb`ibX`HfUX]h]cbYb`V]YhYhž'X]Y`Y]bYb h]YZYb`9]bV`]W_`]b`X]Y`GYY`Y`XYg`@UbXYg`[YkÀ\fYb"`¾XYg`: Yghi]gh Y]bY`; Y`Y[Yb\Y]hž'X]Y`\Yfn`]W\Y`; UghZfYibXgW\UZh`XYf`Ac`XUiYf ni `Yf`YVYb`ibX`X]Y`GW\Ob\Y]h`]\fYf`6fÀiW\Y`ni `[Yb]Y»Yb"`9[U``cV KY]b`]YV\UVYfž'; YgW\]W\hg]bhYfYgg]YfhYf`cXYf`Y]bZUW\`bif bYi[]Yf][Yf`FY]gYbXYf` `Ac`XUk]Yb`\Uh`ZØf`YXYb`YhkUg`ni V]YhYb°

8 Y hU]`g

6 Ygi WX Yb 'G]Y 'i bg 'Ui Z. 'Y]bY!fY]gY "XY