

LING5001

GYWcbX'@Ub[iU[Y'5Wei]g]h]cb

HYfa 'C bY''##'&\$&%

7ci fgY⁻Cj Yfj]Yk

GHJZ7cbHJWh8YHJ]`g

7cbj Ybcfg

B Ua Y	9a U]`	5j U]`UV]`]lm	@cWUh]cb	D\cbY
7 `U]f`<]``	WU]f\]``4 i bgk "YXi "Ui	,	A cfj Yb [·] 6fck b &&,	

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@c\\Ulrighthgaper. G\\\cc``C\Z]\\Y\Z\A\cfj\Yb`6fck\b'6i\]\\X]b[\z'@\j\Y``&z\&),

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9a U]`. \<u>\U`4 i bgk "YXi "Ui</u>

7ci fgY 8YHJ] g

7 fYX]h'Dc]bhg '* '

Gi a a UfmcZh\Y 7ci fgY

 $H\g`Wci\ fgY`ZcW\ gYg`cb`UWei\]g]h]cb`h`Uh`HU_Yg`d`UWY`]b`]bgffi \WfYX`gYhf]b[g`UbX`Wcbg]XYfg`Vch``W\]X`UbX UXi `hgYWcbX``Ub[i U[Y`UWei\]g]h]cb''``Mci `k\]```Yl d`cfY`fYgYUfW\`UbX`Udd`mth`Ycf]Yg`cZgYWcbX``Ub[i U[YUWei\]g]h]cb'hc`]bgffi \WfYX`WcbhYl hg''`Mci `k\]```Yl d`cfY`U'j Uf]YhmcZh\Ycf]Yg`UbX`a Ubmj Uf]UV`Ygžgi \W.`Ug$

5ggYgga Ybh

5ggYgga YbhHUg_g

5ggYgga Ybh'hUg_	K Y][\h	8i Y'8UHY	Gh XYbh@YUfb]b[Ci hWca Yg 5ggYggYX
CfU``DfYgYbłUł]cb`	&\$I	Bch5dd`]WUV`Y	&ž¨
HYghg	(\$1	%+#\$'#&\$&%'%) - 'DA / %(#\$(#&\$&%'%%) - 'DA	%ž &ž '
Dfc YWi	(\$1	\$) #\$) #&\$&%`\$) .\$\$`DA	%ž &ž ' ž (

5ggYgga Ybh'8YHJ]`g

5ggYgga Ybh% CfU DfYgYbhJh]cb

GhUfhXUhY. Bch5dd`]WUV`Y

8 YHJ]`g.

%)!&\$^a]bi hYg"^Ghi XYbhg^fYV\\]j Y^]bX]j]Xi U^k f]hhYb^ZYYXVU_"

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

Gh XYbhg k]``VY U``cWUhY X gi Va]gg]cb XUhY Zcf cfU`dfYgYbhUh]cbg"

Gi Va]gg]cb bchYg. gi Va]hhYX h\fci [\ 'A ccX'Y

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

5ggYgga Ybh'& 'HYghg

8YHJ]`g.

H\YfY`UfY`lk c`HJ_Y`\ca Y`HYghgžYUW\`k cfh\`&\$ı `UbX`YUW\`cZhk c`\ci f`Xi fUh]cb"`Ghi XYbhg`fYWY]j Y]bX]j]Xi U``k f]hYb`ZYYXVUW_"

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

HYgh%]g^hc^VY^gi Va]hh/X^Vm\%) - ^DA ^cb^\%+#\$' /HYgh&^]g^hc^VY^gi Va]hh/X^Vm\%) - ^DA ^cb^\%(#\$("

9UW hygh]g k cfh\ &\$i "

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

5ggYgga Ybh' . 'Dfc YWh

GhUfhXUhY. Bch5dd`]WUV`Y

@Yb[h\.'&ž)\$\$

8YHJ]`g.

&) \$ k cfXg" Gh XYbhg fYW] Y]bX]]Xi U`k f]hhYb ZYYXVUW_" H\]g]g h\Y Z]bU` UggYgga YbhZcf UhhYbXUbW di fdcgYg"

 $\label{thm:condition} \mbox{Hi fb]h]b"gYh]b" Label Label$

5 hhyb XUb WY F Yei]fYa Ybhg

7ci fgY'GWXYXi `Y

J]Yk 'WUgg'ha YHJV'Y

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8 UHY	Hmd Y	7 cbhYbh
K YY_'%'%)': YVfi Ufm!'%- : YVfi Ufm	GYa]bUf	%∵±olfcXi Wjcb
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K YY_'&.'&&': YVfi Ufm!'&* : YVfi Ufm		8]gW gg]cb
		%".7\UdhYf"%"@Ub[iU[Y"@YUfb]b["]b"9Ufm 7\]`X\ccX
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) "``8UHJ`5bU`mg]g

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A UIVW		%"``7\UdhYf`&"'GYWbbX'@Ub[iU[Y'@YUfb]b[
		&"`F YgYUfVX`fYUX]b[`&
		Cj Yfj]Yk
		' "``7\UdhYf`("`9 d`U]b]b[`GYW&bX`@Ub[iU[Y @YUfb]b[
		("'F YgYUfW\'fYUX]b[''
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		C j Yfj]Yk
		' "'7\UdhYf') 'CVgYfj]b['@YUfb]b['UbX'HYUW\]b[']b h\Y'GYWcbX'@Ub[iU[Y'7'Uggfcca
		("FYgYUfW\"fYUX]b["(
		5 Wijj]hm
		' "``8 UKJ`UbU`mg]g
		5ggYgga YbhUgg][bYX`Zcf`k YY_`)
K YY_")."%)"A UfWX"!"%- A UfWX	5ggYgga Ybh	HYgh%]g'Xi Y'cb'%+h\'cZ'A UfW\'Vm'%%) - 'd"a " 7 cj Yfg'7 \UdhYfg'%z&'UbX'('UbX'F YgYUfW\ F YUX]b[g'%' "
	GYa]bUf	8]gW gg]cb
		%"``7\UdhYf') 'CVgYfj]b['@YUfb]b['UbX'HYUW\]b[']b

		h\Y`GYV&bX`@Ub[i U[Y`7`Uggfcca
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		CjYfj]Yk
		' "``7\UdhYf`*"'G]I
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		5 Whji]hm
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		5ggYgga Ybh
		CfU`dfYgYbhUhjcb"'5gg][b'h\Y'hcd]WcZh\Y dfYgYbhUhjcb"'8iY'KYY_',
K YY_'*.'&&'A UfW\'!'&* A UfW\	FYUX]b[FYUX]b['kYY_"'Bc'ZJVW'hc'ZJVW'\cifg"
K YY_'+.'&- 'A UfW\'!'& 5df]`	GYa]bUf	8 jgW gg]cb
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K_YY_`, .`)	5ggYgga Ybh	F YWcfXYX cfU`dfYgYbhUh]cbg a i ghVY gi Va]hhYX Vm'%5A cb'+h\'5df]`žUb'\ci f'VYZcfY h\Y``YWi fYž

1		UbX`ghiXYbhg`UfY`fYei]fYX`hc`UhhYbX`h\Y`WUgg"`
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K YY_''‰'5df]`'!'%*	5ggYgga Ybh	HYghΞ Y %(h\ 5df]`Vm%%) - DA
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K YY_`%\$.`%``5df]``!`&' 5df]`	Dfc YWh	Bc'ZJVW'hc'ZJVW'\cifg":]bU`dfcYWikcf_'kYY_"
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- @][\MckbžD"/ 'GdUXUžB"''<ck' @Ub[iU[Yg:5fY'@YUfbYXž'(h\'9X]hjcb"'C|Dž'&\$%"
- F YgYUfW\ 'fYUX]b[g"\'\Ci 'k]\`'fYW\]j Y\'U\V]V\]c[fUd\mcZh\Y\'fYUX]b[g"\H\YmUfY\'\ci fbU\`\Uff]\WYg\Uj\U\'Y\cb\]bY\h\fci [\\I\BGK\'@]VfUfm"

FYWca a YbXYX FYgci fWfg

Hc VY dfcj]XYX i bXYf gYdUfUhY Wcj Yf"

7 ci fgY '9j U'i Uh]cb 'UbX '8 Yj Y'cda Ybh

A m91 dYf]YbW'fYgdcbgYg'UfY'h\Y'df]a Ufmgci fW'cZghi XYbhZYXVUW_hc'h\Y'Wci fgY'Wcbj Ybcf"'\stazfa U`gi fj Ymg'a UmU`gc'VY'i gYX"'F YgdcbgYg']b'h\Y'dUgh\Uj Y``YX'hc'W\Ub[Yg']b'Wci fgY'a UhYf]U`gz']b!WUgg UWfjj]h]Ygz'UbX'UggYgga Ybhg"

Gi Va]gg]cb cZ5ggYgga YbhHUg_g Hi fb]h]b Gi Va]gg]cb

5 WUXYa]W<cbYghmUbX D`U[]Uf]ga

D`U[]Uf]ga i]gii g]b[ih\Yik cfXgicfi]XYUgicZch\YfgiUbXidfYgYbh]b[ih\Ya iUgimci fick b"i±i\WbihU_Yia Ubm Zcfa gžZfca iXYi]VYfUhYiW\YUh]b[ihciU\W]XYbhU`m\wcdm]b[iZfca iUigci f\Wik]h\ci hiU\w_bck iYX[Ya Ybh'

IBGK '[fci dg'd'U[]Uf]ga ']bhc'h\Y'Zc``ck]b['WUhY[cf]Yg.

7 cdm]b[.'i g]b['h\Y'gUa Y'cf'j Yfmg]a]`Uf'k cfXg'hc'h\Y'cf][]bU`hYl h'cf']XYU'k]h\ci h'UW_bck `YX[]b['h\Y gci fW'cf'i g]b['ei chUh]cb'a Uf_g"'H\]g'U'gc'Udd`]Yg'hc']a U[Ygž'Ufh'UbX'XYg][b'dfcYWhgž'Ug'k Y``'Ug dfYgYbhUh]cbg'k \YfY'gca YcbY'dfYgYbhg'Ubch\Yf'g']XYUg'cf'k cfXg'k]h\ci h'WfYX]h'

± Uddfcdf]UhY 'dUfUd\fUg]b[.'7\Ub[]b['U'ZYk'k cfXg'UbX'd\fUgYg'k\]'Y 'a cghmfYhU]b]b['h\Y'cf][]bU' ghfi WhifY'UbX#cf'dfc[fYgg]cb'cZ]XYUg'cZh\Y'cf][]bU'žUbX']bZcfa UhJcb'k]h\ci hUW_bck 'YX[Ya Ybh''H\]g'U'gc Udd']Yg']b'dfYgYbhUhJcbg'k\YfY'gca YcbY'dUfUd\fUgYg'Ubch\Yf'g']XYUg'cf'k cfXg'k]h\ci h'WfYX]hUbX'hc d]YW]b['hc[Yh\Yf'ei chYg'UbX'dUfUd\fUgYg']bhc'U'bYk'k\c'Yž'k]h\ci h'Uddfcdf]UhY'fYZYfYbW]b['"

7 c``i g]cb. 'k cf_]b['k]th 'cth\Yfg'Vi hdUgg]b['cZZth\Y'k cf_'Ug'U'dYfgcb'g']bX]j]Xi U``k cf_"'7 c``i g]cb'U`gc]bWi XYg'dfcj]X]b['mci f'k cf_'hc'Ubch\Yf'ghi XYbhVYZcfY'h\Y'Xi Y'XUhYžcf'Zcf'h\Y'di fdcgY'cZth\Ya d`U[]Uf]g]b['UhUbmh]a YždUm]b['Ubch\Yf'dYfgcb'hc'dYfZcfa 'Ub'UWUXYa]WhUg_žghYU`]b['cf'UWei]f]b[Ubch\Yf'dYfgcb'g'UWUXYa]Wk cf_'UbX'Wcdm]b[']hz'cZYf]b['hc'Wca d`YfY'Ubch\Yf'dYfgcb'g'k cf_'cf'gYY_]b[

- i bXYfgHUbX'mci f'f][\hg'UbX'fYgdcbg]V]`]h]Yg'Ug'U'gh XYbhUhI BGK
 VY'Uk UfY'cZd`U[]Uf]ga ž'Wcdmf][\hz'I BGK 'Gh XYbh7cXY'cZ7cbXi WhUbX'5VWWdhUV`Y'I gY'cZ IBGK =7 HF Ygci fWrg Dc`]Wh

5WUXYa]W±bZcfaUhjcb

: cf'YggYbhJU`ghi XYbh]bZcfa UhJcb'fY`UhJb['hc.

• fYei Yghg Zcf Yl hYbg]cb/