

# **ARTS3097**

7 i ffYbh'8 YVUhYgʻ]bʻA YX]UʻUbXʻ7 i `hi fY

HYfa 'C bY''##'&\$&%

## 7ci fgY 8YW] g

#### 7 fYX]hDc]bhg\*\*

#### Gi a a UfmcZh\Y 7ci fgY

A YX]U'UfY'W'bffU``mi]a d`]WUhYX']b'ci f``]j Yg'—'Vch\'di V`]WUbX'df]j UhY''': fca 'Y`YWf]cb'WUa dU][ bg'hc fUX]WU`]gUhJcb/Zfca 'hfUbgbUhJcbU``dYfgcbU``fY`UhJcbg\]dg'hc'[ Ua ]b[/Zfca 'h\Y'Wcbgh]hi hJcb'cZh\Y'[`cVU` YWcbca mhc'cb`]bY'XUhJb[/a YX]U'hYWbc`c[]Yg'd`UmU'Wfi WJU``fc`Y'''H\Ym\Uj Y'h\Y'dchYbhJU``hc'WfYUhY'gcWJU`UbX'dc']hJWU``WUb[Y'Ug'k Y```Ug'hc'X]gfi dh'dYfgcbU```]j Yg']b'k Umg'i b]a U[]bUV'Y'U'XYWUXY'cf'gc'U[c''

#Jith ]g Wei fgY mei ik ]``YI Ua ]bY W ffYbhž'`]j Y'hed]Wg ]b a YX]Uži g]b[ ifY`Yj UbhWebWidng UbX ZfUa Yk cf\_gihe ]bj Ygh][ UhY UbX i bXYfghUbX dfYgYbh XUma YX]U!fY`UhYX ]ggi Yg"8i f]b[ ihXY Wei fgYžmei ik ]``VY YbWei fU[ YX he WUdhi fY UbX ghi Xma YX]U!fY`UhYX Yj Ybhg UbX XYj Y`eda Ybhg Ug hX ymi bZc`X" 5 hhXY VY[ ]bb]b[ icZhXY hYfa ihXfYY he Zei fig][ b]Z]WUbhžYl Ya d`Ufmžeb![ c]b[ ihed]WgžbYk gʻghef]YgžefiXYj Y`eda Ybhg ]bj e`j ]b[ ihXY a YX]U ik ]``VY WegYb"HXY fYgheZhXY hYfa ž]bWi X]b[ iYWhi fYgʻUbX hi hef]U``fYUX]b[ gʻUbX X]gWi gg]ebgžk ]``VY`ef[ Ub]gYX Ufci bX ik e`he ihXfYY VfeUX hXya Ygʻh UhUfY VUgYX eb hXY WegYb hed]Wg"

H\Y'\_YmZcWigik]``VY'cb'h\Y'Udd`]WUh]cb'cZfY`Yj Ubhih\Ycf]YgžZfUa Yk cf\_g'UbX'WcbWidhg'cb'h\YgY'hcd]Wgž UbX'Ub'Yl d'cfUh]cb'cZUddfcdf]UhY'a Yh\cXc`c[]Yg'Zcf'h\Y]f'UbU`mg]g"'H\Y'hcd]Wg'Wcj YfYX'Wci `X']bWi XYžZcf ]bghUbWižX][]hU`a YX]U'UZcfXUbWigždc`]hJWU``Wca a i b]WUh]cb'Ug'di V`]WghfUhY[mž'cb`]bY'fUX]WU`]gUh]cbž gcW]U`a YX]U'i gY'UbX'Wci bhYf!di V`]Wgžh\Y'dc`]hJWU``YWcbca mcZ+H']bXi ghf]Ygžcf'gi fj Y]``UbW''UbX'gYW f]mž Wcj Yf]b['h\Y'h\Ya Yg'cZa YX]U']b'h\Y'bgT'{U'Xca U]b'UbX'a YX]U']b'h\Y'bd[hSfWXca U]bžUg'k Y```Ug'h\Y ]bhYfgYW]cbg'cZh\Y'h\ c"'H\Y'a Yh\cXc`c[]Yg'X]gW ggYX'Wci `Xž']b'hi fbž']bWi XY'hYl hi U``UbU`mg]g'UbX XYWcbghfi Wh]cbž'Ui hc!Yh\bc[fUd\mžUbX'Wcb^bbhf bWhi fU``UbU`mg]g''H\Y'Ya d\Ug]g'k]``VY'cb'g]hi Uh]b['a YX]U UbU`mg]g'UbX'h\Ycfmk]h\]b'VfcUXYf'gcW]c!W'`hi fU``UbX'dc`]hJWU``WcbhYl hg''

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

- %'' Uff]W `UhY 'h\Y]f'i bXYfghUbX]b[ 'cZh\Y'fc`Y'cZh\Y'a YX]U']b'WcbhYa dcfUfm`]ZY"
- ' "Ya d`cm`]bXYdYbXYbh`YUfb]b[ 'UbX'gY`ZX]fYWYX`fYgYUfW\`UWfj ]hmUbX'X]gd`Um`]bHY``YWi U``f][ ci f`]b h\Y]f`UbU`mq]q`UbX`fYdcfh]b[ 'cZa YX]U'q`fc`Y`]b`WbHYa dcfUfmW 'hi fYq"
- ("Yb[U[Y]b'Wc``UVcfUhjjY'X]gW gg]cb'UbX'XYVUhY']b'U'k Umh\UhfYZYWg'h\Y'Wca d`Yl]hjYg'cZW ffYbh gcWjc!W`h fU`'UbX'dc`]hjWU`'Zcfa Uhjcbg'UbX'h\Y'a YX]U'g']a dUWicb'h\Ya "

#### HYUWX]b[ 'GhfUhY[ ]Yg'

Ghi XYbhgik ]``Yl d`cfYih\Y]a dcflUbhfc'Yh\Uha YX]U'UbX'a YX]U'HYWbc'c[]Yg'Wbh]bi Yirc'd'Um]b'j Uf]ci g UgdYWg'cZci f``]j Ygž']b'dUfhih\fci [\``YWh fYg'h\Uhk]```]bWi XY'U'g][b]Z]WUbh]bhYfUWjj Y'Wca dcbYbhXi f]b[k\]Wg'dy'Xybhg'k]``'VY'YbWci fU[YX'hc'Wca Yi d'k]h\]bglUbWyg'Zca 'h\Y]f'ck b'a YX]U'i gY'h\UhY! Ya d']Zm WcbWdg'UbX'XYVUhYg'X]gW ggYX']b'h\Y''YWh fY/]b'dUfhih\fci [\`h\Y]f'fYZYI]j Y'Yb[U[Ya Ybhk]h\'h\Y h\Y h'thf]U''fYUX]b[gž'Vf]YZgi a a Uf]Yg'cZk\]W\Z'U'cb['k]h\'Uddfcdf]UhY'Yl Ua d'YgZ'h\YmUfY'Yl dYWYX'hc'Vf]b[hc'WUgg/UbX']b'dUfhih\fci [\'X]gW gg]cbgZ'k]h\'dYYfg'UbX'k]h\'h 'ih hcfgZ']b'hi hcf]U'g'h\Uhk]``\Y'd'h\Ya ibXYfgfUbX'VYhYf'\ck hc'Udd'mWcbWdhg'UbX'h\Ycf]YgZ'UbX'U'gc'k\Uha Yh\cXg'hc'i gY'Zcf'UbU'mg]b['h\Y WcbhYbhcZa YX]U'Ug'k Y``Ug'h\YdfcXi Wfob'UbX'h\Ycf]YgZ'UbX'U'bX'Wca a i b]WUhjcb'hYWbc`c[]Yg'UbX'h\Y]f YYUhjcbg'k]h\'VfcUXYf'gcW]U'Z'dc']h]WU'Z'UbX'W'hi fU''WcbhYl hg''G][b]Z]WUbhmz'h\Y'Yl Ua d'Yg'i gYX']b''YWh fYg UbX']b'h hcf]U'g'k]`'VY'W ffYbhUbX'hcd]WU''-'']j Y''-'i g]b['h\Y'hYWbc`c'[]Yg'Uj U]'UV'Y']b''YWh fY'UbX'h hcf]U'gdUWYgz'k\]M\'k ]`''U'ck 'gh XYbhg'hc fYZYWhcb'UbX'XYj Y`cd'Ub']bhY`'YWh U''Yb[U[Ya Ybhk]h\'Vch\'h\Y]f

ck b a YX]U i gY UbX h Y a YX]U'g ]a d`]WUhcb ]b VfcUXYfž di V`]W]ggi Yg"

 $H\[g'Wc'\ fgY']g'XYg][\ bYX'hc'U``ck'g'h\ XYbhg'hc'Vi\ ]`X'cb'h\Y]f'Zc'\ bXUh]cbU``WcbW'dhg']b'[\ UhYk\ UmWc'\ fgYg'UbXgh'\ XYbhg'hc'Vi\ ]$ 

## 5ggYgga Ybh

#### 5ggYgga YbhHUg\_g

5ggYgga Ybh'tUg_	K Y][ \h	8iY'8UHY	Gh XYbh@YUfb]b[ Ci hWca Ygʻ5ggYggYX
7`UggʻdfYgYbhUhjcbʻ	%) ।	Bch5dd`]WUV`Y	%ž'&ž'' ž'(
G\cfh9ggUm	')।	% #\$' #&\$&%`%%\$\$`DA	%ž <sup>:</sup> &ž <sup>:</sup> '
7 UgY ghi Xm	) \$1	&(#\$(#&\$&%`%%\$\$`DA	%ž`&ž`'

#### 5ggYgga Ybh8YHJ]`g

5ggYgga Ybh% 7`Ugg dfYgYbhJh]cb

GhUfhXUhY. Bch5dd`]WUV`Y

8 YW] g.

Gh XYbhg k ]``a U\_Y`]bX]j ]Xi U``dfYgYbhUh]cbg cZUVci h) !+'a ]bi hYg YUW. cb h\Y]f hcd]WZcf h\Y`7 UgY Gh Xm' H\]g k ]```c\W\f]b U'h hcf]U``WUgg ``UhYf]b h\Y`h\fa "'H\]g \Ug\_`]g \WcgY`mg\WZc`XYX hc h\Y`7 UgY Gh XmUbX Yb\chi fU[ Yg gh XYbhg hc di hZcfk UfX Ub Uf[ i a Ybh]b j Yf\U``Zcfa "5 a Uf\_]b[ 'g\YYhk ]h\ k f]hYb \Wa a Ybhg UbX a Uf\_k ]```VY'dfcj ]XYX"

5ggYgga Ybh& G\cfh9ggUm

GhUfhXUhY. Bch5dd`]WUV`Y

**@Yb[h**\. \%\$\$ k cfXg

8YW]`q.

Ghi XYbhgʻk ]```gi Va ]h`U`%\$\$\$`k cfX`fYZYWhjj Y`d]YWY`cb`U`hcd]WdYfhU]b]b[`hc`a YX]U`hYW\bc`c[]Yg`]b`h\Y`bd[hSfWXca U]b"`5`a Uf\_]b[`g\YYhk]h\`k f]hhYb`Wca a Ybhg`UbX`a Uf\_`k]```VY`dfcj]XYX`j]U`Hi fb]h]b"

 $\label{eq:higher} \begin{tabular}{ll} Hi fb]h]b gYhdb gYYhd for $[\ \ \ ]h]YXh\fci [\ \ \ ]h]b UbXgh XYbhg WUb gYYhd fb]h]b g]a ] Uf]hm fYdcfhg" \end{tabular}$ 

5ggYgga Ybh' . 7UgY gh Xm

GhufhXuhY. Bch5dd`]WUV`Y

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

8YHJ]`g.

Gh XYbhg k ]```gi Va ]h'U'&\$\$\$ k cfX`YggUmcb 'U'hcd]WdYfhU]b]b[ 'hc'h\Y'a YX]U'hYW\bc`c[ ]Yg']b'h\Y'bgT {U Xca U]b"'H\]g']g'h\Y'Z]bU``UggYgga Ybh'HUg\_"'9UW\'Ugg][ ba Ybhk ]```VY'[ ]j Yb'U'bi a Yf]WU`a Uf\_'UbX'U'[ fUXY"

Hi fb]h]b^gYh]b[.~H\ fYdcfhg"	\]gʻUgg][ ba Ybh']gʻgi Va ]	hh∕X'h\fci[∖'Hifb]h]	bʻUbXʻghi XYbhgʻWUbʻç	gYY'Hi fb]h]b'g]a ]`Uf]hm

## Gi Va ]gg]cb cZ5ggYgga YbhHUg\_g

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

Image: Ybwci bhYf'U'dfcV'Ya k \Yb'UhYa dhjb['hc'gi Va ]hmci f'Ugg][ ba Ybhh\fci [\'Hi fb]h]bz'd'YUgY

HY'Yd\cbY'9| hYfbU''Gi ddcfhcb'-', ) "''' %cf'Ya U]''h\Ya 'cb'Y! 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'fl \*) 'XUmg'U'mYUft'''=\mathred{Image: Wa Jhmci f'Ugg][ ba YbhXi Y'hc'U'ZJi 'hk ]h\'Hi fb]h]b'mci 'a UmUdd'm\mathred{Image: Wa Jhmci f'Ugg][ ba YbhXi Y'hc'U'ZJi 'hk ]h\'Hi fb]h]b'mci 'a UmUdd'm\mathred{Image: Wa Jhmci f'Ugg][ ba YbhXi Y'hc'U'ZJi 'hk ]h\'Hi fb]h]b'mci 'a UmUdd'm\mathred{Image: Wa Jhmci f'Ub'Y! hYbg]cb\mathred{Image: Wa Jhmci h\Yf'f'Y'j UbhXcW a Ybhg\mathred{Image: Wa Uj''9! hYfbU''Gi ddcfhmci 'k ]'`

JbWi XY'Ug'Yj ]XYbW' hc'gi ddcfhmci f'Y! hYbg]cb'Udd']\wUh]cb"'\mathred{Image: Wa Uj''9! hYfbU''Gi ddcfhmci 'k ]'`

Ui hca Uh]\wU'`mfYW']j Y'U'h]\w\_Yhbi a VYf\mathred{Image: hY'Yd\cbY'mci 'k ]\tag{Y}\wu''mug\_'\mathred{Image: Wa'\mathred{Image: hY}\wu''mug\_'\mathred{Image: hY}\wu''mug\_'\mathred{Image: hY}\wu''mug\_'\mathred{Image: hY'Yd\cbY''mci 'k ]\tag{Y}\wu''mug\_'\mathred{Image: hY'\mathred{Image: hY'\mathred{I

; YbYfU``mž'UggYgga YbhiHug\_g'a i ghVY'gi Va ]hhYX'Y`YVWfcb]\W)``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`hYfbUhjj 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 bXYfgHJbX'mci f'f][\hg'UbX'fYgdcbg]V]`]h]Yg'Ug'U'gh XYbh'Uhil BGK

## 5WUXYa]W±bZcfaUhjcb

: cf'YggYbhJU`ghi XYbh]bZcfa UhJcb'fY`UhJb['lc.