



## 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 &()	- ' , ) `% *%

GW`cc``7cbhJW`hZcfa Uh]cb

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

@cW]hcb. `GW`cc``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](#)

7 ci fgY'8YHJ`g

7 fYX]hDc]bqg`\*`

Gi a a UfmicZħY'7 ci 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`X]Ygž`"]ħfUhi`fYž`Z`a`ž`  
a`YX]Už`ħfUbg`U]ħcbž`Ubħ.fcd`c`[ miUbX`[ YbXYf`gh`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]"]ħfYX`VmU`fU`b[ Y`cZ`UW]j`]ħYg`  
]bW`i`X]b[ `]bXYdYbXYbh`fYgYUfW`"dfc`Y`Wgž`cfU`"dfYgYbħ]ħcbg`UbX`YggUmik`f]ħb[ ""H`\\fci`[ `\\`ħ.Y`Wđi`fgYž`mci`  
UFY`ħc`"YUfb`UbX`fYZYWđi`cb`ħ.Y`Wđbħ]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`h`Wđbħ`a`dcfUfm`UbX`  
\\]għc`f]WU`"7`\\]bU`/ħc`fYj`]Yk`"UbX`i`dXUħ`gW`c`Ufg`\\d`"cb`7`\\]bYgY`Gh`X]Yg`Z`ca`"Ub`]bZ`fa`YXž`W]ħ]WU`"UbX`  
]bħf`fX]gW]d`]bUfm`dYfgdYW]j`Y`"

7 ci fgY`@YUfb]b[ `Ci`hWđa`Yg

%`5`Wđi`]fY`\_bck`YX[ Y`]bXYdYbXYbh`mž`i`h`]g]b[ `Vch`df]a`Ufm`UbX`gY`WđbXUfma`Uħf]U`g`  
&`8`Ya`cbgh`fUħ`WđbW`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`  
(`" `5`f]W`"Uħ`gdYW]U`]gYX`\_bck`YX[ Y`cZ`7`\\]bU`"UbX`UgdY`Wg`cZ`7`\\]bYgY`Gh`X]Yg`  
)`" `9`b[ U[ Y`]b`fYUgcb`YX`"UbX`cdYb`!`a`]bXYX`X]gW`gg]cb`"UbX`XYVUħY`"

HYUW`]b[ `GħfUħ`[ `]Yg`

H\]g`W]dgr`cbY`Wđi fgY`]g`ħ.Y`"Ugh`Wđi fgY`Z`f`gh`XYbqg`]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`dfcj`]XY`"Ub`cddc`fñ`b]m]Z`f`gh`XYbqg`ħc`fYZYWđi`cb`ħ.Y`]f`Yi`dYf]YbW]g`"UbX`  
\_bck`YX[ Y`]b`7`\\]bYgY`Gh`X]Ygž`ħc`Wđbgc`]XUħ`k`\\Uħ`ħ.Ym`\\Uj`Y`"YUfb`hd`fYj`]ci`g`mž`UbX`ħc`dfYd`UFY`ħ.Y`]f`  
fUbg]ħ]cb`"]bħc`ħ.Y`k`cf`\_Z`c`fW`"cf`dcgh[ fUXi`Uħ`"gh`Xm`"ħ]bħ[ fUħYg`\_bck`YX[ Y`[ U]bYX`ħ.fci`[ `\\`dfYj`]ci`g`  
Wđi fgYk`cf`\_`UbX`c`j`YfgYUg`Yi`dYf]YbW`"UbX`Vi`]Xg`c`b`ħ.Uh`WđbW`dh`U`Z`ci`bXUħ]cb`ħ.fci`[ `\\`U`a`cfY`  
ħ.Yc`fYh]WU`"UbX`\\]għc`f]WU`"dYfgdYW]j`Yž`]bħ[ fUħ] 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`cZħ`Ya`YX`"Y`Wđi`fYgž`]b!`WUgg`X]gW`gg]cbgž`k`cf`\_g`cdg`"UbX`dfYgYbħ]ħcbg`"ħ`  
]g`VUgYX`cb`ħ.Y`df]bW]d`Y`cZgh`XYbqg`fYg`Z`[ i ]YX`"YUfb]b[ ""H`\\Y`fci`Y`cZħ.Y`Wđi fgY`Wđc`fX]bUħc`f`UbX`"Y`Wđi`fYf`  
]g`ħc`W`YUħ`"Ub`]bħ`"Y`Wđi`U`"migh`a`i`"Uħ]b[ `UbX`WđcdYfUħ] Y`"YUfb]b[ `Ybj`]fcb`a`Ybh`Z`f`gh`XYbqg`ħc`Yb[ U[ Y`]b`  
X]U`c[ i`Yg`k`]ħ`YUW`c`ħ.Yf`]b`UbX`ci`ħcZ`WUgg`fcca`ž`VYg]XYg`dfcj`]X]b[ `Ub`]bħ`"Y`Wđi`"\\]għc`f]WU`"dYfgdYW]j`Y`  
UbX`gdYW]U`]nYX`X]gW]d`]bUfm`Z`Ua`Yk`cf`\_"`Gh`XYbqg`UFY`YbWđi`fU[ YX`ħc`fYUX`Yi`dUbg] Y`m`UbX`Z`cgh`f`U`  
dfc`Xi`W]j`Y`fY`Uħ]cbg`\\d`k`]ħ`ħ.Y`Vfc`UXYf`UWUXYa`]W`Wđa`a`i`b]m`"@"Y`Wđi`fYg`"UbX`h`ħc`f]U`g`U]a`"ħc`VfU]bgr`fa`  
UbX`[ ]j`Y`gh`XYbqg`cddc`fñ`b]ħ]Yg`ħc`f`Wđi`bXYfgh`UbX`"UbX`UWđi`]fY`"UgdYW]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`]XYbh]zmX]ZY`fYbhig`fYUa`g`cZ`  
ħci`[ `\\]g`XYj`Y`cdYX`]b`dUf]ħW`"Uf`UFYUg`]b`fYVW`bhim`YUfg`/f`Ł`Yi`d`c`fY`X]gW]d`]bUfm`UbX`]bħf`fX]gW]d`]bUfm`  
Uddfc`UW`Yg`"UbX`a`Yħc`Xc`c`[ ]Yg`]b`fYgYUfW]b[ `dUf]ħW`"Uf`ħc`d]Wg`]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'YW'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`h\fc 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' ÷Yb]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 ^WwdfYgYbH]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

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'fgi 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'mYUfI" 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'fY'Yj UbhXcW a YbHgE'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]WU'm'fYW]j Y'U'h]W\_Yhbi a VYfž'Vi h]Zmci 'HY'Yd\cbY'mci 'k ]'bYYX'hc'gdYW]Z]WU'mUg\_ 'Zcf'cbY"  
Hi fb]h]b'U'gc'dfcj ]XYg'i dXUH'g'cb'H'Y]f'gmgh'Ya 'ghUhi g'cb'Hk ]HYf"

; YbYfU'mž'UggYgga YbhiHUg\_g'a i ghVY'gi Va ]HYX'Y'YW'fcb]WU'mj ]U'Y]H'Yf'Hi fb]h]b'cf'U'A ccX'Y  
Ugg][ ba YbH' 'b]bgHUbVW'g'k \YfY'H'g ]g'bcidcgg]V'Yž'hk ]'VY'ghUH'X'cb'mci f'Wci fgY'g'A ccX'Y'g]H'k ]H  
U'HYfbUH] Y'gi Va ]gg]cb'XYHU]g"

: cf]bZ'fa UH]cb'cb'\ck 'hc'gi Va ]hUgg][ ba YbHg'cb]bYj ]U'A ccX'Y. \hhdg.#gh XYbhi bgk "YXi "Ui #ck!  
gi Va ]hUgg][ ba YbH'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]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 ]Wg'UbX' ]bZcfa Uh'cb'UVci hl BGK 'UbX'I BGK '@]VfUfm

Gca Y'cZh'YgY'UfYUg'k ]`VY'ZJa ]]Uf'hc'mci ž'c'h'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. #gj V'YWf i \]XYg" \]VfUfm'i bgk "YXi "Ui #` \]gY#JVci h' \]gY](#)

