

K U`_ØfY`ghUfhYh`Ui Z!7\U]b`8YZ]:: i bX bÀW\ghY`K cW\Y`

JU`_mf]Y =b| Ygha YbhgžY]bYfXYf[fÒ»hYb JYfa Ò[YbgjYfk U`hYf'ZØf'?fmdhck À\fi b[Ybž'\Uh $Ub[Y_\emptyset bX][h\check{z}^*b\grave{A}W_qhY^*K_cW_Y^*Y]bYb^*qc[YbUbbhYb^*Cb!7^U]b!$ 8 Y Z]b!: cb X g Ui Zni `Y [Y b " 8] Y g Y f b Y i Y : cb X g k Ø f X Y g] W \ Ui Z[fi bX'XYf'@U[Y'XYf'JYfa Ò[Ybgk YfhYž'X]Y'ni f'9fn]Y'i b[jcb~FYbX]hYb~]b~aY\fYfYb~Dfchc_c``Yb~nif~JYfZØ[ib[qhY\YbžYf\YV`]WX`jcb`UbXYfYb`À\b`]WXYb`5b[YVchYb i bhYfqW\Y]XYb": Øf`X]YqY` ⇒]h]Uh]| Y'k i fXYb 'VYfY]hq'%\$\$ $A = 1^{\circ} cbYb' I G! 8 c ``Uf' VY fY]h[YghY ``h" K U`_ØfY `XY V Øh] Y fh' U i Z$ $7 \ Ub' 8 \ YZ!: cb Xg' J U`_mf] Y' = bj Ygha Ybhg' \ Uh' Ub[Y_Øb X][h' X] Y$ $[Yghf][Y'5iZY[ib[']\fYg'YfghYb'Cb!7\U]b!8YZ]b!:cbXqž'XYf$ Y]b DcfhZc`]c'j cb'8YZ]!6`i Y!7\]dg'\U`hYb'k]fX"'8Yf I bhYfgWX]YX'nk]gWXYb'X]YgYa :: cbXg'i bX'À\b`]WXYb 5b[YVchYb^]Y[h]a GhUbXcfhqY]bYf:cbXq"K À\fYbX'UbXYfY A]hhY`X]Y'DfY]qY'j cb'J Yfa Ò[Ybgk YfhYb'dUgg]j 'ni $i Y f Z c (Y b \check{z} g W \check{A} [h J U \underline{m} f] Y i c f \check{z} X] Y / U a d \wedge Y \check{a} d \mathring{a} d$

JU`_mf]Y`=bj Ygha YbhgžY]bYf`XYf`[fÒ»hYb

JYfa Ò[Ybgj Yfk U`hYf`ZØf`?fmdhck À\fi b[Ybž\Uh

Ub[Y_ØbX][hž'bÀW\ghY`K cW\Y`Y]bYb`gc[YbUbbhYb`Cb!

7\U]b!8YZ]b!: cbXg`Ui Zni `Y[Yb"8]YgYf`bYi Y`: cbXg`k ØfXY

g]W\`Ui Z[fi bX`XYf`@U[Y`XYf`JYfa Ò[Ybgk YfhYž`X]Y`ni f

9fn]Y`i b['j cb`FYbX]hYb']b`a Y\fYfYb`Dfchc_c``Yb`ni f

JYfZØ[i b['ghY\YbžYf\YV`]W\'j cb`UbXYfYb`À\b`]W\Yb

5b[YVchYb`i bhYfgW\Y]XYb": Øf`X]YgY`=b]h]Uh]j Y`k i fXYb

VYfY]hg`%\$\$`A]``]cbYb`I G!8c``Uf`VYfY]h[YghY``h"

$KU'_0fYXYVØh]YfhUiZ!7VU]b8YZ]!:cbXg$

JU`_mf]Y`\bj Ygha Ybhg`\Uh`\Ub[Y_\ObX][h`X]Y`[Yghf][Y`5i ZY[i b[]\fYg`YfghYb`Cb!7\U]b!8YZ]b!: cbXgž`XYf`Y]b`DcfhZc`]c'j cb'8YZ]!
6`i Y!7\]dg`\U`hYb`k]fX"'8Yf`I bhYfgWX]YX`nk]gWXYb`X]YgYa :: cbXg i bX`A\b`]WXYb`5b[YVchYb``]Y[h`]a 'GhUbXcfh`gY]bYf`: cbXg"
K A\fYbX`UbXYfY`A]hhY``X]Y`DfY]gY`j cb`JYfa O[Ybgk YfhYb`dUgg]j ni 'j YfZc`[Ybž`gWX`A[h`JU`_mf]Y`j cfž`X]Y`JYfa O[Ybgk YfhY`]b`XYf?YhhY`ni \U`hYb"8]Yg`VYXYi hYhž`XUgg`g]Y`X]YgY`j Yfk YbXYb_ObbYbž`i a '9fhfA[Y`i bX`dUgg]j Yg`9]b_ca a Yb`ni 'Yfn]Y`Ybž`]bXYag]Y`X]YgY`JYfa O[Ybgk YfhY`]b`j YfgWX]YXYbYb`Dfchc_c``Ybdcg]h]cb]YfYb"

 $\label{eq:continuity} K Yg'7ck Ubž'8YZ]!; YgWAÀZhgZØ\fYf'j cb'J U`_mf]Yž'gU[hY.$

8]Yg'Yfa Ò[`]W\h'Yg'i bgž'Ua '5i Zk ÀfhghfYbX'ni dUfh]n]d]YfYb'i bX'[`Y]W\nY]h]['ni gÀhn`]W\Y'FYbX]hYb'Ui g ?fYX]hj Yf[UVYbž'@]ei]X]hÀhgdcc`gž'@UbXk]fhgW\UZh'i bX 6YhY]`][i b['Ua '8YZ]!2 _cgmghYa 'ni 'Yfn]Y`Yb'''K]f'Yf\U`hYb X]Y'K YfhghY][Yfi b['d`i g'X]Y'ni gUa a Yb[YgYhnhY'FYbX]hYž X]Y'Ui g'XYf'8YZ]!6YhY]`][i b[']b'XYf'?YhhY'[YbYf]Yfh'k]fX''

 $8\,Y\,f^{\,:}:\,c\,b\,X\,g^{\,:}k\,\,]f\,X^{\,:}a\,\,]h^{\,:}\%\$\,\$^{\,:}A\,\,]^{\,:}]c\,b\,Y\,b^{\,:}I\,\,G!\,8\,c\,{}^{\,:}U\,f^{\,:}V\,Y\,[\,\,]b\,b\,Y\,b\,{}^{\,:}Z\,]Y^{\,:}j\,\,c\,b$

a Y\fYfYb =bj YghcfYb i bX XYb ?ca d`Ya YbhÀfYb XYg I bhYfbY\a Ybg ghUa a Yb"

. . .

9lch]gWXY7V]dgibXGhUVYWc]bg

8]Y`XYnYbhfU`]g]YfhY`:]bUbni a [YVi b[`]gh'Y]bY`[fc»Y`i bX
j]Y`ZÀ`h][Y`6Yk Y[i b[ž'X]Y`]b`a Y\fYfYb`?fmdhck À\fi b[g_YhhYb
dfÀgYbh']gh"K À\fYbX`UbXYfY`=bj YghcfYb`a Y]gh']b`YhUV`]YfhY
Dfchc_c``Y`k]Y`9h\YfYi a `]bj Ygh]YfYbž'gWXY]bh'J U`_mf]Yg'J cfgWX`U[
UVYbhYi Yf`]WXYf`ni `gY]b"`7ck Ub`VYghÀh][hY`X]Ygž'U`g'Yf`X]Y`?YhhYb
Ui ZhÀ\`hYž']b`X]Y`X]YgYf': cbXg']bj Ygh]YfYb`a ÒWXhY"`7ck Ub
Yf_`ÀfhY.

K]f gY\Yb j]Y Y A Ò[`]W_Y]hYb Ui Z 6 `c W_W\U]bgž XUfi bhYf 9h\YfYi a ž 5j U`UbW\Yž Gc `UbUž 6]bUbW Ga Ufh 7\U]bž A Uh]Wi bX : Ubhca "

CVk c\`X]YgY'9fk À\bi b['a Ò[`]W\Yfk Y]gY'b]W\h'VYXYi hYhžXUgg g]Y']b'X]YgYb'I a [YVi b[Yb']b'bUh]j Y'Hc_Yb']bj Ygh]YfYb'k YfXYbž]gh'X]Y'9fk À\bi b['Y]b][Yf'X]YgYf'Cdh]cbYb']bhYfYggUbh'i bX'Y]b 6Yk Y]g'ZØf'XUg'K UW\ghi a 'Y]b][Yf'X]YgYf'? YhhYb'''8]Y Ni gUa a YbgYhni b['XYg'DcfhZc`]cgž'k Y`W\Y'Hc_Yb'i bX']b'k Y`W\Ya JYf\À`hb]g'g]Y'[Y\U`hYb'k YfXYbž']gh'YXcW\'bcW\'b]W\h'ZYgh[Y`Y[h''

7 ck Yb 'fÀi a hY 'Y]bž'XUgg'GhUV`YWc]bg'Y]bY 'k]W\ h][Y 'F c``Y ']a Dcfh\Zc`]c 'gd]Y`Yb '_ \dot{O} bbh\Yb'i b\X'\Z\Ø[h\Y'\]bni .

5 i W. 'k Ybb 'g]Y 'g]W. ']b 'GhUV `Y Wc]bg 'V Y Z]b X Y b ž 'k Y f X Y b 'g]Y]a a Y f ']b 'X Y f '? Y hh Y 'Y]b [Y g Y hn h ž i a 'F Y b X]h Y 'n i 'Y f n]Y `Y b "

8]Y '5i ZY[i b['X]YgYg': cbXg'_ÒbbhY 'Y]bYb 'HfYbX'Ui g`ÒgYbž'XYf UbXYfY '5_hYi fY 'XUni ']bgd]f]Yfhž']\fY'J Yfa Ò[Ybgk YfhY ']b'XYf ?YhhY 'Y]bni gYhnYbž'i a 'F YbX]hYb'Ui g'XYf'Dcg]h]cb]Yfi b['ni Yfn]Y`Ybž'UVYf'Yf'Vf]b[h'Ui WX 'bYi Y 'F]g]_Yb'ZØf'X]Y 'Yb][Yb'a]h g]WXž'X]Y']b'XYb': cbXg']bj Ygh]YfYb"

K Ug`\U`hYb`G]Y`j cb`X]YgYa `bYi Yb`Cb!7\U]b!8YZ]b!: cbXg j cb`J U`_mf]Y3`GU[Yb`G]Y`Yg`i bg`]a `?ca a YbhUfVYfY]W\ i bhYb"

6] `XbUW k Y]gY. `G\ i hhYfghcW_Z'D] UVUmZ'K]_] '7ca a cbg

fZ bWh]cbfXžgž]XŁoj Uf~gžZgʻ1 X"[Yh9`Ya Ybhg6mHU[BUa YfgŁQ\$Q']ZfK"[Yh9`Ya Ybh6m=Xf]XŁŁfYhi fb/~gʻ1 X"WfYUhY9`Ya YbhfgŁ/~g"]X·1]X/~g"gfWl~\hhdg.#WcbbYWh"ZUWYVcc_"bYh#YbSl G#gX_"~g, I ZVa `1 %/j Yfg]cb1j' "&~/Z~g"dUfYbhBcXY"]bgYfh6YZcfYfl~gžZ~gŁ/qfXcW a YbhžfgWf]dhfz~fZUWYVcc_!~ggX_fŁŁ/

8 Y hU]`c

6Ygi WXYb G]Y i bg Ui Z _fmdhc!bYk g"Uh