

## < UZYbYW\_Yf'Ya dÒfh. 'BY\Ua a Yfg'9I!>cV Y]b'G\_UbXU`'XYg'DcghYbgW\UW\Yfg°

5a '%" 5df] ` &\$&) 'gcf[ h'X]Y 'Bca ]b]Yfi b[ 'j cb'? Uf` BY\Ua a Yf ZØf XUg 8]fY\_hcf]i a XYf 9i fcdA]gW\Yb =b| Ygh]h]cbqVUb\_.ZØfY]bYb'Ghi fa 'XYf'9bhfØghi b["'7\f]gh]Ub < UZYbYW\_Yfž'XYf'; YbYfU`qY\_fYhÀf'XYf': fY]\Y]h`]W\Yb'DUfhY] 2 ghYffY]WX g'fl D2 Łž'Ài » YfhY gWX UfZY '? f]h] 'Ub'X]Y gY f  $DYfgcbU`YbhgWXY]Xib["'9f'VYnY]WXbYhY'BY\UaaYf'U`g$ F\Yhcf]\_hfU]bYfž<sup>2</sup>556!:ib\_h]cbÀfž<sup>2</sup>JD!; YbYfU`gY\_fYhÀfž [YqWXY]hYfhYb ⇒bYba ]b]ghYfibXb]Y [Yk À\`hYb Ni ZU``q\_Ubn`Yf `i bX`j Yfk ]Yq`Ui Z'X]Y`FY\_cfXqW\i `XYbž'X]Y  $BY\setminus Ua$  a  $Yf']b'gY]bYf'5a hgnY]h'U`g'?Ubn`Yf'\]bhYf`UggYb'\Uh"$ @Ui h'< UZYbYW\_Yf'gY]'Yg'Y]b' DcghYbgW\UW\Yf']b'fch! qWk UfnYf'?cU`]h]cbga Ub]Yf'i bX'q\_UbXU`Òqž'XUgq  $BY\setminus Ua \ a \ Yf'Y]bYb' < ][ \setminus !@Y| Y` !6Ub_&V'Yf\A`hz'k A\fYbX'Yq$ ]b '2 ghYffY]WX 'ei U`]Z]n]YfhY '? Ub X]XUhY b 'ZØf'X]Y 'Dc g]h]c b '[ Y V Y "  $5 \g'VYgcbXYfg'VYgcf[b]gYffY[YbX'g]Y\h' < UZYbYW_Yf'X]Y$ a  $O[`]WXY'; YZA\fXi b['j cb'Z]bUbn]Y``Yb'A]hhY`'/ Ua d<math>AY``]d/$ 

5a '%"5df]` &\$&) 'gcf[ h'X]Y'Bca ]b]Yfi b[ 'j cb'? Uf` BY\ Ua a Yf` ZØf XUg`8]fY\_hcf]i a 'XYf`9i fcdÀ]gW\ Yb' \( \b) Ygh]h]cbgVUb\_ 'ZØf`Y]bYb Ghi fa 'XYf`9bhfØghi b[ "'7\f]gh]Ub' < UZYbYW\_Yfž`XYf ; YbYfU`gY\_fYhÀf`XYf`: fY]\Y]h`]W\ Yb` DUfhY]' 2 ghYffY]W\ g`fl D² \( \bar{z}\) Ài \( \bar{z}\) YfhY 'gW\ UfZY'? f]h]\_ 'Ub' X]YgYf` DYfgcbU`YbhgW\ Y]Xi \( b[ "'9f\) YYnY]W\ bYhY'BY\ Ua a Yf`U`g' \( \bar{z}\) F\Yhcf]\_hfU]bYfž' 2 556!: i b\_h]cbÀfž 2 J D!; YbYfU`gY\_fYhÀfž'[ YgW\ Y]hYfhYb' \( \bar{z}\) bYba ]b]ghYf`i bX'b]Y [Yk À\`hYb'Ni ZU``g\_Ubn`Yf' i bX'j Yfk ]Yg`Ui Z'X]Y'FY\_cfXgW\ i `XYbž X]Y'BY\ Ua a Yf`]b'gY]bYf`5a hgnY]h'U`g`? Ubn`Yf`\]bhYf`UggYb`\ Uh'' @Ui h' < UZYbYW\_Yf`gY]'Yg'Y]b' DcghYbgW\ UW\ Yf' \]b'fch\gW\ k UfnYf ?cU`]h]cbga Ub]Yf`i bX'g\_UbXU`ÒgžXUgg`BY\ Ua a Yf`Y]bYb' < ][ \! @Yj Y` !6Ub\_'cV'Yf\\\ h'z'k \( \alpha\) fYbX'Yg']b' 2 ghYffY]W\ 'ei U`]Z]n]YfhY? UbX]XUhYb'ZØf`X]Y'Dcg]h]cb'[ YVY'''5`g'VYgcbXYfg

 $\label{eq:cb-Z} $$ j cb-Z]bUbn]Y``Yb-A]hhY``ZØf-9I!Dfc-Y_hY-]a-6YfY]WA-G]WA-Yf\Y]h'ibX-J-YfhY]X][ib["$ 

<UZYbYW\_Yf'a UW\hY']b'gY]bYf'GhY``i b[bU\a Y'Ui W\'XYi h`]W\z\XUgg
Yf'X]Y'\danhfUbgdUfYbn'VY]'XYf'DcghYbVYgYhni b[']a
FY[]Yfi b[gdfc[fUa a '\_\_f]h]g]Yfh'i bX'X]Y'6i bXYgfY[]Yfi b[
Ui ZZcfXYfhz'X]Y'DYfgcbU`YbhgW\Y]Xi b['ni 'k]XYffi ZYb"'9f'ZcfXYfh
Y]bY'Yfbgh\UZhY'DYfgcbU`gi W\Y'i bX'k Ufbh'XUj cfz'XUgg'X]Y
9i fcd\[A]gW\Y'\danhj Ygh]h]cbgVUb\_']b'Ni \_i bZh'a \[O[`]W\Yfk Y]gY'X]Y
5i ZfØghi b[']b'9i fcdU'Z]bUbn]YfYb'\_\ObbhY''</pre>

 $Dc^{h}gWXY' < bhYf[fØbXY'ibX'9bhk]W_ib[Yb]$ 

8]Y: D² 'ghY\h']a '?cbhYl h'Y]bYf'g]W\'j YfÀbXYfbXYb'dc`]h]gW\Yb@UbXgW\UZh']b'² ghYffY]W\"BUW\XYb'DUf'Ua Ybhgk U\`Yb']a
GYdhYa VYfž'VY]'XYbYb'X]Y: D² '&, Žı 'XYf'Gh]a a Yb'Yf\]Y`h' 'Y]b
5bgh]Y['i a 'ZUgh'%' 'Di b\_hY']a 'J Yf[ `Y]W\'ni '&\$%-' '\_ObbhY'X]Y
DUfhY]'VU`X'X]Y'YfghY'FY[ ]Yfi b[ 'gY]h'XYa 'Nk Y]hYb'K Y`h\_f]Y[
ZØ\fYb"'DfÀg]XYbh'5`Yl UbXYf'J Ub'XYf'6Y``Yb'\Uh'< YfVYfh'?]W\_`ž
XYb'DUfhY]j cfg]hnYbXYbž'VYUi ZhfU[ hž'Y]bY'?cU`]h]cb'ni 'V]`XYb"
8]YgYf'GW\f]hh'nY][ hž'XUgg'J Yfgi W\Yž'Y]bY'FY[ ]Yfi b[ 'c\bY'X]Y': D²
ni 'V]`XYbž'[ YgW\Y]hYfh'g]bXž'XU'UbXYfY'DUfhY]ZØ\fYf'b]W\h'VYfY]h
g]bXž'i bhYf'?]W\_``ni '\_cU`]YfYb"'8]Y'\_cbgYfj Uh]j Y'² ghYffY]W\]gW\Y
J c`\_gdUfhY]'fP J DŁ'\_Ua 'Ui Z'&\* Z' i Z'k À\fYbX'X]Y
Gcn]U`XYa c\_fUhYb'&%%% 'Yf\]Y`hYb"

?ifnY`K YfVYY]bV`YbXib[

?]W\_`ž'XYf'VYfY]hg'j cb'&\$%+'V]g'&\$%-'\dotbYba]b]ghYf'k Ufž']gh'ZØf
gY]bY'dfcj c\_UbhYb'Ÿi »Yfi b[Yb'VY\_Ubbh'i bX'VYZØfk cfhYhY
k À\fYbX'XYf'7CJ\dot8!%-!DUbXYa]Y'\_cbhfcj YfgY
6Y\UbX`i b[ga Yh\cXYb"'I bhYf'gY]bYf': Ø\fi b['\_\ObbhY'X]Y': D²
Y]bY'dfc!fi gg]gWXY'<U`hi b['Y]bbY\a Yb'i bX'g\_Ydh]gWX'[Y[YbØVYf
9I !J cf[UVYb'U[]YfYbž'k À\fYbX'g]Y'[`Y]WXnY]h]['HY]`'Y]bYf
fYWXhqdcdi`]gh]gWXYb'5``]Ubn']a '9i fcdÀ]gWXYb'DUf`Ua Ybh']gh"

:  $D^2$  ]a \ ]ghcf]gW\ Y b ? c b hY l h

8]Y: fY]\Y]h`]W\Y'DUfhY]'² ghYffY]W\gž'X]Y'%-) \* 'Ui g'Y]bYa
GUa a Y`VYW\_Yb'Y\Ya U`][Yf'BUn]g'[Y[fØbXYh'k i fXYž\Uh'g]W\
ØVYf'X]Y'\J\\fY'ni 'Y]bYf'YhUV`]YfhYb'dc`]h]gW\Yb'?fUZh']b'² ghYffY]W\
Ybhk]W\_Y'h''\=\b'XYf'J\Yf[Ub[Yb\Y]h'hfUh'X]Y': D² 'i bhYf'\Df['<U]XYf
]b'XYb'%-, \$Yf'\J\\fYb'U`g'fYW\hgdcdi`]gh]gW\Y'DUfhY]'Ui Zž'X]Y'g]W\
[Y[Yb'X]Y'YhUV`]YfhYb'DUfhY]Yb'k UbXhY'i bX'X]Y'5b[gh'XYf
6Yj O`\_Yfi b['j cf'A][fUh]cb'i bX'?f]a]bU`]h\hana cV]`]g]YfhY''\=\fY
FY[]Yfi b[gdUfhbYfgW\UZhYbz'VY[]bbYbX'a]h'XYf'?cU`]h]cb'\&\\$\\$
a]h'XYf'^2 J Dz'gck]Y'X]Y'XUfUi Z'Zc`[YbXYb
FY[]Yfi b[gVYhY]`][i b[Ybz'k UfYb'ghYhg'j cb'?cbhfcj YfgYb'i bX
]bhYfbUh]cbU`Yb'GUb\_h]cbYb'VY[`Y]hYh''8]YgY'; Ya Yb[Y`U[Y'\Uh
XYb'9]bZi gg'XYf': D² 'gck]Y'X]Y'OZZYbh`]W\Y'K U\fbY\a i b[
\_cbghUbh'[Ydf\A][h''

 $8 ]Y `DUfhY] `` Uh `]b `] ` fYf' < ]ghcf] Y `j YfgWX] YXYbY `K U ` `YfZc `[ Y `Yfn] Y `h i bX `XUVY] `ghY hg `Ui Z `[ YgY ``gWX UZh `]WX Y `J YfÀbXYfi b [ Yb `i bX `Ÿ b [ ghY fY U [ ]Yfh" <math>\Rightarrow$  fY `U \_hi Y ``Y `Dcg]h]cb `XYi hYh `Ui Z Y]bYb `5 i Zk ]bX `ZØf fYWX hgdcdi `]gh]gWX Y `? fÀ ZhY `]b `9 i fcdU `\ ]bž `k À\fYbX `[ `Y]WX nY]h][ X]Y :: D^2 `Y]bYb `\_`UfYb `? i fg `]b `XYf  $\Rightarrow$  bYbdc `]h]\_ 'j YfZc `[ hž i a a ][ fUh]cbg\_f]h]gWX Y `i bX `g]WX Yf\Y]hgdc `]h]gWX Y `H\Ya Yb `k Y]hYf `ni VYhcbYb"

Cfh'XYg'; YgW\Y\Ybg8YhU]`g'ni f'A Y`Xi b[ K Ug']gh dUgg]Yfh3G\_UbXU`; YbUi Yf'Cfh'VY\_Ubbh3² ghYffY]W\6YghY FYZYfYbnchg"UhK Y]hYfY'Ei Y``YbUdbYk g"Wca

Gci fWY. X ]Y!bUWX f]WX hYb"Uh

8 Y hU]`q

6 Y gi W Y b 'G ] Y 'i b g 'U i Z 'b ! U [ "X Y