



ARTS3458

7 \]bYgY '7 Udghc bY. 'F Y!J]g]cb]b['7 \]bU'UbX'7 \]bYgY
Gh X]Yg

HYfa 'H\fYY'##'&\$&\$

7ci fgY`Cj Yfj]Yk

GHJZ7cbhJW`8YhU]`g

7cbj Ybcfg

B Ua Y	9a U]`	5j U]`UV]`]m	@cW]hcb	D\cbY
K U\ ; i Ub`@a	k [`]a 4 i bgk "YXi "Ui	D`YUgY `W`b hJW`j]U Ya U]`	A cfj Yb`6fck b &()	- ' ,) `% *%

GWcc``7cbhJW`hZcfa Uh]cb

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

@cW]hcb. `GWcc``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](#)

7ci fgY'8YHJ`g

7fYX]hDc]bqg`*`

Gi a a UfmicZħY'7ci fgY

H\]g`Wđi fgY`Yb[U[Yg`k]ħ`_Ym]XYUg`UbX`]ggi Yg`]b`7`\\]bYgY`Gh`X]Yg`" ħiU`gc`fY!j]g]cbg`UFYUg`ħ.Uh`\\Uj`Y`
VYYb`Wđj`YfYX`]b`cħ.Yf`Wđi fgYg`]b`ħ.Y`A`U`c`f`"H`\\YgY`]bW`i`XY`7`\\]bYgY`"Ub[i U[Y`gh`i`X]Ygž`"]ħfUhi`fYž`Z`a`ž`
a`YX]Už`ħfUbg`U]ħcbž`Ubħ.fcd`c`[miUbX`[YbXYf`gh`i`X]Yg`"Mci`"UfY`YbWđi`fU[YX`ħc`fYZYWđi`dcbž`fYj`]Yk`"UbX`
i`gY`ħ.Y`_bck`YX[Y`"UbX`"Ub[i U[Y`Wđa`dYħ`bW`"UWđi`]fYX`Z`ca`"ħ.YgY`"UfYUg`cZgh`XmiUbX`Wđbg]XYf`"ck`"mci`
W]b`i`h`]gY`ħ.Ya`"Z`f`mci`f`UWUXYa`]Wcf`WfYfY`Z`h`fYg`"Mci`"k`]"`[U]b`"U`a`cFY`ħ.Yc`fYh]WU`"UbX`"\\]għc`f]WU`
dYfgdYW]j`Y`"cb`7`\\]bU`"UbX`7`\\]bYgY`"Gh`X]Yg`"H`\\Y`"YUfb]b[`k`]"`VY`Z`UW]j]ħUħYX`VmU`fUbb[Y`cZ`UW]j`]ħYg`
]bW`i`X]b[`]bXYdYbXYbh`fYgYUfW`"dfc`Y`W]gž`c`fU`"dfYgYb`h]ħcbg`"UbX`YggUmik`f]ħb[""H`\\fci`[`\\`ħ.Y`Wđi`fgYž`mci`
UfY`ħc`"YUfb`"UbX`fYZYWđi`cb`ħ.Y`Wđb`h]ħ`gž`a`Yħc`Xg`"UbX`"\\]għc`f]Yg`]b`k`"\\W`7`\\]bYgY`"Gh`X]Yg`"Ug`VYYb`
Uddfc`UW`YX`/ħc`[U]b`"Ub`]bZ`fa`YX`i`bXYfgh`UbX]b[`cZ`ħ.Y`_Ym]ggi`Yg`"UbX`XYVUħY`g`Uvc`i`h`Wđb`ħ`a`dcfUfm`UbX`
"\\]għc`f]WU`"7`\\]bU`/ħc`"fYj`]Yk`"UbX`i`dXUħ`"gW`k`"Ufg`\\d`"cb`7`\\]bYgY`"Gh`X]Yg`Z`ca`"Ub`]bZ`fa`YXž`W]ħ]WU`"UbX`
]bħf`fX]gW]d`]bUfmid`YfgdYW]j`Y`"

7ci fgY`@YUfb]b[`Ci`hWđa`Yg

%`5`Wđi`]fY`_bck`YX[Y`]bXYdYbXYbh`mž`i`h`]g]b[`Vch`"df]a`Ufm`UbX`"gYWđb`XUfma`Uħf]U`g`
&`8`Ya`cbgh`fUħ`Wđb`W`dh`U`"UbX`dfUW]WU`"g`_]g`Z`f`W]ħ]WU`"Ybei`]fm`UbX`dfcV`Ya`"gc`j`]b[`cb`]ggi`Yg`cZ`
XYVUħYg`
'`" `D`"Ub`"UbX`Wđa`d`Yħ`"U`fYgYUfW`"dfc`Y`W`h`
(`" `5`f]ħW`"Uħ`"gdYW]U`]gYX`_bck`YX[Y`cZ`7`\\]bU`"UbX`UgdYW]g`cZ`7`\\]bYgY`"Gh`X]Yg`
)`" `9`b[U[Y`]b`"fYUgcb`YX`"UbX`cdYb`!`a`]bXYX`"X]gW`gg]cb`"UbX`XYVUħY`"

HYUW`X]b[`GħfUħY`[]Yg`

H\]g`W]d`għc`bY`Wđi fgY`]g`ħ.Y`"Ugh`Wđi fgY`Z`f`gh`XYbħg`]b`ħ.Y`7`\\]bYgY`"Gh`X]Yg`"UbX`5Xj`UbW`X`7`\\]bYgY`
Gh`X]Yg`"a`U`c`fg`"ħi]g`XYg[]bYX`ħc`dfc`j`XY`"Ub`cddc`f]i`b]m]Z`f`gh`XYbħg`ħc`fYZYWđi`cb`ħ.Y`]f`Yi`dYf]YbW]g`"UbX`
_bck`YX[Y`]b`7`\\]bYgY`"Gh`X]Ygž`ħc`Wđbgc`"XUħY`k`"\\Uħ`h`Ym`\\Uj`Y`"YUfb`hd`fYj`]ci`g`mž`"UbX`ħc`dfYd`UfY`ħ.Y`]f`
fUbg]ħ]cb`"b]ħc`ħ.Y`k`c`f`_Z`c`f`W`"c`f`dcgħ[fUXi`UħY`gh`i`Xm`"ħi]bħY[fUħYg`_bck`YX[Y`[U]bYX`ħ.fci`[`\\`dfYj`]ci`g`
Wđi fgYk`c`f`_UbX`c`j`YfgYUg`Yi`dYf]YbW`"UbX`Vi`]Xg`c`b`ħ.Uh`Wđb`W`dh`U`Z`ci`bXUħ]cb`ħ.fci`[`\\`U`a`cFY`
ħ.Yc`fYh]WU`"UbX`"\\]għc`f]WU`"dYfgdYW]j`Yž`]bħY[fUħj`Y`"UbU`mg]gž`dfUW]WU`"Udd`]W]ħ]cb`"UbX`W]ħ]WU`"ħ]b`_]b[""H`\\Y`
Wđi fgY`]g`Wđa`dcgYX`cZU`gYf]Yg`cZ`ħ.Ya`YX`"Y`W`i`fYgž`]b!`WUgg`X]gW`gg]cbgž`k`c`f`_g`c`dg`"UbX`dfYgYb`h]ħcbg`"ħ`
]g`VUgYX`c`b`ħ.Y`df]bW]d`Y`cZ`gh`XYbħg`fYg`Z`[i]YX`"YUfb]b[""H`\\Y`fci`Y`cZ`ħ.Y`Wđi fgY`Wđc`fX]bUħc`f`UbX`"Y`W`i`fYf`
]g`ħc`W`YUħY`"Ub`]bħY`"Y`W`i`U`"migh`a`i`"Uħ]b[`]UbX`Wđc`dYfUħj`Y`"YUfb]b[`Ybj`]f`c`ba`Ybh`Z`f`gh`XYbħg`ħc`Yb[U[Y`]b`
X]U`c[i`Yg`k`]ħ`YUW`X`cħ.Yf`]b`UbX`ci`ħcZ`WUgg`f`c`ca`ž`VYg]XYg`dfc`j`X]b[`]Ub`]bħY`"Y`W`i`"\\]għc`f]WU`"dYfgdYW]j`Y`
UbX`gdYW]U`]nYX`"X]gW]d`]bUfmi`Z`Ua`Yk`c`f`_"`Gh`XYbħg`UfY`YbWđi`fU[YX`ħc`fYUX`Yi`dUbg]j`Y`m`UbX`Z`c`gh`f`U`
dfc`Xi`W]j`Y`fY`Uħ]cbg`\\d`k`]ħ`ħ.Y`V`f`c`UX`Y`f`UWUXYa`]W`Wđa`a`i`b]m`"@"Y`W`i`fYg`"UbX`h`ħc`f]U`g`U]a`ħc`V`fU]b`għc`fa`
UbX`[]j`Y`gh`i`XYbħg`cddc`f]i`b]ħYg`ħc`f`Wđi`b`XYfgh`UbX`"UbX`UWđi`]fY`"U`gdYW]U`]gh`_bck`YX[Y`cZ`7`\\]bUž`7`\\]bYgY`
W`"h`fYž`\\]għc`fmi`UbX`"Ub[i U[Y`/f&`fYj`]g]hYUf`]Yf`"YUfb]b[`Yi`dYf]YbW`gž`"UbX`]XYbħ]ZmiX]ZY`fYb`hig`fYUa`g`cZ`
ħci`[`\\]g`XYj`Y`cdYX`]b`dUf]ħW`"Uf`UfYUg`]b`fYV`b`h`m`Y`Ufg`/f`l`Yi`d`c`fY`"X]gW]d`]bUfmi`UbX`]bħf`fX]gW]d`]bUfm`
Uddfc`UW`Yg`"UbX`a`Yħc`Xc`c`[]Yg`]b`fYgYUfW]b[`dUf]ħW`"Uf`ħc`d]W]g`]b`7`\\]bYgY`"Gh`X]Yg`"

5ggYgga Ybh

8YHU]g'cb'5ggYgga YbhF Yei]fYa Ybhg.

Dfc YW8YgW]dh]cb#9ggUmDfcdcgU'.

Mci 'bYXX'hc'gi Va]hU'bYUhmK f]hYb'dfcdcgU'XYgW]V]b['hY'fYgYUfW' dfc YWmci '\Uj Y'bY[ch]UH'X'k]h
mci f'YVh'fYf'Z'UbX'\ck'mci 'd'Ub'hc'i bXYfU_Y]h' #ig\ci 'X']bW' XY'hY'Z'ck]b['UfYUg.

5ggYgga Ybh8YhU]`g

5ggYgga Ybh%`A ccX`Y`Dcghg/`8]gW`gg]cb`@YUXYf

GHUfhXUH. `Bch5dd`]WVY

@Yb[h. `! \$\$\$!) \$\$\$`k cfXg

8YhU]`g.

K YY_`mA ccX`Y`Dcghg/`Uh`YUghicbY`k YY_`hc`YUX`X]gW`gg]cb"

⌘!WUgg`ZYXVUW_"

Gi Va]gg]cb`bchYg.Gi Va]hcb`A ccX`Y`VmA`cbXUmbccb`df]cf`hc`h\Y`k YY_`cZX]gW`gg]cb

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

5ggYgga Ybh&.`Dfc`YWh8YgW]dh]cb`#9ggUmDfcdcgU`

GHUfhXUH. `K YY_`"

8YhU]`g.

6]V`]c[fUd\mfYgYUfW\`/`dfcdcgU`cZ]bU`YggUm

⌘!WUgg`ZYXVUW_"

Gi Va]gg]cb`bchYg.GcZhWcdmhc`VY`gi Va]hX`Y`YWfcb]W`m

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

5ggYgga Ybh' .`DfYgYbHh]cb

GHUfhXUH. `

8YhU]`g.

%)!a]bi hY`dfYgYbHh]cbž) !a]bi hY`X]gW`gg]cb`YUW"

⌘!WUgg`ZYXVUW_"

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

5ggYgga Ybh(. `F YgYUfW\`9ggUm

GHUfhXUH. `Bch5dd`]WVY

@Yb[h. ') \$\$'k cfXg

8YhU]`g.

') \$\$!k cfX`YggUm'

: UWY!hc!ZJW`a YYh]b[`k]h `]bgrfi Wcf`cb`mi dcb`fYei YghcZgh XYbt'

Hi fb]h]b`gYh]b[. 'H\]g'Ugg][ba Ybh]g'gi Va]hYX`hfc i [\ `Hi fb]h]b`UbX`gh XYbtg`Xc`bchgYY`Hi fb]h]b`g]a `]Uf]mfYdcfng"

K YY_+. '&* 'C Wtc VYf!' '\$ C Wtc VYf	GYa]bUf	@Ub[i U[Y 'UbX' ðYbh]m Dfc ^Ww8YgW]dh]cb '#9ggUmDfcdcgU` Ž 6]V]c[fUd\mXi Y'f] i Ł
K YY_,' '&Bcj Ya VYf!' '* Bcj Ya VYf	GYa]bUf	7]bYa Uh]WUbX'h\Y'DYfz:fa]b['5f]g
K YY_-' '- Bcj Ya VYf! '% 'Bcj Ya VYf	GYa]bUf	Dfc ^WwdfYgYbhUh]cbg 'UbX'X]gW gg]cb'f] i Ł
K YY_ '\$. '% 'Bcj Ya VYf! &\$'Bcj Ya VYf	GYa]bUf	K f]h]b['k cf_g\cd

F Ygci fWg

DfYgWf]VYX`F Ygci fWg`

F Yei]fYX`UbX`fYWta a YbXYX`fYUX]b[g`cb`A ccX`Y

F YWca a YbXYX`F Ygci fWg

Gi Va]gg]cb`cZ5ggYgga YbhiHUg_g

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

≠mci`YbWci bHYf`U`dfcV`Ya`k` \Yb`UHYa` dh]b[`hc`gi`Va`]hmc`i`f`Ugg][`ba`YbhiHfci`[`\`Hi`fb]h]bzd`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`ia`UmUdd`mZc`f`Ub`YI`HYbg]cbz`Vi`hmc`i`
a`i`ghfYHU]b`mci`f`h]W`Yhbi`a`VYf`Zca`9I`HYfbU`Gi`ddcfhU`cb[`k`]H`Ubmc`H`Yf`fY`Yj`UbhXcW`a`YbHgE`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`j`
Ui`hca`UH]WU`mifYW]j`Y`U`h]W`Yhbi`a`VYfz`Vi`h]Zmci`HY`Yd\cbY`mci`k`j`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`b`]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]HY`k`]H`
U`HYfbUH]`Y`gi`Va`]gg]cb`XYHU]g`"

:`cf]bZcfa`UH]cb`cb`\ck`hc`gi`Va`]hUgg][`ba`YbHg`cb]bY`j`]U`A`ccX`Y`.\`hdg`#gh`XYbhi`bgk`"YXi`"Ui`Ack`!
gi`Va`]hUgg][`ba`Ybhi`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'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'YW'i \]XYg" \]VfUfm'i bgk "YXi "Ui #' \]gY#JVci h' \]gY](#)

