5 Yj Ub[Y`]nU, ~c Xc >Ud~c hYj Y]b‡Wyc Ya %) XY U[cghc XY %) (-žei UbXc G~c : fUbWygWt L Uj]Yf d]gci dY`U df]a Y]fU j Yn c gc`c b]d' b]Wt Y Wta Y, ci U dYfZi a z!`c Wta c cXcf`XY`gi Ugʻj]fhi XYg`Y`Xcbg`UXa]fzj Y]g"

 $8 \ Y \] b \ $W \ Cz <] XYmcg \] b \ \sim c \ dYfg Y[i]i \ cg \ $W \ Cz \ C \ dUgg Uf \ Xc \ h Ya \ dcz \ dcf fa \ z \ dYf W Y Y Yi \ ei \ Y \ g Yi \ g \ Ugg U' \ cg \ Wc \ j \ Yfh] Xcg \ Uc \ 7 \ Uhc`] W \ ga \ c \ E \ a \ i \] h cg \ Xcg \ ei \ U]g \ c W \ dUj \ Ua \ dcg \ XY \ XYgh Uei \ Y \ bc \ YI \ f W \ bgh] hi \ $Ua \ i \ a \ Ya \ dYW \ c \ dUf U \ U \ f Y U`] n U, \ \sim XY \ g Yi \ g \ XYg $U \ i \ a \ c \ Vghz W \ c \ dUf U \ cg \ g Yi \ g \ XYg \ ub \ Xcg \ a \ c \ f U]g''$

9a WtbgYe~..bWJUž Ugg]bci Ya %), + i a XYWfYhc XY Yl di `g~c Xcg a]gg]cbzf]cg" 8 Yj]Xc { g a YX]XUg XY dfi X..bWJU hca UXUg dY`cg Ygi #JUgž YggU]b‡ei U XYWJg~c b~c Zc] Yl YW HUXU" B~c gŒdYfa UbYWfUa `z cg Z]`\cg XY GUbhc =bzWJcž a Ugž U dUfh]f XY %) - 'ž Wta Y, UfUa UWXY[Ufa]gg]cbzf]cg ZfUbWJgWUbcgdfcj Yb]YbhYg XUg:]`]d]bUgž]bhYbg]Z]WUbXc! gY`a U]g`U]bXU`U`cVfU`XY`Yj Ub[Y`]nU, ~c"

 $= bZY`]na\ YbhYžc\ Ua\ V]YbhY\ dc`th]Wc\ YghUj\ U\ a\ i\]hc\ dYfhi\ fVUXc\ dcf\]bhf][\ Ugž\ WcV],\ Ug\ Wca\ YfW]U]g\ Y\ a\ Uei\]bU,\ "Yg\ Xcg\]b]a\][\ cg\ XU\ F\ Y`][\]-c\ Wf]gh-"\ 9\ hi\ Xc\ dfYggU[\]Uj\ U\ i\ a\ U\ j\]c`YbhU'dYfgY[\ i\],\ -c`Xc';\ cj\ Yfbc']a\ dYf]U'"$

B YggUg XY`]WUXUg VIJfWi bgh| bVIJUgž XYi !gY Ya %) - * c `Ua Ybhzj Y`]bVIJXYbhY Xc bUi Zfz[]c Xc [U`Y~c YgdUb\c` GUb : Y`]dYž bc `]hcfU` 'Udcb..g" HYbXc ZJWUXc gYa `Ya Yž XYj]Xc { hYa dYghUXYžU bUi YbWU`\ci Y Wta Y, ci U UZ bXUf" 5 hf]di `U, ~c Y cg dUggU[Y]fcgž a]gg]cbzf]cg ZfUbVIJgWUbcgj]bXcg XUg :]`]d]bUgž ZcfUa gUʻj cg Ya dYei Ybcg VUfWtg" < ci j Y hYa dc hUa V fa 'dUfUʻfYh]fUf hcXUʻUʻWUf[UžWtbgh]hi ‡XUʻXYʻdfYWJcgcgʻhYVJJXcgʻXYʻgYXU"

<]XYmcg\] Ybj]ci i a U[YbhY [cj YfbUa YbhU'ž A Ugi XUž dUfU]bgdYW]cbUf Y Uj U']Uf YggUg a YfWUXcf]Ug" 9ghY fYhcfbci Wta Xi Ug]bZcfa U, "Yg" 5 df]a Y]fUž VYa cV Yh]j U. c j U'cf XU WUf[U YfU gi Z]W]YbhY dUfU fYj][cfUf Ug Yl Ui f]XUg Z]bUb, Ug Xc X]hUXcf" 5 gY[i bXUž</p>



XY ZcbhY VUghUbhY Xi j]XcgU. c d]`chc XU bUj Y `\Y hYf]U WbZ]XYbWJUXc ei YžbUg Wbei]ghUg YgdUb\c`UgžU'dfY[U, ~c'a]gg]cbzf]U'dfYWYX]U'Y'dfYdUfUj U'c'hYffYbc'dUfU'U']bj Ug~c'a]`]hUf"

=ggc gYfj]i XY dfYhYl hc dUfU <]XYmcg\]ž ½ dfYX]gdcghc dY`Ug]bhf][Ug Xcg Vcbncgž a i XUf fUX]WUʻa YbhY gi U Uh]hi XY XY WbhYa dcf]nU, ~c" A UbXci dfYbXYf cg ZfUbW]gWUbcg Y WbZ]gWUf Ug a YfWUXcf]Ug Xc [U`Y~c" Dci WbhYa dc XYdc]gžcfXYbci c WYfWb XUg WUgUg Xcg a]gg]cbzf]cg`Ya `C gU_U`Y`? mchc"

<ia]`\U, ~c`hfUbgZcfa UXU'Ya 'hf]i bZc

 $5 \ a \] gg\sim zf Ub W g W Ub U h b U W a c W b h c XY \] ff UX] U, \sim c U = [fY'U XY B c g g U G Y b C f U X c g 5 b c g X a ? mchc x Y b h c 7 Ud] h U] a d Y f] U' " @ z Z c f Ua d f Y g c g Y a & XY 'Ub Y] f c XY %) - + c g a] g g] c b z f] c g . c G i d Y f] c f z f Y] D Y X f c 6 Uh] g h U / c g d U X f Y g A U f h t b @ c m b U n XY `U 5 g W b g] G b Y : f U b W g W c 6 `Ub W c XY ; U `] W J U / c W f f] [c :] `] d Y X Y > Y g • g Y c g] f a ~ c g `Y] [c g : f U b W g W c X Y G U b A] [i Y `Y ; c b , U `c ; U f W U " > i b h c W c a Y `Y g z e i] b n Y b] d ' b] W c g W c b j Y f h] X c g z Y b h f Y c g e i U] g j z f] c g `W h Y e i] g h U g Y h f . g `W f c] b \ U g z W W U a U X c g @ i t g = V U f U _] z 5 b h b] c Y `H c a z g ? c n U _] "$

9a CgU_U ZcfUa YbWJfWfUXcg cg WJhYei]ghJg >c~c XY; chc Y H]U[c?]gU]žYia bcj], c Ygi ‡hJ WX Ua UXc DUi `c A]_]" 8 Y gYb\cf]U` cf][Ya ž YghY • `h]a c bUgWfU Ya %*, Y hfUVU`\Uj U Wta c Gi dYf]cf Dfcj]bWJU` Ya B U[UgU_]" DfY[UXcf YI ‡a]cž ZJn]U]bhYbgc Udcghc`UXc" A U]g hJfXYž bU df]g~cž cg hf..g h]j YfUa c [zi X]c XY gYfYa cZ]WJU`a YbhY fYWYV]Xcg'bU'7ca dUb\]U`XY'>Ygi g"

Cg &(df]g]cbY]fcg ZcfUa fYi b]Xcg bi a U dfU, U d•V`]WU XY ? mchcžcbXY cg U`[cnYg WcfhUfUa U cfY`\U Ygei YfXU XY WUXU i a XY`Yg" 9a gY[i]XUžhfUbgdcfhUfUa!bcgžWcVYfhcg XY`gUb[i YžYa 'dYei YbUg`WUffc, UgždUfU`gYfYa 'YgWUfbYW]Xcg`dY`U`dcdi`U, ~c"

Dcf fa ž Ug fi XYg WUffc, Ug XU][bca \pm b]U hf Ub gZcfa Uf Ua \pm gY Ya hf]Vi b U XY [`Œf]U" B c hf U Yhc XY ? mchc U B U[UgU_] ž cg a zfh]f Yg Yf Ua f YW V]Xcg Ya hf]i b Zc d Y`cg Z] f]g X Ug U`XY] Ug WUhŒ] WUg" \pm bi a Yfzj Y]g Y Wta cj Yb hYg Wtbj Yf g" Yg gY XYf Ua Uc `cb[c Xcg WUa]b \ cg Y Xcg `i [Uf Y 'cg'dcf' cb X Y'd UggUf Ua "

$\label{eq:conditional} I a "j Y`\c'd" J `Yc'd" a cffYf' Wca "U`Y[f] U$

BcX]U, XY^UbY]fcXY%) - +ž <]XYmcg\] Ugg]bci cXYWfYhcXY WcbXYbU, ~c{ a cfhYXYggYg&(\Yf \Box gXU: fždcfach]jcgYlWig]jUaYbhYfY`][]cgcg" 5Y`YggY^lbhUfUaaU]ghUfXY`Xc]g`cihfcg`eiY`cg`\Uj]Ua`UWcadUb\UXc`bc`hfUYhc"

< UbnUVi fc HYfUnUk Už]fa ~c Xc [cj YfbUXcf XY B U[cmUž fYWVYi XY <]XYmcg\] U cfXYa XY Yl YW hUf hcXcg cg df]g]cbY]fcg Y Zc] YbWbhfz!`cg bi a `i [UfY'c dfI]a c XYggU WJXUXY"

&#*



EiUbXcj]i @itg =VUfU_]žZ]Wti Ya YIhfYacYaVUfU, UXc" GYbh]bXc!gY fYgdcbgzjY`dY`UacfhYXYiaU]bcWfbhYWf]Ub, UžcZYfYWfi!`\YU`]VYfXUXYžgYY`Yei]gYggYYbhfUfUgYigYfj], c"CaYb]bcXY]IciUXYWJg~cUWf[cXY:fY]DYXfc6Uh]ghU"9ghYfYgdcbXYiYagYbh]Xc'UZJfaUh]jcžWta'U'WtbX], ~c'XY'eiY``\Y'ZcggY'dYfa]h]Xc'j]jYf'Wtac'WUhE]Wt"

< UbnUVi fc b~c WcbhUj U Wca YggU fYgdcghU" 5 dŒg U`[i bg]bghUbhYg XY dYfd`Yl]XUXYž fYd`]Wci ei YždUfU Wcbh]bi Uf'j]j cž@i ‡g`XYj Yf]U fYbY[Uf'U: f`WhŒ]WU"

[BYggUg W&bX], "Ygžb~cjU`Y U dYbUj]jYfî Ë hfYd`]W&i c XYVJX]Xc W&fc]b\U" Ci hfU ZcfhY Ya c, ~c Udcggci!gY XY < UbnUVi fcž Uc XYgW&Vf]f YbhfY cg df]g]cbY]fcg gYi jY`\c W&b\YVJXc DUi`c A]_]"BcgUbh][cg hYa dcgž\Uj]U Y`Y Ugg]gh]Xc U U`[i a Ug XY gi Ug Ui`Ug XY WUhYVJga c"Ei UbhUg`fYW&fXU, "Yg`fYa cYfUa `gYi `Ygd‡f]hc`

J YbXc!c Ugg]a Wta cj]Xcž DUi `c A]_] Udfcj Y]hci U cdcfhi b]XUXY dUfU `\Y dYX]f hf..g ZUj cfYgžcg ei U]g X]ZJW}a YbhY dcXYf]Ua gYf bY[UXcg. ei Y U YI YW, ~c ZcggY bU gYI hU! ZY]fUžY`\Yg dYfa]h]ggY UbhYg WtbZYggUf!gY Y Ugg]gh]f { GUbhU A]ggU" < UbnUVi fc WtbgYbh]i ž a UgʻXYdc]qžfYWYUbXc UʻfYU, ~c Xc h]f|b]Wt <]XYmcq\]žj c`hci 'Uhfzg"

Dcf'gi U'cfXYa ž'Yf[i YfUa!gY'&* 'Wfi nYg'bi a U'Wc`]bU'dYfhc'XY'BU[UgU_]"

B U a Ub\~ XY) XY ZYj YfY]fcž U WWa]b\c Xc `cWU` Xc gi d`‡W]cžc WWhYei]ghU >c~c XY; chc j]i Udfcl]a Uf! gY gYi j YbYfzj Y` dU]" 7ca c XYgdYX]XUžj]b\U Y`Y XYa cbghfUf Uc Z]`\c Wta c b~c \z Wt]gU a U]g]a dcfhUbhY Xc ei Y U gU`j U, ~c XU U`a U" 5dŒg Ygh]a i `Uf c 'cj Ya U hYf a i]hc | b]a c Y ZcfhU`YnU XY U`a Už Yl cfhUbXc! c U a cffYf U`Y[fYa YbhYž dc]g a cff]U U gYfj], c XY 8 Yi gž UWfYgWfbhci ei Y hUa V fa Y`Y Y gi U a ~Y YghUj Ua X]gdcghcg U XYffUa Uf c gUb[i Y`dcf Ua cf XY`7f]ghc >Ygi gžgY`bYWfggzf]c ZcggY"

5 [fU, U'Xc'a Ufh#f]c'UhfU]'cg'Wf]gh~cg'^UdcbYgYg

7\Y[UbXcUcUhcXUWc]bUzcg&* a zfh]fYgZcfUa ZcfhYa YbhY Ua UffUXcgbUgWfinYgdfYdUfUXUgWta UbhYWfX..bW]U" 9a hcfbcXY`YgU[`caYfUjUa!gYWfWUXYeiUhfca]`Z]f]gžai]hcgXcgeiU]geiYfYbXcgYfhUaVfa WfiW]Z]WUXcg*I a dfcV`YaU]bYgdYfUXcdUfUcgYaVfihYW]Xcggc`XUXcgdU[~cgžeiYZcfUacVf][UXcgUigUfXYj]c`..bW]UdUfUÅ dcidUfUj]XU'XYggYg'Wf]gh~cg'h~c'dfcZibXUaYbhYhcWUXcg'dY`U'[fU,U'Xc'aUfh#f]c"

C a Yb]bc @i $\pm g = VUfU_{-}$] VfUXci U'hc Y Wta j ch Z]fa Y. Í DUfU $\pm g$ c° DUfU $\pm g$ c° >Ygi gž A Uf]U°Î 9a i a]bghUbhYž hcXcg cg dfYgYbhYg [f]hUj Ua U d`Ybcg di `a " Yg. Í >Ygi gž A Uf]U°



>Ygi gž"A Uf]U°Î

C df]a Y]fc U Wbgi a Uf c a Ufhtf]c Zc]: fY]:]`]dY XY >Yg•g" GYi Wbfdc YghfYa YWYi Uc fYWYVYf cg hfYa YbXcg [c`dYg XY Xi Ug`Ub, UXUg ei Y`\Y dYfZi fUfUa c dY]hcžXc ei U`^cffci c`gUb[i Y`Wbd]cgUa YbhY"

C dYei Ybc Wtfc]b\U 5bh b]c dYX]i Uc DY" 6Uh]ghU dUfU YbhcUf c [@Ui XUhY di Yf] 8 ca]bi a \hat{I} fl@ci j U]ž a Yb]bcgž Uc GYb\cft" 9ghYž dcffa ž YghUbXc Ya dfcZi bXU WtbhYa d`U, ~cž bUXU ci j]U" 5bh b]cž Ybh~cž]b]W]ci gcn]b\c c Wjbh]Wtž a Ug Zc]]bhYffca d]Xc dY`Ug `Ub, UXUg ei Y hfUgdUggUfUa gYi WtfU, ~c]bZUbh]`" 8 c U`hc XU Wfi nž c =fa ~c DUi `c A]_] b~c WfggUj U XY YbWtfU'Ufž Wta X]j]bU Y`ce~..bW]Už cg Wta dUb\Y]fcg" Gi U`U`a U`'z`dfY`]VUj U`c`7 fi "

Cg [c`dYg a cfhu]g XUg `Ub, Ug ZcfUa gi WYXYbXc!gYžia UdŒg ci hfcž UVf]bXc Ug dcfhUg:Xc;DUfUtgc:Ucg:ZY`]nYg:a zfh]fYg"C · `h]a c:U:Yl d]fUf:Zc]:c:DUXfY::fUbW[gWt:6`UbWt"

B U hUfXY XYggY a Yga c X]Už c 6]gdc XY B U[UgU_] Y cg dUXfYg Ygi \sharp hUgž ei Y b~c di XYfUa Ugg]gh]f Uc a Ufh \sharp f]c XYj]Xc { dfc]V], ~c XY < UbnUVi fcž ZcfUa j YbYfUf cg Wtfdcg Xcg gUbhcg a zfh]fYgžWi 'c gUb[i Y \ Uj]U g]Xc d]YXcgUa YbhY fYWt`\]Xc dY`cg WUhE]WtgžWta c dfYW[cgU'fY` \sharp ei]U"

8 YW¢ff]Xcg '\$ Ubcgž Ya %*&+ž c DUdU I fVUbc J == fYW¢b\YWfi cZJWJU'a YbhY gYi a Ufhtf]c"'9 'c '6Ya !5 j Ybhi fUXc 'D]c '=L 'cg'WJbcb]nci 'Ya ', 'XY''1 b\cXY'% *&"

7ca]ghcž Z]Wti ei UgY hchU`a YbhY Yl hYfa]bUXc c 7f]gh]Ub]ga c Ya gc`c b]d' b]Wt" A Ug c gUb[i Y XY hUbhcg a]`\UfYg XY a zfh]fYg b~c WtffYi Ya j~c" l b]Xc Uc DfYW]cgtgg]a c GUb[i Y XY >Ygi gžY`Y ZYW bXUžb~c UdYbUg c gc`c Xc >Ud~cža Ug c XY hcXUg Ug bU, " Yg cbXY]bWtbhzj Y]ga]gg]cbzf]cg Ubi bW]UfUa Y Ubi bW]Uf~c c 9j Ub[Y`\cžUc `cb[c Xcg gfW `cg" 9 gYi `Yl Ya d`c`Wta cj Y`Y`Ub]a U`Uhf`\c^Y`ei Ya ``...'U`\]ghŒf]U`XY`gi U`a cfhY`gi V`]a Y"

: cfa Ua Y`Yg i a U Ygd`YbXcfcgU WcfcU XY [`Œf]U gcVfY U ZfcbhY gUWfcggUbhU XU FU]b\U Xcg A zfh]fYg" fCgWUf A UWchc A ch]hgi _]/ FYj]ghU 5fUi hcg Xc 9j Ub[Y`\cž: Yj #&\$\$(ž`b"`&*žd"`&\$`{`&&Ł



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