

ARTS2870

7]hjnYbgž5WhjcbUbX8]ggYbh

HYfa "Hk c" ## "&\$%

7ci fgY⁻Cj Yfj]Yk

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'7cbj Ybcfg'

B Ua Y	9a U]`	5j U]`UV]`]hm	@cWUh]cb	D\cbY
AY[Ub'FcgY	a Y[Ub"fcgY4 i bgk "YXi "Ui	H67	H67	H67

GWXcc`7cbHJWhi±bZcfa Uhjcb

GWkcc``cZGcWJU``GWJYbWYg

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A cfj Yb 6fck b 7 &\$

Ya U]`. 'gcgg4 i bgk "YXi "Ui

d\cbY. '\$&'-',) '% \$+

Hi fb]hjb gYhjb[. H\]g]g bchU Hi fb]hjb Ugg][ba Ybh

5ggYgga Ybh& 7f]h]WU`fYZYWh]cbg. 6`c[dcghg

GhUfh'XUhY.

@Yb[h\. '%\$) \$ fl 'l '') \$ k cfX Ybhf]YgŁ

8 YHU]`g. '9][\hif] Ł'YbHf]Yg'UfY fYei]fYX'cj Yf'h\Y'Wti fgY'Zfca 'k YY_g'&'hc'-'fl) \$ 'k cfXg'dYf'YbHfmŁ"+D'WUgg Zcfa Uh]j Y'ZYYXVUW_'k]``VY'[]j Yb']b'K YY_'' "H\fYY'fl Ł'V`c['dcghg'gY`YWhYX'Zcf'gi Va]gg]cb']b'U'dcfhZc`]c" Mci 'k]``'fYWY]j Y'U'[fUXY'UbX'ZYYXVUW_'k]h\]b'&'k YY_g'cZgi Va]hh]b["'

5XX]h]cbU`XYhU]`q.

H\Y'V`c['Ybhf]Yg`fYei]fY`fY[i `Uf]hmiUbX`fci h]bY`]b`h\Y`cb!`]bY`Ybj]fcba Ybh'C bY`cZh\Y`UXj UbhU[Yg`cZh\]g hmdY`cZUggYgga Ybh]g`h\Uh]hk]```U``ck `mci `hc`VY`dfYdUfYX`Zcf`gYa]bUfg`UbX`U`gc`[]j Yg`mci `U`[ccX VUW_[fci bX`Zcf`h\Y`ch\Yf`UggYgga Ybhg`]b`h\]g`Wci fgY"'=h]g`U`fYWcfX`cZmci f`Yb[U[Ya Ybhk]h\`h\Y`Wci fgY UbX`k]h\`h\Y`gYhfYUX]b[g`UbX`U`gc`U``ck g`mci `hc`j]Yk `h\Y`Yb[U[Ya YbhcZch\Yf`ghi XYbhg`Ug`Ub`UgdYWicZ Wc``UVcfUh]j Y`XYj Y`cda YbhcZ_bck `YX[Y"'

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Cb'U'k YY_`mVUg]gž'V`c['dcghg`cZ') \$ 'k cfXg`YUW. 'UfY'hc'VY'Wcblf]Vi hYX'hc'h\Y'Wci fgY'g'A ccX`Y X]gW gg]cb'VcUfXg"'5g'h\YmUfY'dfYdUfUh]cb'YI YfW]gYgž'h\Yma i ghVY'i d`cUXYX'TWadWh\Y'gYa]bUf'Zcf'h\Y k YY_'Zcf'k \]W.'h\YmUfY'dfYdUf]b["'\dot\ YY_-\zimci 'k]``'W\ccgY'' 'dcghg'hc'gi Va]hUg'dUfhcZmci f UggYggUV'Y'dcfhZc']c"'H\Y'a cfY'dcghg'mci '\Uj Y'i d`cUXYXz'h\Y'a cfY'mci 'k]``'\Uj Y'hc'W\ccgY'Zfca 'k \Yb W\ccg]b['mci f'V`c['dcghg"'H\YfY'UfY'bc'YI hYbg]cbg'[fUbhYX'Zcf'h\]g'HUg_'Ug']hk Ug'XYg][bYX'hc Wcad'YhYX'k YY_'Vmk YY_"'Nci 'UfY'YbWci fU[YX'hc'dcghk YY_`mV`c['Ybhf]Ygž'Vi hmci 'A I GH'gi Va]hbch 'Ygg'h\Ub'*'dcghg'cj Yf'h\Y'%\$'k YY_g'cZ'h\Y'Wci fgY"

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H\Y'hcd]\Wg'Zcf'h\Y'V'c['dcghg'UfY'`]ghYX']b'h\Y'k YY_!Vmk YY_'WUgg'[i]XYž`UhYf']b'h\]g'ci h]bY"'H\YgY'V'c[dcghg'UfY'a YUbhhc'VY']bZcfa U'ž'h\ci [\hZ\`'UbX'gdYW\`Uh]j Y"'H\YmUfY'dcghgž'bcha]b]!YggUmgž'UbX'gc'ZYY`ZYY'hc'i gY'h\Y'Z]fghidYfgcb''="'Mci 'a Um'U'gc'i gY'h\Y'V'c['dcghg'hc'Wca a Ybhcb'Vf]YZW]dd]b[g'Zfca X]j YfgY'a YX]U'gci f\Wg'h\UhfY`UhY'hc'k YY_`mhcd]\Wg'UbX`\Y'd'mci 'hc'Yl d'cfY'_YmWcb\Wdhg'XYj Y`cdYX']b h\Y'Wci fgY'h\fci [\'Yj YfmXUmYl Ua d'Yg'UbX'']j YX'Yl dYf]Yb\W'''H\Y'gi \W\Ygg'cZh\]g'\Wci fgY'XYdYbXgž']b `Uf[Y'a YUgi fYžcb'X]U'c[i Y']b'h\Y'gYa]bUf'UbX'U`gc'cb'h\Y'V`c['Ug'k Y``'Ug'mci f'\WJfY\Z\''dfYdUfUh]cb'hc \Z\\Y]']h\Y'h\]g'X]g\W gg]cb"'

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FYUX]b[g`\Uj Y`VYYb`gY`YWWX`hc`gh]a i`UhY`]bei]fm`UbX`fYZYWI]cb"`K\Yb`a U_]b[`mci f`Ybhf]Ygžmci `UfY YI dYWYX`hc`ZcW g`cb`Ub`UgdYWhcZmci f`fYUX]b[g`h\UhiUddYU`g`hc`mci "`5`dUfh]W``Uf`dUggU[Y`a UmiUddYU`hc mci Zcfj Uf]ci g`fYUgcbg. Zcf`]hg`]bg][\hž`WUf]hmž`X]ZJW`hmž`Ua V][i]hmž`UbX`gc`Zcfh\"'H\Y`WcbW'dhX]Ufm fYei]fYg`mci hc`Yb[U[Y`k]h\`h\Y`fYUX]b[g`f]h`XcYg`bchfYei]fY`mci hc`gi a a Uf]gY`h\Y`fYUX]b[g\text{Loop}'Nci Wb`YbhYf]bhc`U`X]U`c[i Y`k]h\`U`WfhU]b`dUggU[Y`VmUdd`m]b[`dYfgdYWI] Yg``YUfbYX`]b`h\Y`Wci fgY''`K Y k ci `X``]_Y`mci hc`fYWcfX`mci f`fYgdcbgYg`hc`hYI hgžVch\`dcg]h] Y`UbX`bY[Uh]j Y''`Mci k]``Z]bX`h\Uhik f]h]b[UVci hUbY[Uh]j Y`fYgdcbgY`Wbb`VY`j YfmdfcXi WI]j Y''``

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 $H \searrow Zcfa \ cZk \ f]h]b[\]g]bhYbXYX \ Ug \ U \ Wca \ d \ Ya \ Ybhhc \ h Y \ k \ f]h]b[\ g] \ Y \ cdYX \]b \ ffUX]h]cbU \ YggUm \ k \ f]h]b[\ "K \]Y \ h \searrow Zcfa \ cZk \ f]h]b[\ g \ c \ X \ ZYY \ Ygg \ XYa \ UbX]b[\ h \ Ub \ YggUmk \ f]h]b[\ z \ h \ YfY \]g \ Ub \ YI \ dYWUh]cb \ cZfYgdcbg]V] \ mzcfh \ Y \ k \ cf \ dfYgYbhYX \ dfX \ cZmci \ f \ k \ b \ YUfb]b[\ YI \ dYf]YbWW \ K \ f]h]b[\ mci \ f \ XYUg \ UbX \ mci \ f \ Wf]h]ei \ Y \ cZk \ Uhimci \ fYUX \]g \ U \ X]ZZYfYbha \ UhhYf \ Zca \ h \]b[\ Y \ cdYX \ h \ yhg \ UfY \ XY \ Y \ cdYX \]b \ h \ Y \ dcYX \ h \ Yhd \ dcfhUbhmZk \ Y \ k \ Ubhhc \ gYY \ mci \ f \ k \ cf \]b[\ gz \ bchU \ Zb]g \ YX \ dfcXi \ Wh \ A \ cgh]a \ dcfhUbhmZk \ Y \ k \ Ubhhc \ gYY \ ck \ h \ Y \ dcghg' \ Y \ d \ Yf]ybW \ g \ hc \]ZY \ Zcf' \ mci \ UbX \ Zcf' \ ch \ Yf \ ghi \ XYbhg'k \ C \ Wb'fYUX \ mci \ f'dcghg''$

 $\label{thm:continuous} \begin{tabular}{ll} Hi & fb & fb & gYM &$

5ggYgga Ybh' . 7cbWdhYggUm

GhUfh XUhY.

8 YHJ]`g. 'H\Y`WcbW'dhYggUm]g`% \$\$`k cfXg"' \(\delta\kark \)]``XfUk 'cb`_Ym`]XYUg`]b`h\Y`Wci fgY`UbX`a i gh'U`gc XYa cbghfUhY`h\Y`i gY`cZgca Y`V`c[`dcghgž'Vch\`Zfca 'h\Y`ghi XYbh'UbX`ZY``ck 'ghi XYbhg`k]h\`I F@``]b_g`hc`h\Y dcghg`fYZYffYX`hc"K f]hhYb`ZYYXVUW_k]```VY`dfcj]XYX`k]h\]b`\%\$`k cf_]b[`XUmg`cZgi Va]gg]cb"`

5XX]h]cbU`XYhU]`g.

5b`YggUm]g`Ub`YI hYbXYX`]bhY``YWhi U``Yb[U[Ya Ybhk]h\`U`dUfh]W``Uf`ei Ygh]cb`cf`hUg_"`±ia i ghXYa cbghfUhYbchcb`mUb`UV]`]lmhc`k f]hY`hc`Ub`UWWdhUV`Y`ghUbXUfX`Vi hz`↑ghUg`]a dcfhUbhmz`Ub`UV]`]lmhc`UbU`mgY`h\Y]ggi Yg`fY`Uh]b[`hc`h\Y`hcd]W'H\Y`YggUm]g`mci f`cddcfhi b]lmhc`i bXYfhU_Y`]b!XYdh\`UbU`mg]g`cZU`gdYW]Z]Whcd]WXYj Y`cd]b[`]qqi Yq`fU]qYX`]b`h\Y``YWhi fYq`UbX`fYUX]b[q"`

H\Y'YggUma i ghXYa cbghfUhY'Yb[U[Ya Ybhk]h\ h\Y'_YmWcbWYdhg'UbX'h\Ycf]Yg fU]gYX']b'h\Y'Wci fgY"'H\Y Wci fgY fYUXYf'g\ci `X'VY'mci f'ghUh]b['dc]bh]b'dfYdUf]b['h\Y'YggUmž'Vi hmci 'k]``'U`gc'VY'YI dYWYX'hc'fYUX VYmcbX'h\Y'Wci fgY'fYUX]b[g'hc'Wca d'YhY'h\]g'Ugg][ba Ybh'UbX'XYa cbghfUhY'U'Wf]h]WJ\Yb[U[Ya Ybh'UbX WJdUW]mhc'fYj]Yk ``]hYfUhi fY"'Mci 'UfY'Ug_YX'hc'ei Yfm'UbX'Yj U'i UhY'U``'h\Uhmci 'fYUX'UbXž'h\fci [\'U'Wf]h]WJ\Yb[U[Ya Ybhk]h\]hz'XYj Y`cd'mci f'ck b'UddfcUW\'UbX']XYUg";H\YgY']XYUg'g\ci `X'VY'XYj Y`cd'X'h\fci [\

5 hm/b XUb WY F Yei]fYa Ybhg

 $\hbox{Ghi XYbhg'UfY'ghfcb[`mYbWci fU[YX'hc'UhhYbX'U```WUggYg'UbX'fYj]Yk ``YWhi fY'fYWcfX]b[g''] }$

7ci fgY'GWXYXi `Y

J]Yk 'WUgg'hja YhUV'Y

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8UhY	HmdY	7 cbhYbh

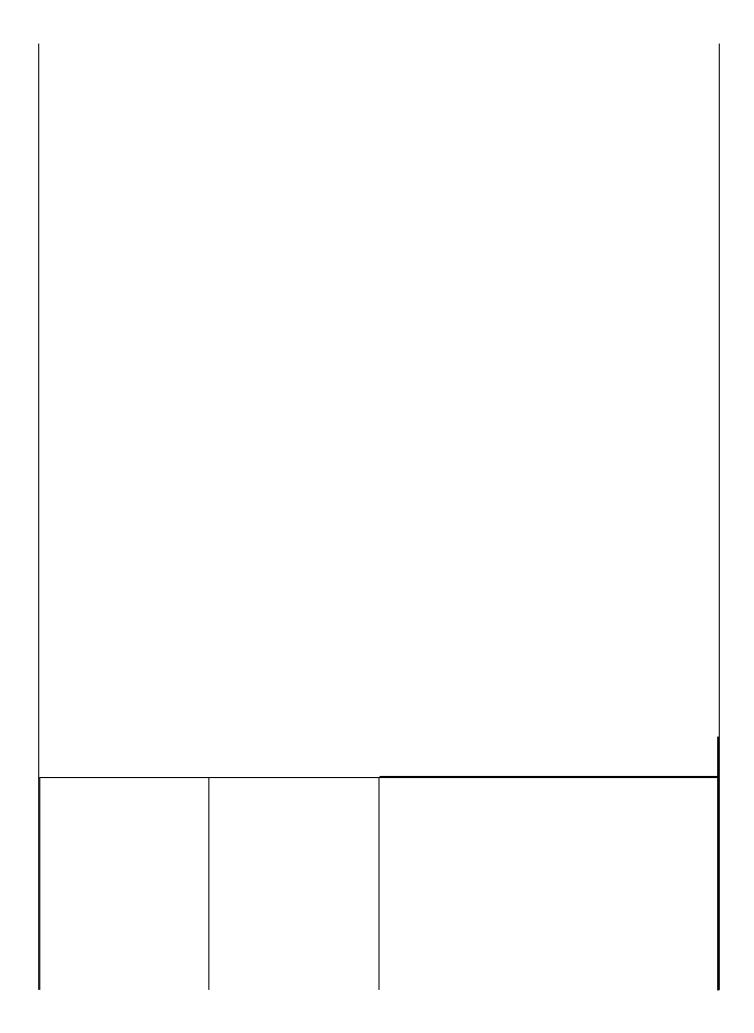
	cf`Ubmch\Yf`WjhjnYbg\]d`hYghih\Uhmci `UfY`Uk UfY`cZ'

I		UhiYI hYbX]b['UbX'Ybf]V%]b['WhjnYbg\]d"
	; fci d'5Whjj]hm	Mci 'a i ghWca a Ybhcbž'fYgdcbX'fc'UbX'dfcj]XY ZYYXVUW_cb'mci '[fci d'a Ya VYfg'V'c['dcgfg"
K YY_'(.'&('>i bY'!'&, >i bY	GYa]bUf	Hcd]W' <i a="" cv]`]hm'="" f][\hg'6ymcbx<br="" ub'a="">6cfXYfg</i>
	FYUX]b[G9H ⁻ F 958-B; G
		A YnnUXfUžGUbXfc'f&\$% Ł'6cfXYf'Ug'A Yh\cXžcf'h\Y A i `h]d`]WUh]cb'cZ@UVcfž'8 i _Y'I b]j Yfg]hm DfYggž'8 i f\Ua ž/ 'BYk 'Mcf_ž'7\UdhYf'C bYž'H\Y Dfc`]ZYfUh]cb'cZ6cfXYfg''fUj U]`UV`Y'Ug'Y!Vcc_ h\fci [\'I BGK '`]VfUfmŁ
		<pre><i &<="" '6cfxyf'7cblfc`'zcf'u';="" 'a="" 'cz`uk="" 'czyh\]wg'']b'k="" 'k="" `cvu`]n]b[="" a="" b]h]yg'uwfcgg="" b]j="" cf'xž="" cfu`wca="" ci="" f="" h\y'vcfxyf"'h\y'dufh]w'`uf]ga="" hyx[="" i="" pre="" xgcbž6ufvufu'f&\$%)="" yfgu']ga="" yh\]b_]b[="" yvyfž@yubby'ffyxł="" yyhg'h\y="" yž@cbxcbždd"%%*!%'="" ł'a=""></i></pre>
		GI DD@9A 9BH5FM
		HUnfY]hYfž7"'f&\$%) Ł''@]ZYVcUh'dc`]hJWg']b'h\Y'DUW]ZJW 5 ZYWh'UbX'h\Y'f]dd`Yg'UbX'g\]a a Yfg'cZU a][fUbh'gUhi fUhYX'Z hi fY'z'gdYWJU`']ggi Y'cZ9a ch]cbz GdUWY'UbX'GcWJYhm'%*z'dd"!%\$+z'YX]hYX'Vm @cfYhU'6U`XUggUf'UbX'DUc`c'6cWW[b]"
	C b`]bY 5 Wjj]hm	6`c['dfYdUfUh]cb'HUg'
		7 ca a Ybhcb fYUX]b[g Ž UbmfY Yj Ubha YX]Už gcW]U`Wca a YbhUfmcf Ufh]gh]WWca a YbhUfm'
		D@ G.`A U_Y`mci fgY`ZZUa]`]Uf`k]h\`h\Y`k cf_`cZh\Y GdYWJU``F UddcfhYi f`cb`h\Y`\i a Ub`f][\hg`cZa][fUbhg
		\hd.#kkk"c\W.f"cf[#9B#ggiYg#A][fUh]cb#GFA][fUbhg#DU[Yg#GFA][fUbhg=bXYI"UgdI
		I gY 'h\]g`_bck `YX[Y'hc'\Y`d'mci 'bUj][UhY'h\Y Vci bXUf]Yg'cZWJh]nYbg\]dž'VY`cb[]b['UbX'f][\hg" K \Uh'UfY'h\YgY'Vci bXUf]Yg3'5fY'h\Yma YfY`mcf cb`mbUh]cb!ghUhY'Vci bXUf]Yg3
	K YV	7 ca a YbWY h\Y Cb`]bY 5 Whj]hm
		J]Yk ''9j YfmXUm6cfXYf]b[''Z]`a 'UbX'gYUfW\Zcf'lk cfY`Yj UbhUff]WYg'h\UhX]gW gg'h\Y'h\Ya Yg'Wcj YfYX']bh\Y'Z]`a "'F YgdcbX'k]h\'U'Wf]h]WU`'fYZYW]cb'cZ) \$\$k cfXg"

		Mci 'UfY'YI dYWYX'hc'gdYbX'U'hchU`cZ*'\ci fg cb'h\]g'dfcYWih\fci [\ci hh\Y'hYfa "'H\]g'UW]j]hm a i ghVY'gi Va]hhYX'hc'h\Y'cb']bY'Zcfi a 'cb A ccXY'Vmk YY_'%%"
K YY_').'%'>i `m'!') '>i `m	GYa]bUf	Hcd]W'6Y`cb[]b['UbX'GcW]U`fY`Uh]cbg.'6YmcbX FUWY'UbX'9h\b]W]hm
	FYUX]b[G9H'F 958-B; G
		6YfbUfX 9a]`mif&\$%\$ّDfc`c[iY.'h\Y'f]XX`Y'cZfUW'' DUhhYfbg'cZDfY^X]WYž()'f%&Ł'dd"')!%("
		6ci fX]Yi ž'D]YffY'f% - \$Ł'H\Y'@c[]WcZDfUWfWYž 7\UdHYf'' ž''GHfi Wi fYgž'\UV]Hi gž'dfUWfWYg'ž Dc`]miDfYggž'7Ua Vf]X[Yž'dd")&!*)
		? fYlgYXYa UgžD\]`]d`UbX`6fch\Yflcbž8Uj]Xž7" f&\$\$, Ł'CdYb`A Uf_YlgžA]`]hUf]nYX 6cfXYfg3\alpha a][fUh]cb`9bZcfWa YbhHcXUm']b 6fch\Yflcb`ž8Uj]X`UbX`? fYlgYXYa UgžD\]`]d`flYXgłž ? YYd]b[`Cihh\Y`Ch\Yf"\5\7 f]h]WU`\\alphalfcXi Wh]cb`lc \alpha a][fUh]cb`9bZcfWa YbhHcXUmž7c`iaV]U I b]j Yfg]lmDfYggžBYk `Ncf_ždd"%!&,
		GI DD@9A 9BH5FM
		?]j]glcžDYhYf'UbX': U]ghž'H\ca Ug'f&\$\$+Ł 7]h]nYbg\]dž'8]gWci fgYž'H\Ycfm'UbX HfUbgbUh]cbU``DfcgdYWgž'6`UW_k Y```Di V`]g\]b[ž A U`XYb''7\UdhYf') '! '9I dUbg]cb'ž'dd"%\$&!%&-
		FcV]bgcbž7YXf]W>"`f%,' 'E'6`UW_'A Ufl]ga "`H\Y a U_]b['cZh\Y'V`UW_'fUX]WD``lfUX]h]cbž''5Zf]WDb'@UVcf Ug'7Ud]hU'''UbX''@YX[Yfg'cZU'K cf'X'GmghYa'ZNYX DfYggž'@cbXcb'dd"%\$-!%%*
		7\`cY` <ccdyf`f&\$\$, ub"'8yuh\`ubx`@]zy<br="" ł`h\y`hu```a="">cb`DU`a`=g`UbXžDYb[i]bžJ]Wcf]U"</ccdyf`f&\$\$,>
	C b`]bY 5 Whjj]hm	6`c['DfYdUfUh]cb'HUg'
		7 ca a Ybhcb fYUX]b[g·Ž UbmfY`Yj Ubha YX]UžgcW]U` Wa a YbhUfmcf Ufh]gh]WWa a YbhUfm
		D@ G. =bWiXY'mcif'WcaaYbhg'cb'HU!BY\]g]'7cUhYg 6YhkYYb'H\Y'KcfX'UbX'AY
		\hd.#kkk"`fV"Wc"i_#j'+#b&'#n\caUg!W\UhhYfhcb! k]``]Uag#cUXYX!X]WY
K YY_'*.', '>i `m'! '&' >i `m	GYa]bUf	Hcd]W'; YbXYf'UbX'8]ZZYfYbW

	F YUX]b[G9H°F 958-₽; G
		M j U`!8Uj]gžB]fU`f&\$%&H\Y`Dc`]h]Wg`cZ6Y`cb[]b[" +bHYfgYWf]cbU``7 cbHYgHJh]cbgžGU[Yž @cbXcb"`7\UdHYf`*ž'H\Y`7Uf]b[`EiYgh]cb.'h\Y 9a ch]cbU``UbX`h\Y`Dc`]h]WJ`ž'dd"'%++!%"
		6U]`YmžC`[Už; i YXYg`f&\$&&L`'A][fUbh5Zf]WUb k ca Yb.`hU`Yg`cZU[YbWmUbX`VY`cb[]b['`'9h\b]W UbX`FUW]U``GhX]Ygž') f) Edd",)\$!,*+
	C b`]bY'5Wf]j]lm	6`c['dfYdUfUh]cb'HUg'
		7 ca a Ybhcb fYUX]b[gʻŽ UbmfY`Yj Ubha YX]UžgcW]U` Wca a YbhUfmcf Ufh]gh]WWca a YbhUfm
		D@ G`\UjY`U``cc_'Uh'h\Y`Zc``ck]b[.
		%": cf'U'\]ghcf]WU`'dYfgdYWf] Yž``cc_'Uhh\Y'k cf_'cZ h\Y'Zci bX`]b['a i gYi a ']b'@cbXcb"' < Uj Y'U``cc_']b dUff]W'`Uf'Uhh\Y'fYWYbh': U``Yb'K ca Ub''YI\]V]h]cb'\h hd.##ci bX`]b[a i gYi a "cf["i_#YI\]V]h]cbgWc``YWf]cbg# YI\]V]h]cbg!X]gd`Umg#
		5fY mci 'Uk UfY czubmig]a j`Uf']b]h]Uh]j Yg']b'5i ghfU`]U3
		&"`FYgdcbX`hc`h\Y`j]XYc`cZ7\]a Ua UbXU`B[cn] 5X]W\]Y'g`hU`_`cb`ZYa]b]ga žXfUk]b[`cb`h\Y`gYh fYUX]b[g.
		\mdg.#kkk"mcihiVY"Wca#kUhW.3j1\['iaLISeKW
	; fci d'5Wfj]hm	Mci a i ghWca a YbhcbžfYgdcbX'hc'UbX'dfcj]XY ZYYXVUW_cb'mci [fci d'a Ya VYfgfN`c['dcghg"
K YY_'+.'%) '>i `m'! '%- '>i `r	n 6 `YbXYX	Hcd]W'±0X][Ybci g'DYcd`Y'UbX'7]h]nYbg\]d
		FZ[eiWW] e U'Seei [^aUUgda` {`Wh[S?aaV^Wz
	FYUX]b[G9H'F 958-B; G
		FYUXžDYHYf'f%, Ł'K \cgY'7]h]nYbgžK \cgY 7 ci bhfm3']b'B]Wc`Ug'DYHYfgcb'UbX'K]```GUbXYfg fYXgŁ'7]h]nYbg\]d'UbX'±bX][Ybci g'5i ghfU`]Ubg. 7 \Ub[]b['WcbWYdh]cbg'UbX'dcgg]V]`]h]Ygž'7 Ua Vf]X[Y I "D"žA Y`Vci fbYž'dd"'%'-!%+, "
		A]W_'8cXgcbzf&\$%&''7cbghjh hjcbu`FYVc[b]hjcbcZ +DX][Ybcig'5ighfu`]Ubg'GYbUhYCWWJg]cbu`@YWhfY GYf]Yg'UhDUf]UaYbh <cigyz'7ubvyffuzcb') 5i[ighz&\$%"DUdYfg'cb'DUf]UaYbhbc")+</cigyz'7ubvyffuzcb')
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