

## A Yfn'i bX'Hfi a d.'< ]ghcf]gWX Yg'HfYZZYb ni f'6Y\_Àa dZi b['fi gg]gWX Yf'²`]a dcfhY°

?Ubn`Yf`A Yfn`hf]ZZh`Hfi a dži a 'GUb\_h]cbYb`[Y[Yb`Fi gg`UbX ni 'YfÒfhYfb"'; Yd`UbhY`NÒ``Y`\_ÒbbhYb`XYb`9bYf[]Ya Uf\_h ghUf\_'VYY]bZi ggYb"



I G5 !! 8Yf'6Ygi WX j cb? Ubn'Yf': f]YXf]WX 'A Yfn'f[781 E'VY]a 'I G!

DfÀg]XYbhYb'8cbU'X'Hfi a d'Ua '\*"'\* b]'&\$&) 'ghY\h']a 'NY]WXYb'XYf

J YfVYggYfi b[ 'XYf'K ]fhgWX UZhgVYn]Y\i b[ Yb'i bX'Y]bYg

[ Ya Y]bgUa Yb'J cf[ Y\Ybg'[ Y[ Yb'Fi gg`UbX']a 'I \_fU]bY!?f]Y[ "

A Yfn'Ài » YfhY 'g]WX 'cdh]a ]gh]gWX 'ØVYf'X]Y': cfhgWX f]hhY 'XYf

GUb\_h]cbgVYa Ø\i b[ Yb'XYg'I G!?cb[ fYggYgž'bUWXXYa 'Y]b

J cfgWX`U[ ']a 'GYbUh'X]g\_i h]Yfh'k i fXYž'XYf'YI hfYa Y'NÒ``Y'j cb') \$\$

DfcnYbh'Ui Z'?Ài ZYf'fi gg]gWXYb'² 'g'i bX'; UgYg'j cfg]Y\h"I G!

A Y\f\Y]hgZØ\fYf'&\b'H\i bY'\Uh'\]Yfni '; YgdfÀWXY'a ]h'XYa

K Y]» Yb' < Ui g'[ YZØ\fh"8]YgY'NÒ``Y'gc``hYb'j cf'U``Ya '@ÀbXYf

hfYZZYbž'X]Y'fi gg]gWXY'9I dcfh[ ØhYf'k ]Y'² 'ž'; Ug'i bX'I fUb

Yfk YfVYbž'k cVY]'7\]bU'i bX'+bX]Yb'XYfnY]h'fi bX'+\$'DfcnYbh'XYg

]bhYfbUh]cbU`Yb'9bYf[ ]Y\UbXY`g'a ]h'Fi gg`UbX'Ui ga UWXYb"

Hfi a d`\Uh'H\i bY'Ui Z[YZcfXYfhž'XYb'; YgYhnYbhk i fZ'j cfYfgh'b]W\h ni f'5Vgh]a a i b['ni 'Vf]b[Ybž'YXcW\fYW\bYh'A Yfn'a ]h'XYf
I bhYfghØhni b['j cb'ØVYf', \$'I G!GYbUhcfYb'ZØf'X]YgY'Nc``]b]h]Uh]j Y"
8]Y'9I!?ca a ]gg]cbgdfÀg]XYbh]b'I fgi `U'j cb'XYf'@YmYb'Yf\_`ÀfhYž
XUgg'X]Y'I G5'VYfY]h'gY]Ybž'[Ya Y]bgUa 'VY]'GUb\_h]cbga U» bU\a Yb
[Y[Yb'Fi gg`UbX'ni 'U[]YfYb"'+b'XYf'JYf[Ub[Yb\Y]h'\Uh'X]Y'9I
VYfY]hg'%+'GUb\_h]cbgdU\_YhY'j YfUVgW\]YXYhž'X]Y'i bhYf'UbXYfYa
A U» bU\a Yb'[Y[Yb'X]Y'gc[YbUbbhY'GW\UhhYbZchhY'VY]b\UhYb"

## 5\_hi Y``Y'GUb\_h]cbgdU\_YhY'[Y[Yb'Figg`UbX

### FU\a Yb'X]YgYf'GUb\_h]cbYb'k i fXYb'%, '''2 `hUb\_Yf'gUb\_h]cb]Yfhž X]Y'ni 'XYf'GW\UhhYbZchhY'[Y\ÒfYb"'8]YgY'GW\]ZZY'hfUbgdcfh]YfhYb]a '`YhnhYb'\*J\f'ØVYf') '\$ 'A ]``]cbYb'6UffY`'fi gg]gW\Yg'Fc\Ò`ž'k cVY]XYf'; fc \*\* hY]``bUW\'7\]bU'i bX'\*DYb'YI dcfh]Yfh'k i fXY"'?fYa `!

JYfhfYhYf'\UVYb'X]Y'GUb\_h]cbYb'U`g'k YhhVYk YfVgj YfnYffYbX

\_f]h]g]Yfh"'Hfchn'X]YgYf'A U\*\* bU\a Yb'\Uh'Fi gg`UbX']a '\*J\f'&\$&(gY]bY'9]bbU\a Yb'Ui g'² `!'i bX'; Ugj Yf\_Ài ZYb'Ui Z'%%%'' '6]``]cbYbFi VY``[YghY][Yfhž'k Ug'Y]bYf'9f\Ò\i b['i a '&\*'DfcnYbh']a

JYf[`Y]W\'ni a 'Jcf'U\f'Ybhgdf]W\h'

## @Ub[Zf]gh][Y:c`[Yb'XYf'GUb\_h]cbYb

 $\label{lem:continuous} $$ \UVYb^g]WX^[Abn^]WX^Ui g^XYa^fi gg]gWXYb^A Uf_h^ni f@W_[Ync[Yb^z k Ug^X]Y^]bhYfbUh]cbU^Y^gc^Uh]cb^Fi gg^UbXg^k Y]hYf^j YfghAf_h''$ 

 $8 ]Y \cdot Ub \setminus U \cdot hY b \times Yb \cdot G Ub \_h] cb Yb \cdot \setminus UV Yb \cdot ni \cdot Y] b Ya \cdot g] [b] Z] \_Ub hY b k ]fhg W UZh \cdot J Yf \cdot i gh \cdot [Y ZØ \setminus fh'' \cdot Ghi X] Yb \cdot VY \cdot Y [Y b z \cdot X Ugg \cdot XY f \cdot Ub [Zf] gh] [Y \cdot K c \setminus gh Ub X gj Yf \cdot i gh \cdot ]b \cdot F i gg \cdot Ub X \cdot VY] \cdot Yhk \cdot U \cdot \% z) \cdot Df c n Y b h \cdot [Y [h'' K A \setminus fY b X \cdot g] W \cdot j ]Y \cdot Y \cdot k \cdot Ygh \cdot ]W \cdot Y \cdot Gh U Uh Yb \cdot [Y [Y b \cdot F i gg \cdot Ub X d c g] h] cb \cdot [Y f Y b z \cdot V \cdot Y] Vh \cdot X Ug \cdot @Ub X \cdot b i f \cdot j cb \cdot k \cdot Yb] [Y b \cdot b] W \cdot h \cdot k \cdot Ygh \cdot ]W \cdot Yb \cdot Gh U Uh Yb \cdot i b h Y f gh Ø h n h'' \cdot 8 ] Y g Y \cdot 9b h k \cdot ]W_ \cdot i b [Y b \cdot XY i h Y b \cdot X Uf U i Z \cdot ]b z \times X Ugg \cdot X] Y \cdot k \cdot ]f h g W \cdot UZh \cdot ]W \cdot Yb \cdot Gd U b b i b [Y b \cdot b c W \cdot `Ub [Y \cdot V Y gh Y \setminus Y b V \cdot Y] V Yb \cdot \_Ob b h Y b z \cdot gc \cdot Ub [Y \cdot X Y f \cdot ? c b Z] \_h \cdot ]b \cdot X Y f \cdot I \_f U] b Y \cdot b \cdot ]W \cdot h \cdot [Y \cdot Ogh ]gh''$ 

: Øf X]Y '\_ca a YbXYb 'A cbUhY 'V `Y]Vh 'UVni k UfhYbž'k ]Y 'g]W 'X]Y dc`]h]gW Yb '8 ]g\_i gg]cbYb ']b 'XYb 'I G5 'i bX 'X]Y 'F YU\_h]cbYb Fi gg`UbXg 'Ui Z'X]Y 'k Y]hYf\]b 'j YfgW ÀfZhYb 'k ]fhgW UZh`]W Yb A U» bU\a Yb 'Ybhk ]W\_Y `b 'k YfXYb " K À\fYbX 'X]Y ']bhYfbUh]cbU`Yb 6`]W\_Y 'Ui Z'X]YgY 'H\Ya Uh]\_Yb '[ Yf]W hYhg]bXž'g]bX 'X]Y 'DchYbh]U`Y ZØf 'Y]bY '8 YYg\_U`Uh]cb 'XYf 'G]hi Uh]cb '[ Yf]b[ "

8 YhU]`g	
J cfZU``	GUb_h]cbYb
Cfh	I G5
EiY``Yb	• k k k "Zf"XY
	• kkk"hU[YggWXUi"XY
	• k k k "]k X"XY

6Ygi WXYb 'G]Y 'i bg 'Ui Z. 'b!U[ "bYh