



ARTS3820

<ck 'hc'ghUfhU'fYj c'i h]cb. 'UW]j]ga ž'gcW]U`'a cj Ya Yb]g
UbX'dc`]h]W]U`'WXUb[Y

HYfa 'Hk c`'#`&\$&\$

7ci fgY`Cj Yfj]Yk

GHJZ7cbHJW`8YHJ]`g

7cbj Ybcfg

B Ua Y	9a U]`	5j U]UV]`]m	@cW]h]cb	D\cbY
B]W_`5dc]Zg	b"Udc]Zg4 i bgk "YXi "Ui		A 6`%((- ' ,) &(\$+

7 ci fgY'8YHJ]`g

7 fYX]hDc]bfg`*`

Gi a a UfmicZ\hY'7 ci fgY

<ck`tc`ghUfhiU'fY] c'i h]cb'UbX'WX'Ub[Y'hY'k c'fX3`#`U'k c'fX'cZ[fck]b[]'bYei U']mžYbj]fcb a YbHU'dc`i h]cbž UbX'WčbZ]Wih]g'ei Ygh]cb'gY'a g'a c'fY]a d'cfU'bh'Ub'Yj Y'f'`#`h]g'Wč'i fgYžmci`'Yi Ua]bY'h]g'ei Ygh]cb Žca`U'Dc`]h]Wg'UbX'`#`h]fbU]cbU'F`Y`U]h]cbg'dYfgdY'W]j YžYi Ua]b]b[]'dfcW'ggYg'cZ'UbX'hY'U'W'c'fg']bj c'j YX]bž'dc`]h]W'`WX'Ub[Y''`fca`'hY'`a Y'hc`'a c'j Ya Yb'ž'hc`'6`UW`_@j Yg'A`U'HY'fž'hc`'hY'`5`'hF`][\`ž'hc`'hY'`5`fUV gdf]b[]'dfc'h]g'g'UbX'C`W'W`dm'UbX'`#`X][bUXc'a c'j Ya Yb'g. U''`U'fci bX'hY'k c'fX'W]h]nYbg'U'fY a cV]]g]b[ž'gca`Y`VY'W]i gY`hY'mk`Ub'hd'c`]h]W'`WX'Ub[Yž'c'hY'fg'VY'W]i gY`hY'mk`Ub'hc`'a`U]b]b[]'hY'`gh]h`g ei c''K` \U'h]g'WX'Ub[Y3`K` \m'Xc`'gca`Y`dY'cd`Y'k`Ub'hfUX]W'`UbX'`c'hY'fg'a`cXY'fU'h'`WX'Ub[Y3`K` \U'h]Yi`d`U]bg`hY'`gi`W'W'gg'cZ`UX] c'W'U]h]g'Z'f'bc'b!`WX'Ub[Yž`]'Y''`hY'`gh]h`g`ei`c3`K` \U'h]`]`V`cZ`WX'Ub[Y'Xc`dc`]'h]W'`U'W'c'fg`gY'Y`_`hc`'U'W'X]j Y3`#`h]g'Wč'i fgY'mci`'k`]'`Z`f'hY'fYi`d`c'fY`hY'gY'`ei`Ygh]cbg'Wč'a`dUf]b[]'dfcW'ggYg'cZ'dc`]'h]W'`WX'Ub[Y`UbX'U'W'c'fg']bj c'j YX`]b[]`YbY'fU]b[]'dc`]'h]W'`WX'Ub[Y`]b`'5`i`gh]h]U'`U'`UbX'`c'hY'f'Wč'i`b'f]Y'g'U'fci`bX`hY`k`c'fX''`Mci`'k`]'`Y`U'fb`U'Vci`h`hY'`f'c`Y`cZ`dck`Y'fž`Y`]h]a`U'W'ž`UbX`]bg]X'Y'f'UbX'`ci`hg]X'Y'f'dcg]h]cbg']b`'a`U`]b[]'dc`]'h]W'`WX'Ub[Y`k`c'f`_`f'c'f'bc'h`'Mci`'k`]'`Y`U`j`Y`h]g'Wč'i fgY`k`]h`U`VY`h]Y'f'i`bXY'fgh]UbX]b[]'cZ` \U'hdc`]'h]W'`WX'Ub[Y`]gž` \ck`]h]W'Ub`VY`U'W'X]j YXž`UbX`'k` \U'h]mci`f'ck`b`f'c`Y`W'Ub`VY`]b`'WX'Ub[]b[]'hY'`k`c'fX''`

7 ci fgY`@YUfb]b[]'Ci`hWč'a`Yg

%`8`Y`g`W']VY`UbX`Yj`U'i`U'h`'hY`'a`U]b`hY`c'f]Yg`UbX`Wč'b`W'dhg'i`gYX`]b`hY`'gh`XmicZdc`]'h]W'`WX'Ub[Y`&`7`f]h]W'`mYj`U'i`U'h`'UbX`Wč'b'f'Ugh]fYgY'U'f'W`'U'Vci`hd'f'c'W'ggYg'cZ'dc`]'h]W'`WX'Ub[Y`UbX`U'W'c'fg']bj c'j YX]b`dc`]'h]W'`WX'Ub[Y`f'UbX`'bc'b!`WX'Ub[Yč`]b`b'U]h]cbU'`UbX`]b'h]fb'U]h]cbU'`Wč'b'h]f`hg`'`9`i`d`U]b`hY`'Wč'b'h]g'hY`'b'U'h`fY`'cZ'dc`]'h]W'`]b'ei`]f'm'UbX`'hY`'X]a`Y`bg]cbg'cZ`Y'h`]W'`g`W'c`'U'fg` \d`]b`'hY`X]g]W'd`]b`Yg'cZ'Dc`]'h]W'g`UbX`#`f`#`h]fb'U]h]cbU'`F`Y`U]h]cbg']b`fY`U]h]cb`'hc`'dfcW'ggYg'cZ'dc`]'h]W'`WX'Ub[Y`UbX`'bc'b!`WX'Ub[Y''`

HYUW]b[]'G'fU'Y']Yg`

H\Y`'Y'U'fb]b[]'U'W]j`]h]g'Z'f'h]g'Wč'i fgY`U'fY`gY`Y`W'X'`hc`'gi`d'c'f'h]mci`]b`g'h]fYb[]'hY'b]b[]'mci`f`W'd`U'W]m'Z'f`f'Uč`W']h]W'ž`]bX'Y'dY'bX'Y'bh'h]]b`]b[]'f'Vč`fYgY'U'f'W`'g`_`'g`'UbX`'f'Wč`fYZY'W]b[]'cb`mci`f'ck`b`d'cg]h]cb`]b`'hY`k`c'fX''`D'f'c'W'ggYg'cZ'dc`]'h]W'`WX'Ub[Y`UbX`'bc'b!`WX'Ub[Y`U'fY`'bYj`Y'f'j`U'i`Y!`bYi`'f'U`ž`UbX`'hY`fY`Z'fY`'k`Y`'k`]''VY`fYZY'W]b[]'Vč`h`'cb`mci`f'ck`b`d'cg]h]cb`UbX`j`]Yk`g`cb`dc`]'h]W'`WX'Ub[Y`U'g`'k`Y''`U'g`'gY'Y`_`hc`'d'cg]h]cb`X]ZY`fY'bh`g'f'UbX`g`cZ`fYgY'U'f'W`'cb`dc`]'h]W'`WX'Ub[Y`'hc`'\Y`d`mci`'i`bX'Y'fgh]UbX`'k` \m'X]ZY`fY'bh]fYgY'U'f'W`Y'fg`Wč'a`Y`'hc`X]ZY`fY'bh]Wč'bW]g]cbg''`

H\Y`gYa`]b'U'fg`U'fY`gY'h]i`d`'hc`'U'W]j`Y`m'Yb[]U[]Y`mci`]b`X]gW`gg]cb`UbX`fYZY'W]cbž`Z'c`W`g]b[]'cb`hY`'U'dd`]'W]h]cb`cZ`_`bck`'YX`]Y`'hc`'fY'U'`k`c'fX`'W]gYg''`Mci`'k`]'`Y`U'fb`'hc`'fYZY'W]h]W]h]W'`mcb`d'f'c'W'ggYg'cZ'dc`]'h]W'`WX'Ub[Y`UbX`'bc'b!`WX'Ub[Yž`hY`j`Uf]Y'micZ`U'W'c'fg']bj c'j YX`]b`dc`]'h]W'`WX'Ub[Y`UbX`'bc'b!`WX'Ub[Yž`UbX`'hY`'gh]fU'h]]Yg'i`gYX`'hc`U'W'X]j`Y`'dc`]'h]W'`WX'Ub[Y''`F`YgY'U'f'W`'g`_`'g`'U'fY`'U`gc`'Yi`d`]'W]h]m'U'X'X'fY'ggYX`]b`'hY`'gYa`]b'U'fg''`

#`U'W'c'fX'UbW`'k`]h`'i`BGK`'@Y'U'fb]b[]'UbX`'HYUW]b[]'i`]X'Y`]b`Ygž`h]g'Wč'i fgY` \U'g`VY'Y'b`X'Yg][]bYX`'hc`'Yb[]U[]Y`mci`]b`'Y'U'fb]b[]'h]fci`]`]b`Z'c'a`YX`'gYa`]b'U'f`X]gW`gg]cb`V'U'gYX`'cb`]'i`]X'YX`'fY'UX]b[]'UbX`]bX'Y'dY'bX'Y'bh`

5ggYgga Ybh

5ggYgga YbhHUg_g`

5ggYgga YbhHUg_	K Y][\h	8i Y'8UH	Gh XYbh@YUfb]b[Ci hWta Yg'5ggYggYX
9ggUm	()l	Bch5dd']WUVY	%z&
7 UgY'Gh Xm'; fci d'K cf_`	' \$l	Bch5dd']WUVY	&
7 f]h]WU`fYZYW]cb`	&)l	Bch5dd']WUVY	'

5ggYgga Ybh8YHJ]`g

5ggYgga Ybh%`9ggUm

GHUfhXUH.`

8YHJ]`g.

Mci`k]`gi Va]hU`&) \$\$!k cfX`fYgYUfW`YggUm`E i Ygh]cbg`UfY`gYhVmiH`Y`Wci fgY`Wcbj Ybcf`Mci`k]`fYW]j Y k f]h]b`ZYXVUW`UbX`U`bi a Yf]WU`[fUXY`k]h]b`h`b`k cf_]b[`XUm]cZgi Va]gg]cb`H\Y`ZYXVUW`g\Y`Hf] Vf]Wk]`VY`Uj U]UV`Y`hc`mci`UhiH`Y`ghUfhcZ`H`Y`Wci fgY`gc`h`Uhmci`WU`b`k cf_`hc`UfXg`gdYW]ZYX ghUbXUfXg"

Hi fb]h]b`gYH]b[. H\]g`Ugg][ba Ybh]g`gi Va]h]X`h`fci [\`Hi fb]h]b`UbX`gh XYbh]WU`b`gY`Hi fb]h]b]g]a]Uf]m fYdcf]g"

5ggYgga Ybh&`7 UgY'Gh Xm'; fci d'K cf_`

GHUfhXUH.`

8YHJ]`g.

H\]g`]g`U`[fci d`fUg_`Mci f`[fci d`k]`gi Va]hU`&\$\$\$`k cfX`WUgY`gh`Xm`Mci`k]`VY`Ug_YX`hc`fUH`mci f ZY`ck`[fci d`a Ya VYfgfdUfh]W]dU]cb`UbX`W`bhf]Vi`h]cb`cb`U`gWU`Y`cZ%\$`i`g]b[`U`W`bZ]XYbh]U`cb`]bY gi f] Ym`5`gh XYbh]b`h`Y`[fci d`k]`fYW]j Y`h`Y`gUa Y`[fUXY`Zcf`h`Y`Ugg][ba Ybh`Z`ck Yj Yf]ZUbm[fci d`a Ya VYf]dUfh]W]dU]cb`UbX`W`bhf]Vi`h]cb`]g`fUH`X`ck Yf`h`Ub`+`fVmigh XYbh]c`f`h`Y`Wci fgY`Wcbj Ybcf`h`Y`b`h`Y]f`[fUXY`k]`VY`a`cXY`fUH`X`UW`W`fX]b[`mVmiH`Y`Wcbj Ybcf`H\]g`k]`VY`WYUf`m`W`a`a`i`b]WU]X`hc`mci`U`h`h`Y`ghUfhcZ`h`Y`f]a`Ygh`f`H\Y`WUgY`gh`Xmk]`VY`gi Va]h]X`h`fci [\`a`ccX`Y`UbX`mci`k]`fYW]j Y`k`f]h]b`ZYXVUW`UbX`U`a`Uf_YX`fi`Vf]Wk]h]b`h`b`k cf_]b[`XUm]cZgi Va]gg]cb

5ggYgga Ybh' .`7 f]h]WU`fYZYW]cb

GHUfhXUH.`

8YHJ]`g.

Mci`k]`gi Va]hU`%) \$\$`k cfX`W]h]WU`fYZYW]cb`VUgYX`cb`mci`f`YI`dYf]YbW`fg`L`UH`Y`bX]b[`U`a`YY]b[#]j`Ybh

5 hYbXUbW`F Yei]fYa Ybhg

7 ci fgY`GWXYXi `Y

[J \]yk `WUgg`hja YhUV`Y](#)

H]ja YhUV`Y`

8UhY	HmdY	7cbhYbh
K YY_`\$.`&` `A Um!`&- A Um		GYY`A ccXY
K YY_`&`,` `>i bY!`%& >i bY		GYY`A ccXY
K YY_``,` `%)`>i bY!`%- >i bY		GYY`A ccXY
K YY_`(` `&&>i bY!`&`* >i bY		GYY`A ccXY
K YY_`)`,`&-`>i bY!`" `>i `m		GYY`A ccXY
K YY_`*`,`*`>i `m!`%\$`>i `m		GYY`A ccXY
K YY_`+`,`%`>i `m!`%+`>i `m		GYY`A ccXY
K YY_`,``,`&\$`>i `m!`&(`>i `m		GYY`A ccXY
K YY_`-`,`&+`>i `m!`" `%>i `m		GYY`A ccXY
K YY_`%\$`,`" `5i [i gh!`+ 5i [i gh		GYY`A ccXY

F Ygci fWg

DfYgWf]VYX`F Ygci fWg`

BchiUj UjUV`Y

F YWca a YbXYX`F Ygci fWg

BchiUj UjUV`Y

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

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'f'gi 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'm'YUfI" 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'Zcf'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'f'Yj UbhXcW a Yb'f'g'hc
]bWi XY'Ug'Yj]XYbVW'hc'gi ddcfhmc i f'YI HYbg]cb'Udd']W]h]cb" Ʒmci 'Ya U]'9I HYfbU'Gi ddcfhmc i 'k]
Ui 'ca UH]W]m'f'YW]j Y'U'h]W_Yhbi a VYfž'Vi h]Zmci 'HY'Yd\cbY'mci 'k]'b'Y'X'hc'gd'Y'W]W]m'Ug_'Zcf'cbY"
Hi fb]h]b'U'gc'dfcj]XYg'i dXUH'g'cb'H'Y]f'gm'g'Ya 'g'h]h'g'cb'Hk]H'Y'f"

; YbYfU'mž'UggYgga YbhiHUg_g'a i ghVY'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 ccX'Y
Ugg][ba YbH' 'b]bg]H'UbVW'g'k \YfY'H'g]g'bc]hd'cgg]V'Yž'hk]'VY'g'H'Y'X'cb'mci f'W'ci fgY'g'A ccX'Y'g]H'k]H
U'HY'fbUH] Y'gi Va]gg]cb'XYHU]g"

: cf]bZ'fa UH]cb'cb'\ck 'hc'gi Va]h]Ugg][ba Yb'g'cb]bY'j]U'A ccX'Y. \h'hdg.#gh XYb'hi bgk "YXi "Ui #ck!
gi Va]h]Ugg][ba Yb'ha 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]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 cgh'cZmci 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