



ARTS3454

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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`i fYfg

B Ua Y	9a U]`	5j U]`UV]`]m	@cW]hcb	D\cbY
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@cW]hcb.`GW`cc``C Z]W`žA cfj Yb`6fck b`6i]X]b[ž`@Yj Y``&ž&),

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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`YhcXc`c[]Yg`Mci`k`]"`YUfb`\ck`hc`
]bH`fdFYhVYhk`YYb`9b[]g\`UbX`7\]bYgYzi`g]b[`X]ZYfYbh]bH`fdFYh]b[`h`YW`b]ei`Yg`Mci`k`]"`UWci`]fY`]"b[]g]h]W`
UbX`W`h`fU`UV`]h]Yg`fYei`]fYX`Zcf`WcbgYW`hj`Y`]bH`fdFYh]b[`UbX`YZZ`W]j`Y`W`cgg!\`Ub[]U[Y`#W`h`fY`
Wca`a`i`b]W]h]cb`]b`U`fUb[Y`cZXmbUa`]W`Wcb`h`I`hg`"Mci`k`]"`XYj`Y`cd`UbX`\cbY`mci`f`g_]`g`]b`hUW_]b[`X]ZYfYbh`
g]mYg`cZ]bH`fdFYh]b[`h`fci`[]j`Uf]ci`g`\UbXg!`cb`]bH`fdFYh]b[`YI`YfW]gYg"

7 ci fgY`@YUfb]b[`Ci`hWca`Yg

%`>XYbh]Zmh`YcfYh]W`]ggi`Yg`]bW`X]b[]bH`fdFYh]b[`Uddfc`UW`Yg`UbX`g]mYg`z`Yh`]W]c`Zdfc`ZYgg]cbU`
]bH`fdFYh]fg`UbX`bcfa`g`UbX`a`cXY`g`cZ]bH`fdFYh]b[
&"`5ggYgg`bYk`a`YhcXc`c[]Yg`UbX`h`YW`b]ei`Yg`Uj`U]UV`Y`Zcf`9b[]g\`UbX`7\]bYgY`]bH`fdFYh]b[
'`" `8Ya`cbg]fU`h`Wca`dY`h`bW`]b`UbX`VUg]Wg_]`g`UbX`h`YW`b]ei`Yg`cZ`WcbgYW`hj`Y`]bH`fdFYh]b[`UbX`
di`V`]WgdYU_]b[
(`" `bH`fdFYh]b`U`fUb[Y`cZdUfUdfc`ZYgg]cbU`g]h`U]cbg`gcW]U`X]U`c[]Yg`z`Wca`a`i`b]m]gYfj`]W`
X]U`c[]Yg`z`fUXY`X]U`c[]Yg`UbX`Wcb`ZYfYbW`gd`Y`Y`W`Y`g`
)" `bH`fdFYhgY`Y`W`Y`X`fYdfYgY`b`h]h]j`Y`h`I`hg`Zca`9b[]g\]bhc`7\]bYgY`UbX`7\]bYgY`]bhc`9b[]g\`

HYUW`]b[`G`h`fU`h`[]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`h\Y`Y`W`h`fYg`]bffcXi`W`
W`ffYbh]bH`fdFYh]b[`h`Ycf]Yg`za`YhcXc`c[]Yg`UbX`h`YW`b]ei`Yg`k`\]W`U`fY`YI`d`c`fYX`]b`gd`Y`W]U`]gYX`Wci`fgY`
fYUX]b[]g`" `H\Y`h`hc`f]U`g`dfc`j`XY`U`\UbXg!`cb`c`ddc`f`h`b]m]h`c`di`h]bH`fdFYh]b[`h`Ycf]Yg`UbX`h`YW`b]ei`Yg`]bhc`
dfUW]W`" `Mci`k`]"`XYj`Y`cd`UbX`dc`]g\`mci`f`g_]`g`]b`]bH`fdFYh]b[`X]ZYfYbh]g]mYX`h`I`hg`h`fci`[]j`Uf]ci`g`
]bH`fdFYh]b[`YI`YfW]gYg`" `HYUa`k`cf`_`UbX`d`Y`Y`f`Y`U`fb]b[`U`fY`Ya`d`U`g]gYX`]b`h\Y`h`hc`f]U`g`"

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hYfdFYh]b[`ei]n`UbX Ugg][ba Ybh	(\$i	hYfdFYh]b[`5gg][ba YbhXi Y]b`k YY_` / hYfdFYh]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(

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

GHUfhXUH`.

8YhU]`g.

Gh XYbhg`Wta d`Yh`cbY`]bYfdFYh]b[`Ugg][ba Ybhf%) i `E`cZUddfcl "`&\$!` \$`\$`k`cfXg#`X`UfUWYfg`UbX`cbY`
]bYfdFYh]b[`ei]n`f&) i `E`k` \]W`Wcbg]ghg`cZ&) `a i `h`d`Y`W`c]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

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Uddfcl ") \$`\$!`*`\$`\$`k`cfXg#`X`UfUWYfg`":]bU`hYgh]g`h`Y`Z]bU`UggYgga YbhZ`f`U`h`b`X`U`b`W`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`hYghUbX`WU`b`Wcbgi`h`h`Y`Y`W`i`f`Y`Z`f`Z`f`h`Y`f`Z`Y`X`V`U`W`"

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

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

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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"

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- \hd.##k k k "Yfi X]hcf[#b#Yj i Y#a YhU#
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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`fYUWk]b[dfcWgg"5bmi]ggi Yg`fU]gYX`]b`gh XYbtf]ZYXVUW`k]`VY`UXXfYggYXz`UbX`ghfUhf[]Yg`hc`Z`fhYf`Yb\UbW`gh XYbtf]YUfb]b[`Yl dYf]YbW`k]`VY`X]gW`ggYX`k]h`gh XYbtf]b`WUgg"

Gi Va]gg]cb`cZ5ggYgga YbhiHUg_g

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≠mci`YbWci bHYf`U`dfcV`Ya`k` \Yb`UHYa` dh]b[`hc`gi`Va`]hmc`i`f`Ugg][`ba`YbhiHfci`[`\`Hi`fb]h]b`z`d`YUgY`
HY`Yd\cbY`9I`HYfbU`Gi`ddcfhcb`-`,`)`"``"``%cf`Ya`Uj`h`Ya`icb`YI`HYfbU`HY`hgi`ddcfh4`i`bgk`"YXi`"Ui`""Gi`ddcfh`
\ci`fg`UfY`,`.\$\$Ua`-`-%\$.\$\$da`icb`k`YY`XUmg`UbX`-`.\$\$Ua`-`).\$\$da`icb`k`YY`YbXg`f1`*)`XUmg`U`mY`Uf2`≠mci`
UfY`i`bUV`Y`hc`gi`Va`]hmc`i`f`Ugg][`ba`YbhiXi`Y`hc`U`ZU`ihk`]h`Hi`fb]h]b`mci`a`UmUdd`mZc`f`Ub`YI`HYbg]cb`z`Vi`hmc`i`
a`i`ghfYhU]b`mci`f`h]W`Yhbi`a`VYf`Zca`9I`HYfbU`Gi`ddcfhfU`cb[`k`]h`Ubmc`h`Yf`fY`Yj`UbhXcW`a`Ybhtg`L`hc`
]bWi`XY`Ug`Yj`]XYbVW`hc`gi`ddcfhmc`i`f`YI`HYbg]cb`Udd`]W]h]cb`≠mci`Ya`Uj`9I`HYfbU`Gi`ddcfhmc`i`k`]`
Ui`hca`UH]WU`mifYW]j`Y`U`h]W`Yhbi`a`VYf`z`Vi`h]Zmci`HY`Yd\cbY`mci`k`]`bYYX`hc`gdYW]Z]WU`mUg`Zc`f`cbY`
Hi`fb]h]b`U`gc`dfcj`]XYg`i`dXUH`g`cb`h`Y]f`gmghYa`ig`hU`h`g`cb`Hk`]hYf`"

;`YbYfU`mz`UggYgga`YbhiUg_g`a`i`ghVY`gi`Va`]hYX`Y`YWfcb]WU`mj`]U`Y]h`Yf`Hi`fb]h]b`cf`U`A`ccX`Y`
Ugg][`ba`Ybhi`h`]bg`hU`bVW`g`k`\YfY`h`lg`]g`bchidcgg]V`Yz`]hk`]`VY`ghUHYX`cb`mci`f`Wci`fgY`g`A`ccX`Y`g]h`k`]h`
U`HYfbU]h]`Y`gi`Va`]gg]cb`XYhU]g`"

:`cf]bZcfa`Uh]cb`cb`\ck`hc`gi`Va`]hUgg][`ba`Ybhtg`cb]bY`j`]U`A`ccX`Y`.\`hhdg`#gh`XYbhi`bgk`"YXi`"Ui`Ack`!
gi`Va`]hUgg][`ba`Ybhta`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'Wc'dmf][\hž' BGK 'Gh XYbh7cXY'cZ7cbXi W'Ubx'5W'W'dhUV'Y'I gY'cZ I BGK '⇒H'F Ygci f'W'g'Dc`]W'h
- VY'Uk UfY'cZ'Y'ghUbxUfXg'cZVY\Uj]ci f'YI dY'W'X'cZYj Yfmcby`]b'h'Y'I BGK 'W'a a i b]m
- 'cW'W'h'gYfj]W'g'UbX']bZ'fa U]cb'UVci hl BGK 'UbX'I BGK '@]VfUfm

Gca Y'cZ'Y'gY'UfY'Ug'k]''VY'ZJa]]Uf'hc'mci ž'c'h'Y'fg'k]''VY'bYk "'; U]b]b['U'gc`]X'i bXYfghUbx]b['cZU''h'Y fY'U'Y'X'UgdY'W'g'cZ9@-G9'k]''\Y'd'mci 'a U_Y'h'Y'a cghcZ'mci f'gh X]Yg'Uhl BGK ""

[\h'hd.##gi V'Y'W'f'i \]X'Y'g"'\]VfUfm'i bgk "Y'X'i "U'i #' \]gY#\]V'ci h' \]gY](#)

5 WUXYa]W=Zcfa Uh]cb

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

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