

ARTS2126

F Yj]Yk]b['h\Y'5fhg

HYfa "Hk c" ## "&\$&\$

5ggYgga Ybh

K CF? GI 6A ≠H98.

5```WJrUrJcbg'a i gh']bWi XY'dU[Y'fYZYfYbWYg"'Y['fbi h\cf'gi fbUa Y'MYUfz'dU[Y'bc"Ł'fGa]h\ &\$\$\$z') Ł

=b!hYl hfYZYfYbW]b['cf'ZcchbchYg'UfY'UVWYdhUV`Y"

: i ```V]V`]c[fUd\mUhih\Y`YbX`cZmcif'fYgYUfW\`dUdYfg']g'fYei]fYX"

 $I\ bfY`]UV`Y`k\ YVdU[\ Y`fYZYfYbWfg`UfY`bch`UVWYdfUV`Yž`Y[\ "`K\]_]dYX]U"`$

: cbhg]nY''&dYUgY'!'a mYmYg'UfY'[Yh]b['C@8"

5ggYgga Ybh'HUg_g'

5ggYgga Ybh'hJg_	K Y][\h	8i Y'8UHY	Gh XYbh@YUfb]b[Ci hWca Ygʻ5ggYggYX
K cf_g\cd^5Wfj]hJYg^	&\$I	Bch5dd`]WUV`Y	%ž&
Dcfh7c`]c'cZFYj]Ykg'	(\$1	%(#\$, #&\$&\$`\$) .\$\$`DA	%ž&
9ggUmi	(\$1	&(#\$+#&\$&\$`\$).\$\$`DA	%ž&Ž

5ggYgga Ybh'8YHJ]`g

5ggYgga Ybh% K cf_g\cd 5Whjj]hjYg

GhUfhXUhY. Bch5dd`]WUV`Y

@Yb[h\. b#J

8 YHJ]`g.

 $\&! (\ k \ cf_g \ b \) ``VY \ XYg][\ b \ b' \ X' \ Ug' \ Ugg \ Ygga \ Yb \ b' \ b' \ YY' \ a \ cXY \ YX']b' \ W \ Ugg' \ VY \ CfY' \ a \ cXY \ YX']b' \ W \ Ugg' \ VY \ CfY' \ A \ cXY \ YX']b' \ W \ Ugg' \ VY \ CfY' \ A \ cXY \ YX']b' \ W \ Ugg' \ VY \ CfY' \ A \ cXY \ YX']b' \ W \ Ugg' \ VY \ CfY' \ A \ cXY \ YX']b' \ W \ Ugg' \ VY \ CfY' \ A \ cXY' \ YX']b' \ W \ Ugg' \ VY \ CfY' \ A \ cXY' \ YX']b' \ W \ Ugg' \ VY \ CfY' \ A \ cXY' \ YX' \ A \ cXY' \ A \ cXY' \ YX' \ A \ cXY' \ A \ A \ cXY' \ A \ c$ UggYgga Ybh

5ggYggYX Vmifi Vf]WV

5XX]h]cbU`XYhJ]`g.

+b! WUgg 'UggYgga Ybhg'k]```hU_Y'd`UWY']b'h hcf]U'g']b'K YY_g'' 'UbX'+"

Wf]hYf]U	BYYXg k cf_	gUhjgZUWhcf m	[ccX	JYfm[ccX	YI WY``Ybh
i bXYfglUbX]b[cZ		•	•		
h\Y`a cXYgž					
W. UfUWY f UbX Y`Ya Ybhg cZj Uf]ci	α				
fYj]Yk]b['ghmYg	9				
UV]`]hmhc`]XYbh]Zm	•	•	•	•	•
h\Y'jUf]cig					
Y`Ya Ybhg`UbX					
ghfuh/[]/gicZ					
j Uf]ci gʻfYj]Yk]b[ghmYg					
gY`ZIfYZYWhjcb`UbX					
UggYgga Ybh					
Yl dfYgg]cb					
cf][]bU`]mi]b`h\Y	•	•	•		•
ZFUa]b['cZ fYgdcbgYg'hc'h\Y					
hug_g"					
5—5					

 $\label{thm:continuous} \begin{tabular}{ll} Hi fb]h]b"gYh]b"[."H\]g"Ugg][ba Ybh]g"gi Va]hhYX"h\fci [\ 'Hi fb]h]b"UbX"ghi XYbhg"Xc"bchgYY"Hi fb]h]b g]a]"Uf]hmfYdcfhg" \\ \end{tabular}$

5ggYgga Ybh& DcfhZc`]c cZFYj]Yk g

GhUfhXUhY. Bch5dd`]WUV`Y

@Yb[h\."&\$\$\$"k cfXg

8YHJ]`g.

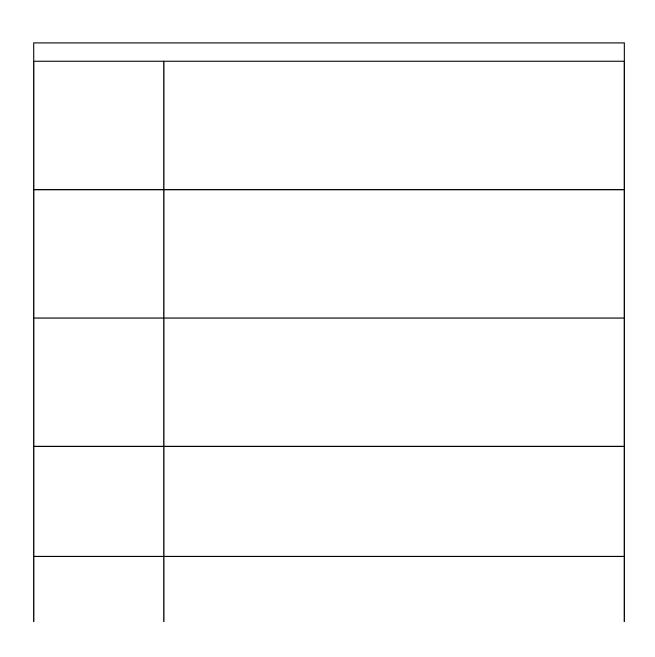
&\$\$\$ k cfXg

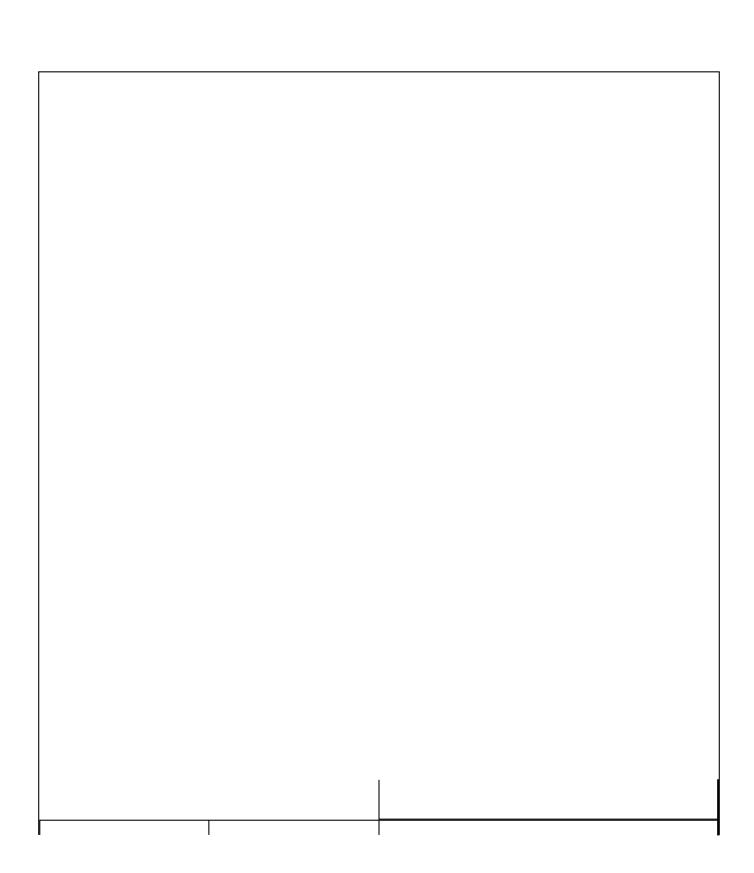
 $\label{thm:ci_wub_index} Vi hmci_wub_index_gY_UggY_gga_YbhHUg_ghcik_f]hY_bYk_fYj_Yk_g"DYUgY_gYY_k_cf_g\cdgk_YY_!Vmk_YY_Zcf_b!WUggk_f]hb[_HUg_ghbx_XYgWf]VY_h\Y_HUg_index_ind$

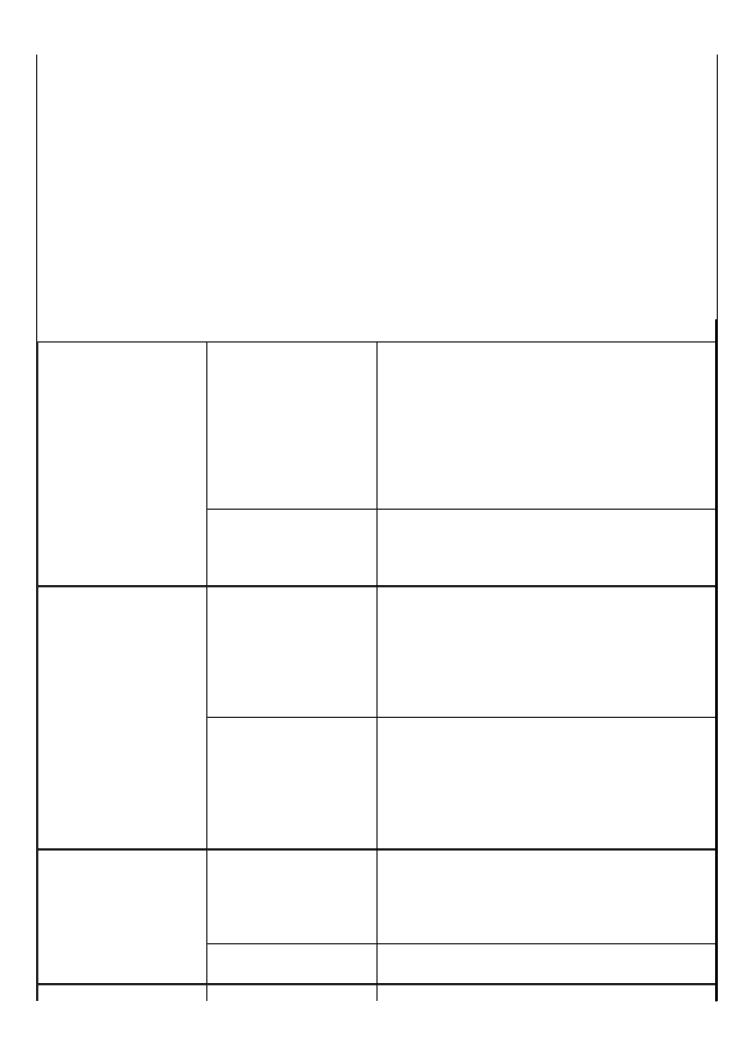
 $: YYXVUW_k] ``VY`cb[c]b[`UbX`U`Z]bU``UggYgga Ybhk] ``VY`dfcj] XYX`a Uf_]b[`h\Y`dcfhZc`]c`U[U]bghU`[f]X `]gh]b[`h\Y`UggYgga YbhWf]hYf]U.$

.

₩f]HYf]U







K YY_'%\$.'' '5i [i gh!'+ 5i [i gh		@YWfifYf. '9f]b '6fUbb][Ub 6YmcbX'k cfXg. 'U`hYfbUh]j Y'a Yh\cXg'Zcf'cb`]bY Wf]h]W]ga . 'dcghXYgWf]dh]j Y'a Yh\cXg'gi W\'Ug'h\Y]bghU[fUa 'fYj]Yk ž'h\Y'd\chc'YggUm'UbX'h\Y'j]XYc YggUm'
	<pre><ca cf_<="" pre="" yk=""></ca></pre>	 G\Uf]b['k cf_'XcbY`]b``YWi fY`V`cW_"

FYgci fWfg

DfYgWf]VYX F Ygci fWYg

GYY'A ccX`Y

FYWca a YbXYX FYgci fWYg

GYY'A ccX'Y

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

 $H\g``Wci\ fgY`k\]``VY`fYj\]Yk\ YX`UWfcgg`k\ \Uhik\]```VY`U`a\ i\ `h]!\ X]gW]d`]bUfm`Wc\cfhi\ g]b[\ `75H9=UbX`U\ W\ ghca\]gYX`7ci\ fgY`9I\ dYf]YbW'E\ i\ Ygh]cbbU]fY''`K\ Y`k\]```U`gc`\Uj\ Y`h\Y`VYbYZ]hcZU`[\ i\ Ygh`YWh\ fYf`hc\ Wcbhf]Vi\ hY`hc`h\Y`fYj\]Yk ''$

.

Gi Va]gg]cb cZ5ggYgga YbhHUg_g

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

Image: Ybwei bhyfu'dfcv'ya k \yb'uhhya dhjb['hc'gi va]hmci f'Ugg][ba Ybhh\fci [\ 'Hi fb]h]bž'd'YUgY

Hy'Yd\cby'9| hy'fbu''Gi ddcfhcb'-',) '' ' ' %cf'Ya U]''h\Ya 'cb'Y! hy'fbu'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'fl *) 'XUmg'U'mYUft'''=Z'mci
UfY'i bUV'Y'hc'gi va]hmci f'Ugg][ba YbhXi Y'hc'U'ZJi 'hk]h\ 'Hi fb]h]b'mci 'a Um'Udd'mZcf'Ub'Y! hy'bg]cbž'Vi hmci
a i ghfYhJ]b'mci f'h]W_Yhbi a VYf'Zfca '9! hy'fbU''Gi ddcfhfU'cb['k]h\ 'Ubmch\Yf'fy'Yj UbhXcW a Ybhgt'hc
]bWi XY'Ug'Yj]XYbW' hc'gi ddcfhmci f'Y! hy'bg]cb'Udd']WUh]cb"'=Zmci 'Ya U]''9! hy'fbU''Gi ddcfhmci 'k]'`
Ui hca Uh]WJ'`mfYW']j Y'U'h]W_Yhbi a VYfZ'Vi h]Zmci 'hY'Yd\cbY'mci 'k]``bYYX'hc'gdYW]Z]WJ'`mUg_'Zcf'cbY''
Hi fb]h]b'U'gc'dfcj]XYg'i dXUhy'g'cb'h\Y]f'gmghYa 'ghUh' g'cb'Hk]hyf''

; YbYfU`mž'UggYgga YbhiHug_g'a i ghVY'gi Va]hhYX'Y`YVWfcb]\WJ``mij]U'Y]h\Yf'Hi fb]h]b'cf'U'A ccX`Y Ugg][ba Ybh''=b']bgHJb\W'g'k \YfY'h\]g']g'bchdcgg]V`Yž']hk]```VY'gHJhYX'cb'mci f'\\circ i fgY'g'A ccX`Y'g]hY'k]h\U`hYfbUh]j Y'gi Va]gg]cb'XYHJ]`g"

cfi]bZcfa Uhjcbicbi\ckihcigi Va]hUgg][ba Ybhgicbi]bYij]UiA ccXiY.i\hdg.#gh XYbhi bgk "YXi "Ui #\ck! gi Va]hUgg][ba Ybha ccXiY

5 WUXYa]W<cbYghmUbX D`U[]Uf]ga

D`U[]Uf]ga i]gii g]b[ih\Yik cfXgicfi]XYUgicZch\YfgiUbXidfYgYbh]b[ih\Ya iUgimci fick b"i=hWJbihU_Yia Ubm Zcfa gžZfca iXYi]VYfUhYiWXYUh]b[ihciUWW]XYbhU`mWcdm]b[iZfca iUigci fWYik]h\ci hiUW_bck iYX[Ya Ybh'

IBGK [fcidg'd'U[]Uf]ga]bhc'h\Y'Zc``ck]b['WUhY[cf]Yg.

- i bXYfgfUbX mci f'f][\hg'UbX'fYgdcbg]V]`]hJYg'Ug'U'gh XYbhUhl BGK
- VY`Uk UfY`cZd`U[]Uf]ga ž`Wcdmf][\hz'l BGK `Gh XYbh7cXY`cZ7cbXi WhUbX`5VWWdhUV`Y`l gY`cZ I BGK `=\forall H`F Ygci f\W\g`Dc`]\m\m
- VY 'Uk UfY 'cZh\Y 'ghUbXUfXg 'cZVY\Uj]ci f'Yl dYWYX 'cZYj YfmcbY ']b 'h\Y 'l BGK 'Wca a i b]hm
- `cWUHY 'gYfj]WYg'UbX ']bZcfa UH]cb'UVci hI 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 bXYfgHJbX]b['cZU``h\YfY`UhYX'UgdYWng'cZ9@+69'k]``\Y`d'mci 'a U_Y'h\Y'a cghicZmci f'ghi X]Yg'UhI BGK "'\\hd.##qi VYWfi |XYg"`]VfUfm'i bqk "YXi "Ui #\`]qY#JVci hY`]qY

5 WUXYa]W = b Zcfa Uh cb

: cf'YggYbhJU`'gh XYbh']bZcfa UhJcb'fY`UhJb['hc.

- fYei Yghg 'Zcf'Yl hYbg]cb/
- `UhY`gi Va]gg]cbg`[i]XY`]bYg/
- fYi]Yk 'cZa Uf_g/
- I BGK '< YU`h\ 'UbX'GUZYhm'dc`]W[Yg/
- YI Ua]bUhcb dfcW/Xi fYq/
- gdYWJU`Wcbg]XYfUHjcb`]b`H\Y`Yj YbhcZ]``bYgg`cf`a]gUXj Ybh fY/
- qh XYbhYei]miUbX X]qUV]`]m/
- UbX'ch\Yf'YggYbhJU`'UWUXYa]W]bZcfa UhJcbž'gYY

\hdg.#k k k "Ufhg"i bgk "YXi "Ui #W ffYbhgh XYbhg#UWJXYa]W]bZcfa Uh]cb#dfchcWc`g![i]XY`]bYg#

.

⇒a U[Y'7fYX]h

 $D\chc cZ8 Ub]Y``6i fYbfg'k cf_f@_Y'7\]Xfg'D`UmfiUh'7 Uff]U[Yk cf_gz'&$\%"]$

7F = 7CG

7F = 7CG Dfcj]XYf 7cXY. \$\$\$-,;

5W_bck `YX[Ya YbhcZ7ci bhfm

 $K_{Y'UW\underline{b}ck} YX[Y'hY'6YXY[U''dYcd'Y'k \c'UfY'hY'ffUX]h]cbU''W ghcX]Ubg'cZhY''UbXg'cb'k \]WX'I_BGK_{Ybg]b[hcb'WJa_di_q']q''cWJhYX'''$