



ARTS3574

Hcd]Wg`]b`@Uh]b`5a Yf]Wub`7]bYa U

HYfa `H\`fYY`##`&\$&\$

7ci fgY`Cj Yfj]Yk

GHJZZ7cbhUW`8YhU]`g

7cbj Ybcfg

B Ua Y	9a U]`	5j U]`UV]`]m	@cW]hcb	D\cbY
B U]U]U`C fhjn 7YVYf]c	b"cfhjnWVYf]c4 i bgk "YXi "Ui	VmUddc]bħa Ybh	A 6&&,	W`b]UW`Vm Ya U]`

GWXcc``7cbhUW`bZcfa Uh]cb

GWXcc``cZ<i a Ub]h]Yg`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`*%&`-`' ,)`:`%*, %

: Ul. `ž`*%&`-`' ,)`:`; , +\$)

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

7ci fgY'8YHJ]`g

7fYX]hDc]bfg`*`

Gi a a UfmicZ\hY'7ci fgY

H\]g`Wci fgY`YI Ua]bYg`U`fUb[Y`cZgi WwYggZ ``Z]a g`Zca `@Uhb`5a Yf]WU`dfcXi WwX`dcgh&\$\$\$`VmU`bYk
[YbYfU]hcb`cZ]a a U_Yfg`Vcfb`UZYf`%`*\$``#YI Ua]bYg`hY`bYk `fYbXg`]b`A`YI]Wbž`6fUn]]Ubž`5f[Ybh]b]Ubž
UbX`DYfi j]Ub`W]bYa Uhc[fUd`m]fZ]a g`UbX`Wci b]f]Yg`j Ufm]Zca `mYUf`hc`mYUf`UbX`a Um]bW] XY`Z]a g`gi`Wk`Ug`
3_`adWe`bW]a]e] 5]fk`aX9`aV] BS`ie >STk] fZ] ?`afad]kU`W6]Sd]We] FZWE`WUd]f [FZW]d`7kWež?`SVW] geS]`
#iU`gc`Wcbg]XYfg`X]ZYfYbW]g`VYhk`YYb`Wcb]Ya dcfUfm]Z]a `dfcXi`W]cb`UbX`hY`UYgh`Yh]W]g`UbX`dc`]h]W]c`Z`hY
@Uhb`5a Yf]WU]b`W]bYa U`cZ`hY`%`*\$g]!`%` , \$g``H\Y`Z]a g`UfY`gh`X]YX`]b`hY]f`dc`]h]W]ž`gc]W]U`UbX`W`h`fU`
Wcb]h]h`

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

%` ⇒XYbh]ZmhY`gc]W]U`žY`Wcbca]W]UbX`dc`]h]W]`Wcb]h]h`hcZ@Uhb]f]c]E`5a Yf]WU]b`W]bYa U
&`8]gW`gg`@Uhb`5a Yf]WU]b`Z]a g`Vch`]b`hYfa`g`cZ]h]h`U`UbX`j]gi U`UbU`mgYg
`" `8]gW`gg`hY`X]ZYfYbW]g`VYhk`YYb`hY`bYk `fYbXg`]b`@Uhb`5a Yf]WU]b`W]bYa U`UbX`hY`UYgh`Yh]W]g
UbX`dc`]h]W]c`Z`hY`@Uhb`5a Yf]WU]b`B`Yk`7]bYa U`#`h]fX`7]bYa U`cZ`%`*\$g]!`%` , \$g
(" 9i`d`U]b`hY`]a`dUW]g`cZ[`cVU]n]U]h]cb`UbX`df] U]h]U]h]cb`cZ@Uhb`5a Yf]WU]b`W]bYa Uhc[fUd`m

HYUW]b[`GhfUHY[]Yg`

H\Y`hYUW]b[`d\]cgcd`micZ]h]g`Wci fgY`]g`]bZ`fa YX`Vm`hY`I`BGK` ; i]XY`]bYg`cb`@YUfb]b[ž`UbX`WU]b`VY
gi a a Uf]nYX`Ug`9b[U[Ya Yb]ž`7`cb]h]h`U`n]U]h]cb`UbX`#`W]g] YbYgg`fgY`Y`
[k`k`k`\["i \]XY`\]bYg`cb`YUfb\]b\["i`bgk`"YXi`"Ui`E`"H\Y`Y`W\]h`fYf`\]b`W\]Uf\[Y`gY`Y`_g`hc`dfc\] \]XY`U`j`Ybi`Y`Z`f`h\]cgY`h\]fY`Y`
_Y\]mdc\]b\]h\]gž`UbX`hY`fY`Z`fY`Ya`d`Ug\]n\]Yg`h\]U\]h\]hY`Uf\[Yf`cV`Y`W\]j`Y`\]g`hc`hYUW\]`gh\] XYb\]h\]g`\`ck`hc`VY`Wca`Y`W\]h\]WU`
YUfbYfg`"](#)

H\]g`Wci fgY`i`gYg`U`V`Yb`XYX`UddfcUW]`cZ`@Y`W]h`fYg`UbX`Hi`hc]f]U`gž`cf[Ub]nYX`Ufci`bX`_YmfYUX]b[g`Ug
Wcb]h]b]YX`]b`hY`7`ci`fgY`F`YUXYf`"

5`Y`W]h`fY`YUW]`k`YY`_`k`]`UXXfY`gg`hc]d]W]g]E`UXXfY`gg`YX`]b`hY`Z]a`J`Yk`]b[; i]XYg`UbX`F`YUX]b[g`"A`U`cf]h]m

5ggYgga Ybh

8i f]b['h]g'Wci fgYžX]ZYfYbh@Uhb'5a Yf]WUbb'Z'a g'k]'VY'X]gW ggYX'k]h'U'fUb[Y'cZ[YbfYg'UbX'hc d]Wg]bWi X]b[žVi hbchi'a]hY'hcžYI]Yž'a][fU]cbž]bX][Ybci g'hYa Yg'UbX'gi V'Y'Wgž[YbXYf'fYdfYgYbhU]cbž]XYbh]mZcfa U]cbž]c'YbWž'W'cb]nU]cb'UbX'W'h fU'Uddfcdf]U]cb'"H\Y'Z'a g'gY'Y'W'X'Zcf'h]g'WUgg'UfY]bh'YbX'X'Zcf'a Uhi fY'Ui X]YbW'g'"H\i gž'a cghcZ'hYa 'W'cbU]b'hY'i gY'cZYI d']W'h'Ub[i U[Y'UbX'gca Y'a][\h \Uj Y'gYI 'gW'Yg'cf'bi X]m'žmci 'Z]bX'UbmcZ'hYgY'UgdY'W'g'cZ]bg]j Yžcf'X]Z]W'h'hc'XYU'k]h'd'YUgY'U' _hc'hY'Wci fgY'W'cbj Ybcf'UVci hi'Y'fbU]j Y'WUggfccca 'Ugg][ba Ybhg'"5''Z'a g'k]'VY'k U'hW'YX'df]j U'h'mUbX k]h'hY'UV]]mZcf'mci 'hc'Z]ghZcfk UfX'h'fci [\i bW'ca Zcf'U'Y'g'W'Yg"

Gca Y'h]hYg'UfY'Uj U]UV'Y'Uh? 5BCDMžB9H: @Łžcf'I BGK '@]VfUfm'

H\]g'g'U'V'YbX'YX''YUfb]b['Wci fgYžUW]j Y'X]gW gg]cb'UbX'dUfh]W]dU]cb'UfY'fYeI]fYX''5W]j Y'dUfh]W]dU]cb]b'h]g'Wci fgY'a YUbg'hUhmci '\Uj Y'a UXY'U'W'cbgfi W]j Yž]bZcfa YX'W'cbf]Vi h]cb'hc'WUgg'X]gW gg]cbg" D'YUgY'W'ca Y'hc'WUgg'dfYdUfYX'"H\]g'a YUbg.'gY'Y'hY'k YY_'m]Z'a g'UbX'fYUX'hY'dYfh]bYbhUfh]WYg'Zcf'hY dUfh]W'Uf'k YY_'gc'mci 'UfY'dfYdUfYX'Zcf'WUgg"

5ggYgga YbhHUg_g'

5ggYgga YbhHUg_	K Y][\h	8i Y'8UH'	Gh XYbh@YUfb]b[Ci hW'ca Yg'5ggYggYX
h!WUgg'dfYgYbhU]cb'	' \$i	k YY_' !-	%ž&ž ž{

lc'Hyb'a]bi H'g'cZwUgg'X]gW'gg]cb"Mc'k]'H'U'žBC'HF'958"

⊕'UXX]hcb'lc'a U_]b['h'Y]b!WUgg'dfYgYbHhcbžYUW'ghi XYbhk]''gi Va]hUb'UbbchUH'X'V]V']c[fUd\m
f%\$\$\$'k cfXgłž'k \]W'k]'XYU'k]h'U'a]b]a i a 'cZ) 'UWXYa]Wgci fWg'i gYX]b'h'Y'fYgYUfW'YUX]b['lc
h'Y'dfYgYbHhcb": cf'YUW'cZ'h'YgY'fYž'fYbW'gž'h'Y'ghi XYbhk]'Vf]YZmci h]bY. 'Uł'žca 'k \YfY'h'Y'h'Y' h'k Ug
gci fWX/Vł'k \m]h]g']a dcfhUbhž'f'h'Y' h'cd]Wgh X]YX/Wł'ck ']h'k Ug]b'h'Y']fUH'X']b'lc'h'Y'dfYgYbHhcb" H\Y'

5XX]h]cbU`XYHJ]g.

5ggYgga Ybh8YgW]dh]cb. 'Gh XYbhg`bYYX`lc`fYgYUfW`U`hcd]WfY`Yj Ubhlc`@Uh]b`5a Yf]WUb`7]bYa U`Vi h
X]ZZfYbhZfca`hY`cbY`WcgYb`Zcf`hY`[fci d`dfYgYbhU]cb""9UW`gh XYbhYXXg`k`f]h
U` \$\$!k cfX`YggUmUbX`]bW` XY`U`V]V`]c [fUd`micZUh`YUghhYb`UWXYa]Wgci fWg`Wcbgi`hX`]b

Gi Va]gg]cb`cZ5ggYgga YbhiHUg_g

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

≠mci`YbWci bHYf`U`dfcV`Ya`k` \Yb`UH`Ya` dh]b[`hc`gi`Va`]hmc`i`f`Ugg][`ba`Ybhi`h`fci`[`\`Hi`fb]h]b`z`d`Y`Ug`Y`
HY`Yd`cb`Y`9I`HY`fb`U`Gi`ddc`fh`cb`-`,`,)``'``'``%cf`Ya`U]`h`Ya`i`cb`YI`HY`fb`U`HY`hgi`ddc`fh`4`i`bgk`"YXi`"Ui`""Gi`ddc`fh`
`l`ci`fg`Uf`Y`,`.\$\$Ua`-`-%\$.\$\$da`i`cb`k`YY`XUmg`U`bX`-`.\$\$Ua`-`).\$\$da`i`cb`k`YY`YbXg`f`l`*)`XUmg`U`m`Y`Uf`l`"≠mci`
Uf`Y`i`bUV`Y`hc`gi`Va`]hmc`i`f`Ugg][`ba`Ybhi`Xi`Y`hc`U`Z`Ji`h`k`]h`Hi`fb]h]b`mci`i`a`Um`Udd`m`Z`f`U`b`YI`HY`bg]cb`z`Vi`hmc`i`
a`i`gh`f`Y`h]b`mci`f`h]W`Y`hbi`a`VY`f`Z`ca`9I`HY`fb`U`Gi`ddc`fh`f`U`cb[`k`]h`U`b`m`c`h`Y`f`f`Y`Y`U`b`h`X`c`W`a`Y`b`h`g`k`h`c`
]b`Wi`XY`U`g`Y`j`]X`Y`b`W`hc`gi`ddc`fh`mci`f`YI`HY`bg]cb`Udd`]W`h]cb`"≠mci`Ya`U]`9I`HY`fb`U`Gi`ddc`fh`mci`k`]`
Ui`h`ca`U`h]W`U`m`f`Y`W`]j`Y`U`h]W`Y`hbi`a`VY`f`z`Vi`h]Z`mci`HY`Yd`cb`Y`mci`k`]`b`Y`Y`X`hc`gd`Y`W`Z]W`U`m`Ug`_`Z`f`c`b`Y`"
Hi`fb]h]b`U`gc`d`fc`j`]X`Y`g`i`d`X`U`h`Y`g`c`b`h`Y`]f`g`m`g`h`Y`a`i`g`h`U`h`g`c`b`H`k`]h`Y`f`"

;`Yb`Y`f`U`m`z`Ugg`Y`gga`Yb`hi`U`g`_`g`a`i`gh`V`Y`gi`Va`]h`Y`X`Y`Y`W`f`c`b]W`U`m`j`]U`Y`]h`Y`f`Hi`fb]h]b`c`f`U`A`cc`X`Y`
Ugg][`ba`Yb`h`i`h`]b`g`h`U`b`W`g`k` \Y`f`Y`h`l`g`]g`b`c`h`d`c`g`g]V`Y`z`]h`k`]`V`Y`g`h`U`h`X`c`b`mci`f`W`ci`fg`Y`g`A`cc`X`Y`g`]h`k`]h`
U`h`Y`fb`U`h]`Y`gi`Va`]gg]cb`X`Y`h]g`"

:`cf`]b`Z`fa`U`h]cb`c`b`l`ck`hc`gi`Va`]h`Ugg][`ba`Yb`h]g`c`b]b`Y`j`]U`A`cc`X`Y`.`h`h`d`g`#`g`h`X`Y`b`h`i`bgk`"YXi`"Ui`#`ck`!
gi`Va`]h`Ugg][`ba`Yb`h`a`cc`X`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'j]b'h'Y'I BGK 'Wca a i b]m
- `cWJh'gYfj]Wg'UbX'j]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 ""

[\hhd.##ji V'YWf'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.