



ARTS3454

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HYfa ` H \ f Y Y ` # ` & \$ & \$

7ci fgY`Cj Yfj]Yk

GHJZZ7cbHJW`8YHJ]`g

7cbj Ybcfg

B Ua Y	9a U]`	5j U]`UV]`]m	@cW]hcb	D\cbY
8F`M]b[`]Gi b	m]b[`]"gi b4 i bgk "YXi "Ui	6mUddc]bħa Ybh	A cfj Yb`6fck b -' ,) &* (\$ &)	

@YW] fYfg

B Ua Y	9a U]`	5j U]`UV]`]m	@cW]hcb	D\cbY
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GWXcc`7cbHJW]`bZcfa U]hcb

GWXcc`cZ<i a Ub]hYg`UbX`@Jb[i U[Yg

@cW]hcb.`GWXcc`C Z]W]ZA cfj Yb`6fck b`6i]X]b[ž@Yj Y`&ž&),

CdYb]b[`<ci fg.`A cbXUm! : f]XUmž - Ua `!) da

D\cbY.`ž*%&`-' ,) `* , %

: U!.`ž*%&`-' ,) ` , +\$)

9a U]: [\U`4 i bgk "YXi "Ui](#)

7 ci fgY'8YHJ]`g

7 fYX]hDc]bhr '*`

Gi a a UfmicZ\hY'7 ci fgY

H\]g`Wci fgY`]bffcXi W`g`mci`hc`fYW`bhi]bH`fdFYh]b[`h`Ycf]Yg`UbX`a`Yh`cXc`c[]Yg" Mci`k`]"`YUfb`\ck`hc`
]bH`fdFYhVY`k`YYb`9b[`]g\`UbX`7\]bYgYzi`g]b[`X]ZY`fYbh]bH`fdFYh]b[`h`W`b]ei`Yg" Mci`k`]"`UWci`]fY`]"b[i`]gh]W`
UbX`W`h`fU`UV]"h]Yg`fYei`]fYX`Zc`f`WcbgY`W`hj`Y`]bH`fdFYh]b[`UbX`Y`ZY`W]j`Y`W`cgg!`Ub[i`U[Y`#W`h`fY`
Wci`a`a`i`b]W]h]cb`]b`U`fUb[Y`c`Z`X`mb`Ua`]W`W`b`h`i`hg" Mci`k`]"`XYj`Y`cd`UbX`\`cbY`mci`f`g_]`g`]b`h`U`W_]b[`X]ZY`fYbh`
ghmYg`cZ]bH`fdFYh]b[`h`fci`[\]`Uf]ci`g`\`UbXg!`cb`]bH`fdFYh]b[`Yi`YfW]gYg"

7 ci fgY`@YUfb]b[`Ci hWci a Yg

%` =>Ybh]Zmh`YcfYh]W`]"ggi`Yg`]bW`i`X]b[`]bH`fdFYh]b[`Uddfc`UW`X`Yg`UbX`ghmYg`z`Y`h`]W]c`Z`dfc`Z`Y`gg]cbU`
]bH`fdFYh]f`g`UbX`bcfa`g`UbX`a`c`X`Y`g`cZ]bH`fdFYh]b[
&"`5ggYgg`bYk`a`Yh`cXc`c[]Yg`UbX`h`W`b]ei`Yg`Uj`U]UV`Y`Zc`f`9b[`]g\`UbX`7\]bYgY`]bH`fdFYh]b[
'`" `8Ya`cbg]fU`h`Wci`d`Y`h`b`W`]b`UbX`V`Ug]Wg_]`g`UbX`h`W`b]ei`Yg`c`Z`WcbgY`W`hj`Y`]bH`fdFYh]b[`UbX`
di`V`]WgdYU_]b[
("`<`bH`fdFYh]b`U`fUb[Y`c`Z`d`U`f`U`d`f`c`Z`Y`gg]cbU`]"g]h`U]cbg`g`c`W]U`X]U`c[i`Yg`z`Wci`a`a`i`b]hmigYfj`]W`
X]U`c[i`Yg`z`h`U`X`Y`X]U`c[i`Yg`UbX`WcbZ`fY`b`W`gd`Y`Y`W`Y`g`
)" <`bH`fdFYhgY`Y`W`X`fY`d`f`Y`g`Y`b`h`U]j`Y`h`i`hg`Z`ca`9b[`]g\]bhc`7\]bYgY`UbX`7\]bYgY`]bhc`9b[`]g\`

HYUW]b[`GhFUh[]Yg`

H\Y`Wci fgY`]g`hUj`[\hVmk`UmicZ`h`c!\`ci`f`Y`W`h`fY`UbX`cbY!\`ci`f`h`hc`f]U`k`YY`_`m`i`H\Y`Y`W`h`fYg`]bffcXi`W`
W`ffYbh]bH`fdFYh]b[`h`Ycf]Yg`za`Yh`cXc`c[]Yg`UbX`h`W`b]ei`Yg`k`\]W`U`fY`Yi`d`c`f`Y`X`]b`gd`Y`W]U`]g`Y`X`Wci`fgY`
fYUX]b[g" H\Y`h`hc`f]U`g`d`f`c`j`XY`U`\`UbXg!`cb`c`d`d`c`f`h`b]h`m`h`c`d`i`h]bH`fdFYh]b[`h`Ycf]Yg`UbX`h`W`b]ei`Yg`]bhc`
d`f`U`W]W`" Mci`k`]"`XYj`Y`cd`UbX`dc`]g\`mci`f`g_]`g`]b`]bH`fdFYh]b[`X]ZY`fYbhghmYX`h`i`hg`h`fci`[\]`Uf]ci`g`
]bH`fdFYh]b[`Yi`YfW]gYg" HYUa`k`c`f`_`UbX`d`Y`Y`f`Y`U`fb]b[`U`f`Y`Ya`d`U`g]g`Y`X`]b`h`Y`h`hc`f]U`g"

5ggYgga Ybh

5ggYgga YbhHUg_g`

5ggYgga YbhHUg_	K Y][\ h	8i Y`8UH`	Gh XYbh@YUfb]b[Ci hWta Yg`5ggYggYX
ᄁhYfdFYh]b[`ei]n`UbX Ugg][ba Ybh	(\$i	ᄁhYfdFYh]b[`5gg][ba YbhXi Y]b`k YY_` /ᄁhYfdFYh]b[`E i]n Xi Y`]b`k YY_`- "	%Z ž(ž)
HYghg`	(\$i	A]X!hYfa `HYghXi Y`]b`k YY_`) / :]bU`HYghXi Y`]b`k YY_`%\$	%Z ž(ž)
F c`Y`D`Um	&\$i	Xi Y`]b`k YY_`- `cf`k YY_`%\$	%Z&Z ž(

5ggYgga Ybh8YhU]`g

5ggYgga Ybh% `ᄁhYfdFYh]b[`ei]n`UbX`Ugg][ba Ybh

GHUfhXUH`.

8YhU]`g.

Gh XYbhg`Wta d`Yh`cbY`]bYfdFYh]b[`Ugg][ba Ybhf%) । E`cZUddfcl "`&\$!` \$ \$`k cfXg#XUfUWYfg`UbX`cbY
]bYfdFYh]b[`ei]n`f&) । E`k \]W`Wcbg]ghg`cZ&) `a i `h`d`Y`Wc]W`ei Ygh]cbg`UbX`) \$`j`cWUvi `Ufmei Ygh]cbg`

: YYXVUW_`j]U`]bX]j]Xi U`Wta a Ybhg`UbX`]b!WUgg`X]gW`gg]cb"

5ggYgga Ybh&`HYghg

GHUfhXUH`.

8YhU]`g.

Gh XYbhg`Wta d`Yh`U`a]X!hYfa `hYghf&\$i E`cZUddfcl "`(\$ \$!) \$ \$`k cfXg#XUfUWYfg`UbX`U`Z]bU`hYghf&\$i E`cZ
Uddfcl ") \$ \$!`* \$ \$`k cfXg#XUfUWYfg`":]bU`hYgh]g`h`Y`Z]bU`UggYgga YbhZ`f`U`h`bX`UbW`di`fdcgYg`"

: YYXVUW_`Z`f`a]X!hYfa `hYghdfcj]YX`j]U`]bX]j]Xi U`Wta a Ybhg`UbX`]b!WUgg`X]gW`gg]cb`"Gh XYbhfYW]j`Y`U
a Uf_`Z`f`Z]bU`hYgh]UbX`W]b`Wcbgi `h`h`Y`Y`W`i`fYf`Z`f`Z`f`h`Yf`ZYXVUW_`"

Hi fb]h]b`gYh]b[.`H\]g`]g`bchU`Hi fb]h]b`Ugg][ba Ybh

5ggYgga Ybh' .`F c`Y`D`Um

GHUfhXUH`.

8YhU]`g.

Gh XYbhg`Wta d`Yh`U`[`fci`d`fc`Y`d`UmifWU`) `fc`*`a`]bi`hYg`dYf`dYfgcbE`cb`]bYfdFYh]b[`]g]i`U]h]cbg`[]j`Yb`"

: YYXVUW_j]U]bX]j]Xi U`Wt a a Ybng`UbX`]b!WUgg`X]gW gg]cb"

Hi fb]hb`gYhb[. H\]g`]g`bchU`Hi fb]hb`Ugg][ba Ybh

F Ygci fWg

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5`fYUX]b[`a Uhf]U`g`UfY`Uj U]UV`Y`cb`A ccX`Y"

F YWca a YbXYX`F Ygci fWg

- \hd.##k k k "Yfi X]hcf[#b#Yj i Y#a YhU#
- [\hd.##k k k "n\[Zmn"Wca #](#)

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

H\]g`Wci fgY`k]`VY`Zcfa U`mYj U`i UHX`hfc i [\`A m9l dYf]YbWz`Ug`k Y`Ug`]bZcfa U`mXi f]b[`hY`hYUWk]b[dfcWgg"5bmi]ggi Yg`fU]gYX`]b`gh XYbtgf]ZYXVUW`k]`VY`UXXfYggYXz`UbX`ghfUhf[]Yg`hc`Z`fhYf`Yb\UbW`gh XYbtgf]YUfb]b[`Yl dYf]YbW`k]`VY`X]gW`ggYX`k]h`gh XYbtg`]b`WUgg"

Gi Va]gg]cb 'cZ5ggYgga YbhiHUg_g

Hi fb]h]b 'Gi Va]gg]cb

Ʒmci 'YbWci bHYf'U'dfcV'Ya 'k \Yb'UH'Ya dh]b['hc'gi Va]hmc i f'Ugg][ba YbhiH'fci [\ 'Hi fb]h]bž'd'YUgY
HY'Yd\cbY'9I HYfbU'Gi ddcfhcb'-',) "' ' ' %cf'Ya U]'H'Ya 'cb'YI HYfbU'HY'hgi ddcfh4 i bgk "YXi "Ui "'Gi ddcfh
\ci fg'UfY', .\$\$Ua '—%\$.\$\$da 'cb'k YY_XUmg'UbX'-. \$\$Ua '—) .\$\$da 'cb'k YY_YbXg'fI *) 'XUmg'U'mYUfI" Ʒmci
UfY'i bUV'Y'hc'gi Va]hmc i f'Ugg][ba YbhiXi Y'hc'U'Zi 'hk]H'Hi fb]h]b'mci 'a UmUdd'm'Zc'f'Ub'YI HYbg]cbž'Vi hmc i
a i ghfYHU]b'mci f'h]W_Yhbi a VYf'Z'ca '9I HYfbU'Gi ddcfhfU'cb['k]H'UbmcH'Yf'fY'Yj UbhXcW a YbHgE'hc
]bWi XY'Ug'Yj]XYbVW'hc'gi ddcfhmc i f'YI HYbg]cb'Udd'jW]h]cb" Ʒmci 'Ya U]'9I HYfbU'Gi ddcfhmc i 'k]
Ui 'ca UH]WU'm'fYW]j Y'U'h]W_Yhbi a VYfž'Vi h]Zmci 'HY'Yd\cbY'mci 'k]'b'YX'hc'gdYW]Z]WU'mUg_ 'Zc'f'cbY"
Hi fb]h]b'U'gc'dfcj]XYg'i dXUH'g'cb'H'Y]f'gmgh'Ya 'ghU'hi g'cb'Hk]HYf"

; YbYfU'mž'UggYgga YbhiHUg_g'a i ghVY'gi Va]HYX'Y'YW'fcb]WU'mj]U'Y]H'Yf'Hi fb]h]b'cf'U'A ccX'Y
Ugg][ba YbH' 'b]bgHUbVW'g'k \YfY'H'lg]g'bc'hd'cgg]V'Yž'hk]'VY'gh'UH'X'cb'mci f'Wci fgY'g'A ccX'Y'g]H'k]H
U'HYfbUH] Y'gi Va]gg]cb'XYHU]g"

: cf]bZ'fa UH]cb'cb'\ck 'hc'gi Va]hUgg][ba YbHg'cb]bYj]U'A ccX'Y. \h'hdg.#gh XYbH'i bgk "YXi "Ui #ck!
gi Va]hUgg][ba YbH'a ccX'Y

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

D`U[]Uf]ga `]g`i`g]b[`h`Y`k`c`f`X`g`c`f`]X`Y`U`g`c`Z`c`h`Y`f`g`i`U`b`X`d`f`Y`g`Y`b`h]b[`h`Y`a` `U`g`m`c`i`f`c`k`b`" `#`W`U`b`h`U`_`Y`a` `U`b`m`
Z`c`f`a`g`Z`Z`c`a` `X`Y`]V`Y`f`U`h`Y` `W`X`Y`U`h]b[`h`c` `U`W`W`Y`X`Y`b`h`U` `m`i`W`c`d`m]b[`Z`c`a` `U`g`c`i`f`W` `k`]h`c`i`h`U`W`_`b`c`k` `Y`X[`Y`a` `Y`b`h`

I`B`G`K` `[`f`c`i`d`g`d`U[]Uf]ga `]b`h`c` `h`Y` `Z`c` `c`k`]b[`W`U`h`Y`[`c`f`]Y`g.

- i bXYfghUbx'mci f'f][\hg'UbX'fYgdcbg]V]h]Yg'Ug'U'gh XYbhUhl BGK
- VY'Uk UfY'cZd'U[]Uf]ga ž'Wcdmf][\hž' BGK 'Gh XYbh7cXY'cZ7cbXi W'Ubx'5Ww'dhUV'Y'I gY'cZ I BGK '⇒H'F Ygci fW'g'Dc`]Wm
- VY'Uk UfY'cZh'Y'ghUbxUfXg'cZVY\Uj]ci f'YI dYW'X'cZYj Yfmcby`]b'h'Y'I BGK 'Wca a i b]m
- `cWJh'gYfj]W'g'UbX']bZcfa Uh'cb'UVci hl BGK 'UbX'I BGK '@]VfUfm

Gca Y'cZh'YgY'UfYUg'k]`VY'ZJa]]Uf'hc'mci ž'ch'Yfg'k]`VY'byk "; U]b]b['U'gc`X'i bXYfghUbx]b['cZU`h'Y fY'UH'X'UgdYW'g'cZ9@G9'k]`Y'd'mci 'a U_Y'h'Y'a cghcZmci f'gh X]Yg'Uhl BGK ""

[\hd. #gj V'YW'f i \]XYg" \]VfUfm'i bgk "YXi "Ui #` \]gY#JVci h' \]gY](#)

5 WUXYa]W=Zcfa Uh]cb

: cf`YggYbh]U`ghi XYbh]bZcfa Uh]cb`fY`Uh]b[`tc.

- fYei Ygth]Zc`YI H`bg]cb/
- `Uh`gi Va]gg]cbg`[i]XY`]bYg/
- fYj]Yk `cZa Uf_g/