

# **ARTS2389**

 $D\]$ cgcd\mUg'U'K UmcZ@]ZY

Gi a a Yf "# "&\$&%

## 7ci fgY<sup>\*</sup>Cj Yfj ]Yk

#### GHJZ7cbHJWh8YHJ]`g

#### 7cbj Ybcfg

B Ua Y	9a U]`	5j U]`UV]`]hm	@cWJhjcb	D\cbY
8Uj]X <sup>-</sup> 6fcbghY]b	X"VfcbghY]b4 i bgk "YXi "Ui		A 6' ((	

#### GWXcc`7cbHJWhi±bZcfa Uh]cb

GWkcc`cZ<iaUb]hJYg'UbX'@Ub[iU[Yg

@c\\U||cb. G\\cc`C\\Z|\\\žA cfj\Yb'6fck\b'6i]\X]b[\\ž@Yj\Y``&\\z\&),

CdYb]b[ '<ci fg. 'A cbXUm! ': f]XUmž - Ua '!') da

D\cbY.'Ž\*%'&'-',)'%\*,%

: UI . Ž\*%'&'-',)', +\$)

9a U]`. <u>\U`4 i bgk "YXi "Ui</u>

# 5ggYgga Ybh

## 5ggYgga YbhHUg\_g

5ggYgga Ybh'hUg_	K Y][ \h	8i Y'8UHY	Gh XYbh@YUfb]b[ Ci hWca Yg 5ggYggYX
8 ]gW gg]cb Zcfi a 'dcghg'	(\$1	Bch5dd`]WUV`Y	%ž' &
: ]bU`YggUm	*\$1	\$%#\$&#&\$&%`\$).\$\$`DA</td><td><b>%</b></td></tr></tbody></table>	

5ggYgga Ybh'8YHJ]`g

### 5 https://bxubwww.Fyei ]fya Ybhg

D`YUgY`bchY`h\Uh`YWh fY`fYWcfX]b[g`UfY`bch'Uj U]`UV`Y`Zcf`h\]g`Wci fgY"`Ghi XYbhg`UfY`ghfcb[`mYbWci fU[YX`hc UhhYbX`U```WUggYg`UbX`WcbhUWh\Y`7 ci fgY`5i h\cf]hmhc`a U\_Y`U`hYfbUh]j Y`UffUb[Ya Ybhg`Zcf`WUggYg a ]ggYX"

## 7ci fgY'GWXYXi `Y

#### J]Yk 'WUgg'ha YHUV'Y

#### H]a YHJV`Y

8 UHY	HmdY	7 cbh/bh
A cb '( '>Ub	FYUX]b[	D`Uhcž'3ba^aYk
Hi Y ·) ·>Ub	FYUX]b[	D`UhcžBZSWWa`fgY`YW¶cbgŁ
K YX <sup>·</sup> * ·>Ub	F YUX]b[	5 f]ghchYž@[Ua_SUZW\$`7 fZ[Ue`fgY`YWn]cbgŁ
H\i	FYUX]b[	5 f]ghchYž@[Ua_SUZW\$`7 fZ[Ue`fgY`YWf]cbgŁ
A cb <sup>-</sup> ‱->Ub	FYUX]b[	Ghc]WJga. '9d]WHYhi gž': S`VTaa]
Hi Y '‰'>Ub	F YUX]b[	Ghc]Wjga . '9d]WhYhi gž'6 [eUagæWe fgY`YWhjcbgŁ
K YX % ->Ub	F YUX]b[	Ghc]Wjga . GYbYWUž'>WffWde flgY`YWfjcbgŁ
H\i	FYUX]b[	Ghc]Wjga. GYbYWUž>WffWdefgYYWjcbgŁ
Acb <sup>.</sup> % '>Ub	F YUX]b[	9d]W fYUb]ga . '9d]W fi g fgY YW]cbgŁ
Hi Y '%- '>Ub	F YUX]b[	9d]W fYUb]ga . '9d]W fi g fgY YW]cbgŁ
K YX <sup>*</sup> &\$ <sup>*</sup> >Ub	F YUX]b[	H\Y`7 mb]Wg`fgY`YW¶cbgŁ
H\i `&%'>Ub	F YUX]b[	G_YdhJWJga . GYJ

### FYgci fWyg

#### DfYgWf]VYX F Ygci fWYg

H\Y`Wci fgY`Wcbj Ybcf`k]``UffUb[Y`Zcf`ghi XYbhg`hc`\Uj Y`UVWWgg`hc`U```fYUX]b[g"

#### FYWca a YbXYX FYgci fWYg

 $\label{lem:conditional} GhUbZcfX`9bWhWcdYX]U`cZD\]`cgcd\mYbhfmcb`5bW]Ybh9h\]WU``H\Ycfm$ 

\hdg.#d`Uhc"ghUbZcfX"YXi #\bhf]Yg#\h\]\\\g!\Ub\\]\Ybh#

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

D`YUgY`Wca Y`Hu`\_`hc`h\Y`Wci fgY`Wcbj Ybcf`UVci h`Ubm]ggi Yg`\Uj ]b[`hc`Xc`k]h\`Wci fgY`UXa ]b]ghfUh]cbž`UbX VY`gi fY`hc`Z]```ci h`mci f`A m'9I dYf]YbWY`gi fj YmUh'h\Y`YbX`!!`U```ZYYXVUW\_`]g`]bghfi a YbhU``hc`XYj Y`cd]b[UbX`]a dfcj ]b[`h\Y`Wci fgY"

### 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 + DZcfa Uhjcb

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

- fYei Yghg Zcf Yl hYbg]cb/
- `UhY 'gi Va ]gg]cbg '[ i ]XY`]bYg/
- fYj ]Yk 'cZa Uf\_g/
- I BGK < YU`h\ UbX GUZYmdc`]W[Yg/
- YI Ua ]bUh]cb dfcW/Xi fYg/
- gdYWJU``Wcbg]XYfUHjcb']b'H\Y'Yj YbhcZ]``bYgg'cf'a ]gUXj Ybh fY/
- gh XYbhYei ]hmUbX'X]gUV]`]hm/
- UbX'ch\Yf'YggYbhJU`'UWUXYa ]W]bZcfa UhJcbž'gYY