



ARTS2570

ϕhYfa YX]UHΥ `GdUb]g\ `5

HYfa `C.bY` `##`&\$%-

7ci fgY`Cj Yfj JYk

`GHUZZ7cbhUWh8YHJ`g`

`7cbj Ybcfg`

B Ua Y	9a Uj`	5j Uj`UVj]m	@cWjhcb	D\cbY
<YbUf`J JWbhY! 7fjgh`VU`	\`j JWbhYW]ghcVU`4 i bgk "YXi "Ui	Hi YgXUmg`%" \$`hc &" \$da `cf`Vm		

7ci fgY'8YHJ]`g

7fYX]hDc]bqg`*`

Gi a a UfmicZ\hY'7ci fgY

Gi VYWh5fYU. 'E bS` [eZ S` V >Sf[3_ Wd[US` E fgV[Wd

K]h'a cFY'hUb" ' 'a]"cb'GdUb]g\`gdYU_Yfg]'b'hY'i G5`U'cbYž<]gdUb]WW`hi fY`]g`]bWfYUg]b[`m
g][b]Z]WbH'h\]g`Wci fgY`Yb\UbW'g'mci f'UV]']mhc`UddfYU]UHY`hY`Wca d'YI]]micZ<]gdUb]WW`hi fY`UW'cgg
fk c`Wcb]bYbqg" H\Y`Wci fgY`]g`UVci h`YUfb]b[`hc`gdYU_žfYUX`UbX`k f]H`GdUb]g\`Vmi g]b[`hY`a`YX]i a`cZ
W`hi fY`"J cWVi `UfmUbX`[fUa a U]WU`gfi W] fYg`UfY`dfYgYbH`X`]'b`hY`Wcb]hI hcZW`hi fU`mfY`Yj Ubh]cd]Wg"
Hcd]Wg'a Um]bW] XY. `Ub[i U[Y`UbX`Wca a i b]W]h]cbžVY`]YZgmg]H`a gž`UbX`hY`Ybj]fcb`a`YbH`

H\Y`Ub[i U[Y`cZ]bgfi W]cb`]g`GdUb]g\`"K`Y`UfY`hY`Z]fghi b]j`Yfg]m]b`5i`gfU`]U`i`g]b[`hY`]bbcj`Uhj`Y`cb`]bY
WcUW]b[`dfc[fUa`k`\]W`cZ]Yfg`mci`U`i`b]ei`Y`cddcf]i`b]mhc`k`cf`_`ci`hg]XY`cZWUgg`k`]h`U`dYfgcbU`ž`b]Uhj`Y!
gdYU_Yf`Ub[i U[Y`WcUW]`]'b`U`fYU`'h]a`Yž`cb`]bY`YUfb]b[`Ybj`]fcb`a`YbH`K`Y`\`cdY`h`Uh`h`]g`i`b]ei`Y`dYfgcbU`
YI`dYf]YbW`k`]"`VY`f]i`mYb`emUV`Y`UbX`k`]"`a`chj`UHY`mci`hc`Wcb]bi`Y`YUfb]b[`GdUb]g\`"

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

%`I`bXYfghUbX`UbX`fYgdcB`X`hc`hY`a`U]b`dc]bqg`cZcfU`UbX`k`f]H`b`hYI`hg`XYU`]b[`k`]h`hcd]Wg`cZ
VfcUXYf`gcW]U`WcbWf]bg`YbWci`bH`fYX`]'b`GdUb]g\`gdYU_]b[`Wca`a`i`b]h]Yg"
&"`DfcXi`W`g]a`d`Yž`Wc`\YfYb]h]hYI`hg`fc`fU`UbX`k`f]H`b`E`cb`Wca`a`cb`hcd]Wg`cf`UfYUg`cZ`dYfgcbU`]'bH`fYgH`
'`" `8`YgW]VY`YI`dYf]YbW`g`UbX`Yj`Ybqg`UbX`dfcj`]XY`fYUgcbg`cf`YI`d`Ub]h]cbg`Z`f`cd]b]cbg`UbX`d`Ub
(`" `8`]gh]b[i`]g\`g][b]Z]Wb]h]X]Z]YfYbW`g`VY`k`Y`Yb`gca`Y`W`g]ca`gž`U]h]h`XYg`cf`VY`]Yž`dfYj`U`Ybh]b`hY
<]gdUb]WgdYU_]b[`Wca`a`i`b]m]UbX`h`cgY`cZ`hY`]f`ck`b"
)`" `I`gY`ghfU]h`[]Yg`hc`Wc`cdYfU]h`Y`Z]Y`W]j`Y`mk`]h`ch`Yf`a`Ya`VYfg`cZ`hY`[fci`d`"

HYUW]b[`GhfU]h`[]Yg`

F`U]cbU`Y`Z`f`hY`]'bW]`g]cb`cZ`Wcb]h]bh]UbX`hYUW]b[`UddfcUW]

@Ub[i U[Yg`UfY`VYgh`YUfbYX`h`fci`[\`i`gY`cZ`hY`Ub[i U[Y`"K`Y`dfcj`]XYž`h`YfY`Z`fYž`cddcf]i`b]h]Yg`Z`f`
gh`XYbqg`hc`i`gY`hY`Ub[i U[Y`UbX`k`Y`Xc`gc`]'b`U`a`YU]b[ž`k`Um`H`U]h]gž`k`Y`i`gY`U`h`Ya`U]WUddfcUW`hc`
hY`cf[Ub]n]U]cb`cZ`Wci`fgY`a`U]h]f]U`g`"H\Y`hc`d]Wg`Wc]j`YfYX`fYdfYgYb]h]W`ffYbh]g]gi`Yg`]b`GdUb]g\`gdYU_]b[
Wci`b]f]Yg"

H\]g`Wci`fgY`Ya`d`cm]g`gh`XYbh]W`b]h]fYX`YUfb]b[`Ug`hY`VU]g]Z`f`]hg`]bgfi`W]cbU`XYg][b`UbX`Ya`d`U]g]nYg`
hY`]a`dcf]UbW`cZUW]j`Y`YUfb]b["

H\Y`hYUW]b[]b`h`]g`Wci`fgY`]g`V`Yb`XYX.`cb`]bY`UbX`]b`WUgg`UW]j`]h]Yg`"``

H\Y`Ub[i U[Y`cZ]bgfhi W]cb`]g`GdUb]g\`"

: fca `h\Y`; i]XY`]bYg`cb`@YUfb]b[`h\Uh`bZca `HYUW]b[`gh XYbhg`Wca a i b]W]hY`]bZca Uhcbz]XYUg`UbX
Uf[i a Ybhg`Vch`cfU`mUbX`]b`k`f]h]b[``H\Ymi[U\Yf`UbX`dfcW]gg`]bZca Uhcb`Zca `U`j`Uf]YmicZdUdYfz
Ui X]c]]gi U`UbX`Y`YWfcb]Wgci fW]g``H\Ymi gY`#i`YZYW]j`Y`mVch`Ug`U`a`YUbg`cZWca a i b]W]hcb`UbX`Ug`Ub
U]X`h`YUfb]b[`Ug`k`Y``Ug`XYa`cbgfhU]h`gca`Y`UV`]m]Ug`Ub`]bXYdYbXYbh`YUfbYf`"

5ggYgga Ybh

H\]g]g*! c7`Wci fgYžYei]j U`YbhY`tc`%) \$\`lci fg`cZghi XmUh\ca Y`UbX`]bWUggžmci`g\ci`X`a U_Y`gi fY`tc U`cWUHY`hja Y`Zcf`h\]g`Wci fgY"

Gh XYbhg`UfY`YI dYWYX`tc`Wca Y`tc`: UW`tc`: UW`YW`i fYg`UbX`h`hcf]U`g`dfYdUfYX"D`YUgY`Wca d`YH`XY k YY_mUW`j]Yg`VYZcfY`YW`i fY`UbX`hY`UW`j]h]Yg`VYZcfY`h`hcf]U`g`fIGYY`A ccX`Y`Zcf`Z`fh`YF`XYHJ]YgŁ"

5ggYgga YbhHUg_g`

5ggYgga YbhHUg_g`	K Y][\h	8i Y`8UH`	Gh XYbh@YUfb]b[

F Ygci fWg

DfYgWf]VYX F Ygci fWg

Cb]bY 7cUW]b[. di fWUg]b['UbX fY[]ghf]b['h fci [\ '@]b[i Ua YYh]b['k YVg]hY'

```
%" ; c'hc \hfdg.##k k k "]b[ i Ua YYh]b[ "Wca #Y[ ]ghfc"d\d
&" GY'YWh'ci f'i b]j Yfg]mžgY'YWh'ci f']bgfhi Wcf#WUgg'gYW]cbžYbhf'nci f'dYfgcbU'']bZcfa Uhcb'UbX
gY'YWh'ci f'dUma Ybhcdh]cb.
' " 7 \ccgY'nci f'gYgg]cb'Zca 'hY'Uj U]UV'Y'gYgg]cb'hja Yg"Mc' f'gYgg]cb'k ]'VY'cb'hY'gUa Y'XUm'UbX
Uh'hY'gUa Y'hja Y'i b'Ygg'nci 'WU'Ub[ Y']h'
(" 5h'hY'YbX'cZ'hY'fY[ ]ghfU]cb'dfcW'ggž'nci 'k ]'fYW]j Y'U'W'cbZ'fa Uhcb'Ya U]'k ]h'nci f'W'UW]b[
gYgg]cb'U[ YbXU"Mc' 'WU'gUj Y'hY'U[ YbXU'Ug'U'XcW'a Ybhcb'nci f'XYg_hcd"D'YUgY'W'Y'W'U''hY
]bZ'c[ ]'b'nci f'Gh XYbhf]DcftU'hcc. [ c'hc \hfdg.##k k k "]b[ i Ua YYh]b[ "Wca 'UbX'W]W'cb
"Gh XYbhf'c[ ]'b"i5bm]ggi Yž'hY'gh XYbhg'ci 'X'W'cbUW]gi ddcfh_ ]b[ i Ua YYh]b[ "Wca 'fh]g'g'hY
Z]gh'gh'UbX'hY'a cghYZ]W]Ybhk Umhc '\Y'd'nci 'E'
)" D'YUgY'bc'hY'. Cb]bY 7cUW]b[ 'gYgg]cbg'Zca 'k YY_' 'hc'k YY_ '%%
```

F YWca a YbXYX'HYI hWcc_''

- ' E i Ā'hY'dUFYVW3/A W fUk !<]'/' ' fX'YX]h]cb''&\$%)

F YWca a YbXYX F Ygci fWg

'DfUW]W'A U_Yg'DYfZYWh' b'hYfa YX]UhY'GdUb]g\ ; fUa a Uf. 'K]h '% \$'9l YfW]gYg f'DfUW]W'A U_Yg DYfZYWh'GYf]YgE'DUdYfVUW_ ' C'W'cVYf'&ž&\$%&

Vm;]XU'B]ggYbVYf[

```
H\]g'Wci fgY'i gYg'A ccX'Y'Ug'U'fYgci fW' W'bfY'k \Yf'gh XYbhg'WU'UW]gg'U'k ]XY'gY'YW]cb'cZa UHf]U'g
gdYW]U'mXYg[ ]bYX'hc'XYj Y'cd''Ub[ i U[ Y'g_]g'UbX'W'h'fY''A ccX'Y'dfcj ]XYg'U'Wca dfY\Ybg]j Y
Ybj ]fcba Ybh'hc'Yi d'cfY''Ub[ i U[ Y'UbX'W'h'fY'i g]b[ 'U'XU'U'VUgY'cZ'Ub[ i U[ Y']bZcfa Uhcb'W'cbU]b]b[
fYUX]b[ 'hYi hž] ]XYcgž'gcb[ gž[ fUa a Uf'dfUW]W'UbX'U''VfUfmcZ]bhYfbYh'fYgci fW'g''': cf'A ccX'Y
a UHf]U'gž'YgdYW]U'm'Ui X]c'a UHf]U'gž'i gY'hY''UH'ghj Yfg]cb'cZa cn]''U': # 9: C L 'fA UW' 'K ]bXck gE''ž'nci
UfY'i g]b[ 'ch'Yf'Vfck gYfg'nci 'a ][ \hYI dYf]YbW'Wca dU]V] ]midfcV'Ya g''fGdYW]U'm'k ]h' b'hYfbYh'9l d'cfYfE
Hc''ghYb'cf'gYY'hY'Ui X]c'-'j ]gi U'a UHf]U'Z]Yg'Zca 'A ccX'Yž]Z'nci 'UfY'U'i gYf'cZK ]bXck g'ž'nci 'bYXX'hY
'UH'ghj Yfg]cb'cZK ]bXck g'A YX]U'D'UmYf''ž'nci 'i gY'A UWž'nci 'bYXX'hY''UH'ghj Yfg]cb'cZ' E i ]W'hja Y"
fi i fh'Yf']bgfhi W]cbg:]b'A ccX'YE
```

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

7ci fgYg'UfY'dYf]cX]W'm'fYj]Yk YX'UbX'gh XYbhg' ZYXVUW_]g'i gYX'hc'ja d'fcj Y'hYa ''

: YYXVUW_]g[U'hYfYX'Zca 'gh XYbhg'i g]b['a m9l dYf]YbW''-h]g'YbWci fU[YX'gh XYbhg'Wca d'Yh'hY]f fj Ymg'Vm'UW]gg]b['hY'dYfgcbU']gYX'k YV'']b_]]U'hY'A ccX'Y Wci fgY'g]hY''

Gi Va]gg]cb`cZ5ggYgga YbhHUg_g

Gi Va]gg]cb`cZ5ggYgga YbhHUg_g

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

≠mci`YbWci bHYf`U`dfcV`Ya`k`Yb`U`HYa`dh]b[`hc`gi`Va`]hmc`i`f`Ugg][`ba`Ybh`h`fci`[`\`Hi`fb]h]b`z`d`YUgY`
HY`Yd`cbY`9I`HYfbU`Gi`ddcfhcb`-`,`),`'`,`'`,`%cf`Ya`U]`h`Ya`cb`YI`HYfbU`HY`hgi`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`mY`UfL`≠mci`
UfY`i`bUV`Y`hc`gi`Va`]hmc`i`f`Ugg][`ba`YbhXi`Y`hc`U`ZU`ihk`]h`Hi`fb]h]b`mci`a`Um`Udd`mi`Zc`f`Ub`YI`HYbg]cb`z`Vi`hmc`i`
a`i`ghfY`hU]b`mci`f`h]W`Yhbi`a`VYf`Zca`9I`HYfbU`Gi`ddcfhfU`cb[`k`]h`Ubmc`h`Yf`fY`Yj`UbhXcW`a`Yb`hg`L`hc`
]bWi`XY`Ug`Yj`]XYbW`hc`gi`ddcfhmc`i`f`YI`HYbg]cb`Udd`]W]h]cb"≠mci`Ya`U]`9I`HYfbU`Gi`ddcfhmc`i`k`]"`

5 WUXYa]W<c bYghmUbX`D`U[]Uf]ga

D`U[]Uf]ga `]g`i g]b[`hY`k cfXg`cf]XYUg`cZchYfg`UbX`dfYgYbh]b[`hYa `Ug`mci f`ck b" `hWUb`hU`Y`a Ubm
Zcfa gž`Zca `XY`]VYfUHY`WXYU]b[`hc`UWV]XYbhU`mW`dm]b[`Zca `U`gci fW`k]h`ci hUW`bck`YX[Ya Ybh`

I BGK `[fci dg`d`U[]Uf]ga `]bhc`hY`Zc`ck]b[`WUHY`[cf]Yg.

7 cdm]b[.`i g]b[`hY`gUa Y`cf`j Yfmg]a]Uf`k cfXg`hc`hY`cf][]bU`hYI hcf]XYU`k]h`ci hUW`bck`YX[]b[`hY`
gci fW`cf`i g]b[`ei chU]cb`a Uf`g" `H\]g`U`gc`Udd`]Yg`hc`]a U[Ygž`UfhUbX`XYg][b`dfc`YWgž`Ug`k Y`Ug
dfYgYbhU]cbg`k \YfY`gca YcbY`dfYgYbh]g`UbchYf`g`]XYUg`cf`k cfXg`k]h`ci hW`YX]h`

hUddfcdf]UHY`dUfUd`fUg]b[.`7`U`b[]b[`U`ZYk`k cfXg`UbX`d`fUgYg`k`Y`a cghmifYU]b]b[`hY`cf][]bU`
ghfi W`fY`UbX`#`f`dfc[fYgg]cb`cZ]XYUg`cZ`hY`cf][]bU`ž`UbX`]bZcfa U]cb`k]h`ci hUW`bck`YX[Ya Ybh`H\]g`U`gc
Udd`]Yg`]b`dfYgYbhU]cbg`k \YfY`gca YcbY`dUfUd`fUgYg`UbchYf`g`]XYUg`cf`k cfXg`k]h`ci hW`YX]h`UbX`hc
d]YW]b[`hc[Y`hYf`ei chYg`UbX`dUfUd`fUgYg`]bhc`U`bYk`k \c`Yž`k]h`ci hUddfcdf]UHY`fYZYfYbW]b["

7 c`i g]cb.`k cf_]b[`k]h`chYfg`Vi hdUgg]b[`cZ`hY`k cf_]Ug`U`dYfgcb`g`]bX]j]Xi U`k cf_]7 c`i g]cb`U`gc
]bWi XYg`dfcj]X]b[`mci f`k cf_]hc`UbchYf`gh`XYbhVYZc`fY`hY`Xi Y`XUHYž`cf`Zc`f`hY`di fdcgY`cZ`hY`a

- 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'h'cb'UVci hi 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'UH'X'UgdY'W'g'cZ9@-G9'k]''\Y'd'mci 'a U_Y'h'Y'a cgh'cZ'mci f'gh X]Yg'Uhl BGK ""

[\h'hd.##gi V'Y'W'i \]X'Y'g" \]V'f'U'f'm'i b'gk "Y'X'i "U'i #' \]g'Y'#J'V'ci h' \]g'Y](#)

5 WUXYa]WbZcfa Uhcb`

: cfYggYbhU`ghi XYbh]bZcfa Uhcb`fY`Uh]b[`rc.

- fYei YghZcfYI hYbg]cb/