



ARTS2451

ϠhYfa YX]UHŸ '7 \]bYgY 'Zcf'B cb!6UW_[fci bX'GdYU_Yfg'6

HYfa 'H\ŸŸ'##'&\$&\$

7ci fgY'8YHJ]`g

7fYX]hDc]bHg`*`

Gi a a UfmicZ\hY'7ci fgY

H\]g`Wci fgY`]g`XYg][bYX`Zcf`ghi`XYbHg`k` \c` \Uj`Y`UWei`]fYX`U`VUg]W`Yj`Y`c`Zgdc`_Yb`7` \]bYgY`fA` UbXUf]bE`UbX`
U`k`cf`_]b[`[_bck`YX[`Y`c`Zi`d`h`c`Y][` \h\i`bXFYX`g]a`d`]ZYX`WX`UFUWV`fg`]b`h`Y]f`%)`m`Y`Ufg`c`Zgh`XnZ`Ug`k`Y`Ug`
Zcf`h`cgY`ghi`XYbHg`k` \c`Yb`h`f`h`Y`7` \]bYgY`Ub[`i`U[`Y`dfc[`fUa`k`]h`Ub`Yei`]j`U`Ybh`_bck`YX[`Y`c`Z`7` \]bYgY`
WX`UFUWV`fg`" `h]g`XYg][bYX`Zcf`ghi`XYbHg`k` \c`Xc`bch`Wca`Y`Zca`U`7` \]bYgY`W`h`fU`UbX`Ub[`i`U[`Y`f`c`f`
X]U`Y`W`V`U`U`[`fci`bX`" `h`h]g`Wci fgY`Z`mci`k`]`" `a`dfcj`Y`mci`f`7` \]bYgY`g`_]`g`]b`h`Y`U`f`Y`U`g`c`Z`g`d`Y`U`_]b[`z`
]`gh`b]b[`z`f`Y`U`X`_]b[`z`UbX`k`f]h]b[`z`UbX`k`]`" `a`U`_`Y`g][`b]Z`W`b`h[`U]b]g`]b`mci`f`W`ca`a`i`b]W`h]j`Y`g`_]`g`]b`c`f`U`UbX`
k`f]h]b`Z`ca`g`" `Mci`k`]`" `U`g`c`V`Y`Yi`d`cg`Y`X`h`c`U`gd`Y`W`g`c`Z`7` \]bYgY` \]g`h`c`f`n`z`W`h`f`Y`z`d`c`]h]W`z`UbX`g`c`W`Y`h`m`
f`Y`Y`j`Ub`h`c`" `]j`Yb`h`Y`h]g`]b`7` \]bYgY`]b`Ub[`i`U[`Y`U`Wei`]g]h]cb`"

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

%`5`dd`m`Y`Z`W`j]Y`g`h`f`U`h`[`]Y`g`Z`c`f`f`Y`U`X`]b[`7` \]bYgY`h`Y`h]g`Z`ca`j`U`f]ci`g`g`ci`f`W`g`UbX`cb`U`j`U`f]Y`m`ic`Z`
h`c`d]W`g`
&`" `7`ca`d`cgY`g`l`c`f`h`Y`gg`U`m]g`]b`7` \]bYgY`cb`U`[`]j`Yb`h`c`d]W`k`]h`W`c`b`Z`X`Y`b`W`" `"
'`" `h]h]U`h]U`h`Y`j`Y`f`m`X`U`m`W`c`b]j`Y`f`g`U`h]c`b]g`UbX`Y`b[`U[`Y`]b`X]g`W`g]c`b]g`]b`7` \]bYgY`" `"
(`" `8`Ya`c`b]g`h`f`U`h`W`h]W`" `U`d`d`f`Y`W`U`h]c`b`UbX`bi`Ub`W`X`_bck`YX[`Y`c`Z`7` \]bYgY`" `]b[`i`]g`h]W`V`Y` \U`j`ci`f`z`
g`c`W`Y`h`m`UbX`W`h`f`Y`" `"

HYUWX]b[`GhfUHy []Yg`

H\Y`Wci fgY`Wca`df]gYg`h`k`c`Wca`dcb`Y`b]g`c`Z`Z`U`W`!`h`c`!`Z`U`W`h`Y`U`W`X`]b[`UbX`Y`U`f`b]b[`d`Y`f`k`Y`Y`_`f`h`h`h`Y`Y`W`h`f`Y`g`
d`f`c`j`X`Y`Ub`]b]f`c`X`i`W`h]c`b`h`c`[`fUa`a`U`f`z`_`Y`m`Ub[`i`U[`Y`UbX`W`h`fU`]g]g`i`Y`g`]b`Y`U`W`X`Y`g`g`c`b`z`k`]h`d`f`U`W`h]W`g`h`c`
W`c`b]g`c`]X`U`h`Y`b`Y`k`_bck`YX[`Y`]b`Ub[`i`U[`Y`U`Wei`]g]h]cb`/f&E`H\Y`h`h`c`f]U`g`Z`c`W`g`c`b`k`c`f`_V`cc`_`Yi`Y`f`W]g`Y`g`z`k`]h`
c`d`d`c`f`h`b]h]Y`g`Z`c`f`g`h`i`XY`b]h]g`h`c`d`f`U`W`h]W`c`f`U`7` \]bYgY`UbX`U`X`X`f`Y`g`g`]g]g`i`Y`g`]b`f`Y`U`X`]b[`UbX`k`f]h]b[`" `Mci`g`l`ci`X`
d`f`Y`j`]Y`k`h`Y`b`Y`k`k`c`f`X`g`V`Y`Z`c`f`Y`Y`U`W`X`Y`W`h`f`Y`UbX`X`c`h`Y`Yi`Y`f`W]g`Y`g`]b`h`Y`k`c`f`_V`cc`_`V`Y`Z`c`f`Y`Y`U`W`X`h`h`c`f]U`"
Mci`U`f`Y`Yi`d`Y`W`X`h`c`U`c`W`h`Y`U`X`X]h]c`b`U`h]a`Y`Z`c`f`g`Y`Z`g`h`X`m`UbX`d`U`f`b`Y`f`Ub[`i`U[`Y`d`f`U`W`h]W`z`k` \]W`X`k`]`V`Y`
W`X`Y`W`_`Y`X`k`Y`Y`_`m]b`Y`W`h`f`Y`g`UbX`h`h`c`f]U`g`" `9`b[`U[`Ya`Y`b`h`k`]h`h`Y`Wci fgY`W`c`b`h`b`h`k`]`V`Y`Z`f`h`Y`f`U`g`g`Y`g`Y`X`
V`m`i`U`a`]X]h`f`a`h`Y`g`h`UbX`Ub`Y`b`X]c`Z`h`f`a`Z]b`U`h`Y`g`h`"

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GHUfhXUHŸ. Bch5dd`]WUV`Y

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8YHU]`g.

9UWX`gh XYbhk]`VY`fYeI]fYX`hc`Xc`Uh`YUghk c`X]U`c[i Y`YI YfWŸgYg`k]h`U`Ub[i U[Y`dUfbYf`h.fci [\ci h h.Y`Wci fgY`]b`YWŸ fYg`": YYXVUW`j]U`]bX]j]Xi U`Wta a Ybhgžfi Vf]WžUbX`]b!WUgg`X]gW`gg]cb"

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h\]g`]g`U`Zcfa U`k f]h]b`hŸghfWU`" & \ci fgŸhc`UggYgg`gh XYbhg`UWci]g]h]cb`cZhY`7\]bYgY`Ub[i U[Yž]b dUfh]W`Uf`k f]h]b[`UbX`fYUX]b[`g_]`gž]b`hY`a]X`gYa YghŸf`": YYXVUW`j]U`]bX]j]Xi U`Wta a Ybhg`UbX`fi Vf]W

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Ʒmci`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`Uj`h`Ya`cb`YI`HY`fb`U`HY`hgi`ddc`fh`4`i`bgk`"YXi`"Ui`""`Gi`ddc`fh`
`l`ci`fg`Uf`Y`,`.\$\$Ua`-`-%\$.\$\$da`cb`k`YY`XUmg`UbX`-`.\$\$Ua`-`,`)`. \$\$da`cb`k`YY`YbXg`f`l`*)`XUmg`U`m`Y`Uf`l`"Ʒmci`
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`a`Um`Udd`m`Z`f`Ub`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`Ub`m`c`h`Y`f`f`Y`Yj`Ub`h`X`c`W`a`Y`b`h`g`k`h`c`
]b`Wi`XY`Ug`Y`j`]X`Y`b`W`hc`gi`ddc`fh`mci`f`YI`HY`bg]cb`Udd`]W`h]cb`"Ʒmci`Ya`Uj`9I`HY`fb`U`Gi`ddc`fh`mci`k`j`
Ui`h`ca`U`h]W`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`j`b`Y`Y`X`hc`gd`Y`W`Z`W`m`Ug`_`Z`f`cb`Y`"
Hi`fb]h]b`U`gc`d`fc`j`]X`Y`gi`d`X`U`h`Y`g`cb`h`Y]f`g`m`g`h`Ya`g`h`U`h`g`cb`Hk`]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`cb]W`m`j`]U`Y`]h`Y`f`Hi`fb]h]b`cf`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`cb`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`cb`l`ck`hc`gi`Va`]h`Ugg][`ba`Yb`h]g`cb`]b`Y`j`]U`A`cc`X`Y`.`h`h`d`g`#`gh`XY`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'jb'h'Y'I BGK 'Wca a i b]m
- `cWJh'gYfj]Wg'UbX'jbZcfa Uhcb'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](#)

