



ARTS3054

H\Y'; Ym]b['cZK]gXca . 'Mci hž'@jYfUhi fY 'UbX'hY
: cfa Uh]cb'cZH\Y'GY'Z

GYa YghYf'Hk c''##'&\$%

7ci fgY`Cj Yfj]Yk

`GHJZ7cbhJWhi8YhJ]`g`

`7cbj Ybcfg`

B Ua Y	9a U]`	5j U]`UV]`]m	@cWjhcb	D\cbY
>c\b`5hfh]X[Y	^Uhhf]X[Y4 i bgk "YXi "Ui	K YXbYgXUm %\$" \$!%&" \$	K YVghYf`&&, - ' ,) ((, (

GWXcc``7cbhJWhi`bZcfa Uh]cb

Fcca "`%&ž`Yj Y`` `F cVYfhk YVghYf`6i]X]b[

D\cbY.`f\$&Ł`- ' ,) `(,) *

9a U]`.gUa 4 i bgk "YXi "Ui

7ci fgY'8YHJ]`g

7fYX]h'Dc]bHg '*`

Gi a a UfmcZh\Y'7ci fgY

H\Y`dfYgYbHhcb`k]`XYj Y`cd`g_]`g`cZcfU`Wca a i b]WUhc b`UbX`ZcghYf`X]gW gg]cb`k]h]b`gYa]bUfg" H\Y`dYfgcbU`fYZYW]cb`YI YfW]gY`k]`YbWci fU[Y`ghi XYbthg`hc`gYY`WcbbYW]cbg`VYtk YYb`hY`a UHYf]U`g`ghi X]YX]b`hY`Wci fgY`UbX`ZJWn U`bUffU]h] Yg`cZXYj Y`cda Ybhz`k \YhYf`Ui hcV]c[fUd\]WU`cf`XfUk b`Zca`chYf gci fWg" H\Y`ei]n`gYfj Yg`hY`di fdcgY`cZW`h] U]b[`ZJa]]Uf]m]k]h`hY`hY] hg`UbX`#cf`Z]a fgL`gh X]YXz`UbX U`gc`U`ck`g`ghi XYbthg`UbchYfz`bcb!X]gW fg]j Y`a YUbg`cZXYa cbgfhU]b[`hY]f[fUgd`cZhY`fYUX]b[g`UbX Z]a`g"

....

5ggYgga Ybh

5ggYgga YbhHUg_g`

5ggYgga YbhHUg_	K Y][\h	8i Y'8UH	Gh XYbh@YUfb]b[Ci hWta Yg'5ggYggYX
DfYgYbhU]cbf&)`	&)	Bch5dd`]WUVY	B #5
A U`cf'YggUmf) \$`) \$	&(#/\$#&\$% '\$*.\$\$'DA	B #5
DYfgcbU`fYZYW]cb YI YfV]gYf&)`	&)	&#/\$, #&\$% '\$*.\$\$'DA	B #5

5ggYgga Ybh8YHU]`g

E

Gi Va]gg]cb'cZ5ggYgga YbhHUg_g

Gh XYbHg'UfY'YI dYW'X'hc'di h'Y]f'bUa Yg'UbX'ghi XYbhbi a VYfg'cb'Yj YfmdU[Y'cZ'Y]f'Ugg][ba Ybhg"

Hi fb]hb'Gi Va]gg]cb

zmc i'YbWci bhYf'U'dfcV'Ya'k \Yb'U'HYa dh]b['hc'gi Va]hrci f'Ugg][ba Ybh'fci [\ 'Hi fb]hb'z'd'YUgY
HY'Yd\cbY'9I HYfbU'Gi ddcfh'cb'-' ,) ' ' ' %cf'Ya U]'h'Ya 'cb' [YI HYfbU'HY'f'gi ddcfh' i bgk "YXi "Ui."](#) Gi ddcfh
\ci fg'UfY' , .\$\$Ua '-%\$.\$\$da 'cb'k YY_XUmg'UbX'-. \$\$Ua '-) .\$\$da 'cb'k YY_YbXg'f'*) 'XUmg'U'm'Uf'z' zmc i
UfY'i bUV'Y'hc'gi Va]hrci f'Ugg][ba Ybh'Xi Y'hc'U'Zi 'hk]h'Hi fb]hb' b' mci 'a UmiUdd'm'Z'f'Ub'YI HYbg]cb'z'Vi hrci
a i gh'f'Y]b' mci f'h]W_Yhbi a VYf'Z'ca '9I HYfbU'Gi ddcfh'f'U'cb['k]h'Ubmc'h'Y'f'f'Y'j Ubh'Xc'W a Ybh'g'k'hc
]b'Wi XY'Ug'Yj]XYb'W'hc'gi ddcfh'mci f'YI HYbg]cb'Udd']W]h'cb" zmc i 'Ya U]'9I HYfbU'Gi ddcfh'mci 'k]`
Ui 'ca U]W'W'm'f'Y'W'j Y'U'h]W_Yhbi a VYf'z'Vi h]Zmc i 'HY'Yd\cbY'mci 'k]`b'Y'X'hc'gd'Y'W]W'm'Ug_'Z'f'cbY"
Hi fb]hb'U'gc'd'fcj]XYg'i dXU'Y'g'cb'h'Y]f'g'm'gh'Ya 'gh'U'h'g'cb'Hk]h'Y'f"

; YbYfU'm'z'UggYgga YbhHUg_g'a i gh'VY'gi Va]h'Y'X'Y'Y'W'f'cb]W'm'j]U'Y]h'Y'f'Hi fb]hb'cf'U'A cc'X'Y
Ugg][ba Ybh'f' b]bg'h'Ub'W'g'k \Y'f'Y'h'g']g' b'chid'cgg]V'Y'z']h'k]`VY'g'h'U'Y'X'cb' mci f'W'ci fg'Y'g'A cc'X'Y'g]h'k]h'
U'h'f'Y'U'h] Y'gi Va]gg]cb'XY'U]g"

@UH'5ggYgga YbhDYbU'h]Yg

Gh XYbHg'UfY'f'Y'g'd'cbg]V'Y'Z'f'h'Y'gi Va]gg]cb'cZ'UggYgga YbhHUg_g'V'm'h'Y'f'Yei]f'Y'X'X'U'Y'g'Ub'X'h'a Yg"
8Yd'Yb'X]b['cZ'Y'YI HY'bh'c'Z'X'Y'Um]b'h'Y'gi Va]gg]cb'cZ'Ub'UggYgga YbhHUg_'d'Ugh'h'Y'Xi Y'X'U'Y'Ub'X'h'a Yz

- K cf_gi Va]hYX`%\$`hc`%-`XUmg`UZhf`h`Y`gh]di`UH`X`XYUX`]bY`k`j`VY`UggYggYX`UbX`ZYXVUW`dfcj`]YX`Vi`hU`a`Uf`_`cZnYfc`k`j`VY`fYW`fYX`"Z`h`Y`k`cf`_`k`ci`X`U`j`Y`fYW`j`YX`U`dUgg`a`Uf`_`Vi`hZ`f`h`Y`U`h`b`Y`gg`UbX`h`Y`k`cf`_`]g`U`W`a`di`gc`fm`W`i`fgY`W`a`dcbYbhf`i`fX`Y`fYei`]fYa`Yb`h`Z`U`gh`XYb`h`k`j`VY`XY`Ya`YX`h`_`U`j`Y`a`Y`h`h`U`h`f`Y`ei`]fYa`Y`b`h`/`
- K cf_gi Va]hYX`&\$`cf`a`cfY`XUmg`UZhf`h`Y`gh]di`UH`X`XYUX`]bY`k`j`bchVY`U`W`W`d`h`X`Z`f`UggYgga`Ybh`UbX`k`j`fYW`j`Y`bc`ZYXVUW`z`a`Uf`_`cf`[`fUXY`"Z`h`Y`UggYgga`Ybh`Ug`_`]g`U`W`a`di`gc`fm`W`a`dcbYbhcZ`h`Y`W`i`fgY`U`gh`XYb`h`k`j`fYW`j`Y`Ub`l`bgU`h`g`Z`U`W`c`fm`:`U`j`f`l`:`k`[`fUXY`Ug`U`fYgi`h`c`Z`i`bgU`h`g`Z`U`W`c`fmdY`f`Z`fa`Ub`W`_`]b`Ub`Y`ggY`b`h`j`U`W`a`dcbYbhcZ`h`Y`W`i`fgY`"

H\]g`]bZ`fa`U`h`c`b`]g`U`gc`U`j`U`j`\$` %ofm` %o` %o` %o`

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 gZ`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[YgZ`UfhUbX`XYg][b`dfc`YWgZ`Ug`k Y`Ug
dfYgYbhU]cbg`k \YfY`gca YcbY`dfYgYbh]g`UbchYf`g`]XYUg`cf`k cfXg`k]h`ci hWYX]h`

hUddfcdf]UHY`dUfUd`fUg]b[.`7`Ub[]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`Z`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 hWYX]hU`bX`hc
d]YW]b[`hc[YhYf`ei chYg`UbX`dUfUd`fUgYg`]bhc`U`bYk`k \c`Yz`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

- i bXYfghUbx'mci f'f][\hg'UbX'fYgdcbg]V]]hYg'Ug'U'gh XYbhUhl BGK
- VY'Uk UfY'cZd'U[]Uf]ga ž'Wcdmf][\hžI BGK 'Gh XYbh7cXY'cZ7cbXi WñUbX'5WwdfUV'Y'I gY'cZ I BGK '⇒H'F Ygci fW'g'Dc`]Wñ
- VY'Uk UfY'cZñY'ghUbXUfXg'cZVY\Uj]ci f'YI dYWñX'cZYj Yfmcby`]b'hY'I BGK 'Wca a i b]m
- `cWñH'gYfj]Wg'UbX']bZcfa Uñcb'UVci hl BGK 'UbX'I BGK '@]VfUfm

Gca Y'cZñYgY'UfYUg'k]`VY'ZJa]]Uf'hc'mci žcñYfg'k]`VY'byk "; U]b]b['U'gc`X'i bXYfghUbx]b['cZU`ñY fY'UH'X'UgdYWñ'cZ9@G9'k]`Y'd'mci 'a U_Y'hY'a cghcZmci f'gh X]Yg'Uhl BGK "

[f\hñ.#gi.VYWñ\[i\]XYg"\]VfUfm'i bgn"YXi "Ui #`\]gY#UVci h`\]gYŁ](#)

7 ci fgY'GWXYXi `Y

[J.Jyk.WUgg.ha.YhUV.Y](#)

H]a YhUV`Y`

8UH	HmdY	7cbhYbh
K YY_%&'>i`m!&-'>i`m	@YWh fY	hfcXi W]cb. h\Y`[YbfY`cZhY`4[Vg` Yeda_ S`
K YY_&." \$>i`m!) 5i [i gh	@YWh fY	K]`Ua `K cfXgk cfhZ`F ZWBdWgVWf% \$) Ł
	GYa]bUf	Df]a UfmiHYI h`F ci ggYUi ž5a` X]e[a` ežVcc_%
K YY_."`*`5i [i gh!`%& 5i [i gh	@YWh fY	A cXYfb]gh`]Z`bUffU]j Yg.`J]f[]b]U`K cc`ZUbX`A UfW` Dfci gh
	GYa]bUf	Df]a UfmiHYI h`K cfXgk cfhZ`F ZWBdWgVWfYI hfUW`
K YY_(.`%`5i [i gh!`%` 5i [i gh	@YWh fY	; Ycf[Y`9`]chž? [VV`W_ SdJZ`@YWh fY`%
	GYa]bUf	Df]a UfmiHYI hg.` 9i hfUWh]ca `J]f[]b]U`K cc`Z`5`g_YhW`cZhY`dUgh` 9i hfUWh]ca `A UfW`Dfci ghžFZWI `Sk Tk Ei S``ie f%- % Ł
K YY_)`.&\$`5i [i gh!`&` 5i [i gh	@YWh fY	? [VV`W_ SdJZ`@YWh fY`&
	GYa]bUf	Df]a UfmiHYI h`? [VV`W_ SdJZ
K YY_*.`&+`5i [i gh!`& GYdhYa VYf	@YWh fY	G][a i bX`: fYi Xž": fca `hY`\]ghcfmicZUb`]bZ]bh]Y bYi fcg]g`f%- % Ł
	GYa]bUf	Df]a UfmiHYI h`? [VV`W_ SdJZ
K YY_+.`" `GYdhYa VYf!`-` GYdhYa VYf	@YWh fY	Gmj]U`D`UhI` FZW4W^<Sd
	GYa]bUf	Df]a UfmiHYI h`: fYi Xž": fca `hY`\]ghcfmicZUb`]bZ]bh]Y bYi fcg]g`
K YY_`. `.%\$`GYdhYa VYf!` %*`GYdhYa VYf	@YWh fY	>Ua U]WU]?]bWU]Xž3` ` [W<aZ`
	GYa]bUf	Df]a UfmiHYI h`Gmj]U`D`UhI`žFZW4W^<Sd
K YY_`. `.%+`GYdhYa VYf!` &`GYdhYa VYf	@YWh fY	3bScS\fažX]f`GUmU`]hF Um
	GYa]bUf	Df]a UfmiHYI h`>Ua U]WU]?]bWU]Xž3` ` [W<aZ`
K YY_`%\$.`%C`WcVYf!`+`		

		Uj U]UV'Y'j]U'A ccX'YŁ
	C b`]bY'5W]j]m	@UVci f'8Umdi V]W\c`]XUm`UgmbW\fc bci g`cb`]bY X]gW gg]cb`]b`]Yi`cZgYa]bUf">c]b`h'Y`X]gW gg]cb VcUfX`h.UhWŁffYgdc bXg`h`mci f`gYa]bUf`h]a Y`" HYI h`3bSdS\fa`Z`X]f`"GUhmU`]hF Um` .
K YY_`%%` ;`C WŁcVYf!`%{ C WŁcVYf	@YW]i fY	? aa` ^YZf`X]f`"6Uffm>Yb_]bg
	GYa]bUf	Df]a Ufmi]YI h`? Uf`C j`Y`? bUi`g[UUFXZ`? k E fd]YY WŁ j`c`""%`" DfYgYb]h]h]cbg.`K YY_`%%`dfYgYb]h]h]cbg`WŁb`VY cb`3bSdS\fa`c f`? k E fd]YY WŁ
K YY_`%&.`%`C WŁcVYf! &%C WŁcVYf	@YW]i fY	7cbW]i g]cb.`4[Vg`Y`h`Yb`UbX`bck
	GYa]bUf	:]a`.`? aa` ^YZf`X]f`"6Uffm>Yb_]bg`" DfYgYb]h]h]cbg.`K YY_`%&`dfYgYb]h]h]cbg`WŁb`VY cb`? k E fd]YY WŁcf`? aa` ^YZf`"
K YY_`%` .`&&`C WŁcVYf! &.`C WŁcVYf	GYa]bUf	:]bU`gYa]bUf.`? aa` ^YZf`WŁb]h]bi YX`Z`gi a a Ufm X]gW gg]cb`" #`h`]g`Z]bU`gYa]bUf`Z`k`Y`k`j`h`Y`i`d`ccgY`YbXg`Z`ca h`Y`? aa` ^YZf`X]gW gg]cb`]b`k`YY_`%&`z`UbX`h`Yb`"cc_ VUW`c`j`Yf`h`Y`h`YI`h`g`UbX`WŁb`W`d`h`g`k`Y`U`j`Y YbWŁi`b`h`Y`X`U`W`c`g`g`h`Y`g`Ya`Y`g`h`f`"H`]g`f`Y`j`]Yk d`f`c`W`g`g`k`j`"b]c`j`Y`[`f`ci`d`U`W]j`]h`Y`g`U`g`k`Y`"U`g`U [`Y`b`Y`f`U`X]gW gg]cb`" DfYgYb]h]h]cbg.`]h]g`Z]bY`h`c`dfYgYb]h]cb`? aa` ^YZf`]Z mci`k`Ub]h]c`Z`Vi`h`K`YY_`%`dfYgYb]h]h]cbg`WŁb`VY`cb Ubmi]h]I`h`c`f`Z]a`"

F Ygci fWg

DfYgWf]VYX`F Ygci fWg`

7ca d`YH`hYI hg`fUj Uj]UV`Y`]b`I BGK`Vcc_g\cdk

; Ycf[Y`9`]chz? [VV`W_ SdJZ

>Ua U]WU?`]bWU]Xz`3` `` [W<aZ`

? Uf`Cj Y`? bUi g[UUFXz?` k E fdgYY`Wz] c`i a Y`%

Gmj]]U`D`U`h`z`FZW4W^<Sd

G\cfhYf`hYI hg`]b`fYUXYf`fUbX`cb`A ccX`Yk

G][a i bX`: fYi Xz`": fca`h`Y`\]ghcfmcZUb`]bZUbh]Y`bYi fcg]g`

A UfW`Dfci ghz`FZWI` Sk Tk Ei S` `` ie fYI hfUWk

>YUb!>UW`i Yg`F ci ggYUi z5a` XW`e[a` el Vcc_`%

J]f[]b]U`K cc`Z`"5`g_Y`h`X`cZ`h`Y`dUgh`f`fYI hfUWk

K]`]Ua`K`cfXgk`cfh`z`FZWBdWgVWfYI hfUWk

:]`a`g`fghfYUa UV`Y`j]U`h`Y`I BGK` ``]VfUfmdc`fH]k

3bSdS\fa`@ZWG`hS`cg[eZWQ`X]f`"GUhmU`]hF Umf]Zmci` \Uj Y`U`W`UbW`z`d`YUgY`f`f`m`h`c`U`g`c`k`U`h`X`h`Y`Z`f`g`h`
UbX`h`f`X`Z`]a`g`]b`h`Y`5`di`f`]`c`[`m`z`B`S`f`Z`W`d`B`S` `U`Z`S`[`U`b`X`3`b`g`d`E`S` `e`S`d`Z`V`i`h`3`b`S`d`S`f`a`W`b`V`Y`U`d`d`f`Y`W`U`h`Y`X`
d`Y`f`Z`W`h`m`i`k`Y` ``U`g`U`g`h`U`b`X`U`c`b`Y`Z`]a`k

? aa` (YZfz`X]f`"6Uffm>Yb_]bg

GYW`cbXUfmUbX`\]ghcf]WU`fYUX]b[g

GY`Y`W`Y`X`U`X`X`]h`c`b`U`f`Y`U`X`]b[g`k`]`V`Y`]b`W`i`X`Y`X`]b`h`Y`W`e`i`fgY`f`Y`U`X`Y`f`U`b`X`a`U`X`Y`U`j`U`j`U`V`Y`c`b`A`cc`X`Y`"

F YW`ca`a`Yb`X`Y`X`F Ygci fWg

7cbgi`h`A`cc`X`Y`z`c`f`b`ch`Y`g`c`b`Z`f`h`Y`f`f`Y`U`X`]b[""

7ci fgY`9j U`i`U`h`]c`b`U`b`X`8`Y`j`Y`c`d`a`Y`b`h`

7ca`a`Y`b`hg`i`=U`W`Y`X`c`b`

Gca`Y`g`h`i`X`Y`b`hg`g`U`]X`h`U`h`i`k`c`k`YY_g`k`U`g`h`c`c`i`c`b`[`h`c`g`d`Y`b`X`c`b`h`Y`b`c`j`Y` ``? [VV`W_ SdJZ`z`C`b`h`Y`k` \`c`Y`z`=
U[fYY`z`g`c` `f`j`i`Y`f`Y`X`i` W`X`h`h`]g`d`U`f`h`c`Z`h`Y`W`e`i`fgY`h`c`h`k`c`k`YY_g`" <ck`Y`j`Y`f`z`=U`g`c`b`c`h`Y`h`U`h`h`]g`k`U`g`b`c`h`
U`i`b`U`b`]a`ci`g`j`]Y`k`."`h`X`Y`g`Y`f`j`Y`g`" `k`YY_g`c`b`h`Y`W`e`i`fgY`z`k`f`c`h`Y`c`b`Y`g`h`i`X`Y`b`h`

Gca Y'gh XYbkg k UbhX'a cfY`WcbYa dcfUfmhI hgž UbX'U'a cfY`Xj YfgY'gY`YWjcb`cZWcbYa dcfUfmhI hgž