

HUMS2006

FYgYUfWX 'D`UWYa Ybhž'5fhg'UbX'GcWJU`'GWJYbWYg

HYfa 'H\fYY''##'&\$&\$

7ci fgY^{*}Cj Yfj]Yk

GHJZ7cbHJWh8YHJ]`g

7cbj Ybcfg

B Ua Y	9a U]`	5j U]`UV]`]lm	@cWJhjcb	D\cbY
BUca]'DUf_]bgcb	b"dUf_]bgcb4 i bgk "YXi "Ui	VmUddc]bha Ybh	' ' * 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>

7ci fgY 8YHJ] g

7 fYX]hDc]bhg**

Gi a a UfmcZh\Y 7ci fgY

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

%" 91 YW hY`Ugg][bYX`fYgYUfVX`hUg_g`]b`U`Wta dYhYbhz`dfcZYgg]cbU``UbX`hJa Y`ma UbbYf

5ggYgga Ybh

5ggYgga Ybh'HUg_g'

5ggYgga Ybh'hJg_	K Y][\h	8i Y'8UHY	Gh XYbh@YUfb]b[Ci hWca Yg 5ggYggYX
F YgYUfVX 'DcfhZc`]c') \$1	%* #%#&\$&\$`\$) .\$\$`DA	% <u>₹</u>
F YgYUfVX 'F Ydcfh'	(\$1	%*#%%#&\$&\$`\$).\$\$`DA	&
F YgYUfVX Gi dYfj]gcf 5ggYgga Ybh	%\$ı	Bch5dd`]WUV`Y	%

5ggYgga Ybh'8YHJ]`g

5ggYgga Ybh% F YgYUfW DcfhZc`]c

GhUfh'XUhY. K YY_'%

@Yb[h\."\$\$\$

8YHJ]`g.

#bh/fbg\]d'dcfhzc`]c'fl \$\$\$ k cfXgŁ'H\Y'dcfhzc`]c'g\ci `X'VY'UggYa V'YX'h\fci [\ci hh\Y'h\fa "'#ig\ci `X XcW a Ybhmci f'Yl dYf]YbW'gždfc[fYgg'UbX'fYZYWf]cbg'cZmci f'F #@dfc[fUa "'8cW a YbhUh]cb']bWi XYg Zcfhb][\hmfYdcfhgž'UbX'Yj]XYbW'cZfYgYUfW\i bXYfhU_Yb"'#ig\ci `X'U'gc']bWi XY'U'Wf]h]WU`'fYZYWf]cb'cb mci f'dfcW'ggž'dfc[fYggž'UbX'k\UhWcbgh]hi hYg'U'gi WW'ggZ ``fYgYUfW\'dfcYWh]b'h\]g'Z]Y'X"'Mci 'k]`` k cf_g\cd'mci f'dcfhzc']c'k]h\'mci f'Wcbj Ybcf'cf'XY'Y[UhY'UbX'fYWY]j Y'Zcfa Uhjj Y'ZYYXVUW_cb'mci f'dfc[fYgg Uhh\Y'a]Xdc]bhcZh\Y'hYfa "'H\]g'dcfhzc']c'k]``VY'[fUXYX'Vmh\Y'Wcbj Ybcf'cf'XY'Y[UhY']b'Wcbgi `hUh]cb'k]h\ mci f'gi dYfj]gcf": YYXVUW_k \cdot \cf \cdot \cdo

Gi Va]gg]cb bchYg.J]U Ya U]`

Hi fb]hjb gYhjb[. H\]g]g bchU Hi fb]hjb Ugg][ba Ybh

5ggYgga Ybh& FYgYUfW FYdcfh

GhUfhiXUhY. K YY_')

8YW]`q.

F YgYUfW. F Ydcfhf&\$\$\$ k cfXgL 'Mci f'fYgYUfW. 'fYdcfhdfcj]XYg'Ub'cddcfhi b]lmhc'k f]hY 'U'fYgYUfW. 'dUdYf VUgYX'cb'Ub'UgdYWhcZmci f'fYgYUfW. 'h\Uh'\Ug'dUfh]W 'Uf'mgdUf_YX'mci f']bhYfYghz'cf'hc'fYZYWhcb'mci f fYgYUfW. 'd'UW'a YbhYl dYf]YbW'''Mci 'g\ci 'X'dfcdcgY'mci f'dfc YWh]b'k f]h]b['UbX\Uj Y']hUddfcj YX'Vmmci f gi dYfj]gcf''UbX'h\Y 'Wci fgY 'Wcbj Ybcf'VYZcfY'h\Y'a]XX'Y'cZh\Y'hYfa "'=ha Um\Uj Y'Ub'cfU''dfYgYbhUh]cb Wca dcbYbh—'hc'VY'XYhYfa]bYX']b'Wcbgi 'hUh]cb'k]h\'mci f'gi dYfj]gcf'''H\]g'k]``'VY'Xci V'Y'a Uf_YX'Vmmci f Wcbj Ybcf'cf'XY'Y[UhY'UbX'mci f'gi dYfj]gcf'': YYXVUW_k]``VY'[]j Yb'j]U'U'a Uf_]b['fi Vf]WUbX']b'k f]h]b["

Gi Va]gg]cb bchYg.J]U 9a U]`

Hi fb]h]b gYh]b[. H\]g]g bchU Hi fb]h]b Ugg][ba Ybh

5ggYgga Ybh' . F YgYUfW 'Gi dYfj]gcf'5ggYgga Ybh

GhUfhXUhY. Bch5dd`]WUV`Y

8YHJ]`g.

 $\label{eq:localization} $$ Mci f'fYgYUfWX'gi dYfj]gcf'k]$ ``UggYgg'mci f'dYfZcfa UbWY'U[U]bgh'dfcj]XYX'Wf]hYf]U'': YYXVUW_']b'k f]hJb['UbXVmfi Vf]W'' $$$

FYgci fWyg

DfYgWf]VYX F Ygci fWYg

Bch'Uj U]`UV`Y

FYWca a YbXYX FYgci fWYg

Bch'Uj U]`UV`Y

7ci fgY 9j U'i Uhjcb UbX 8Yj Y'cda Ybh

 $Ghi \ XYbhZYXVUW_k \] \ ``VY'[UhYfYX'] \] U Ya U] \ ``UhhYYYbX'cZhY'Wci fgY'VmhY'Wci fgY'Wcbj Ybcf''Ghi XYbhg k] \ ``VY'fYei YghYX'hc'dfcj] XY'ZYYXVUW_cb'hY]f'Ugg] [bYX'dfc'YWhf]bWi X]b ['ei U`] mcZ gi dYfj]g]cb/k cf_`cUX/hfUbgZyfUV] \ [mcZfYgYUfWk'g_] \ ``g/\ck 'Yb [U[]b['h\YmZci bX'h\Y'Ugg] [bYX'dfc'YWh'' H\Ymk] \ ``U`gc'VY'fYei YghYX'hc'Wca a Ybhcb'h\Y'cj YfU```ghfi Whi fY'cZh\Y'Wci fgY'UbX'] hg'UggYgga Ybhg'' : YYXVUW_cb']bX]j] Xi U``dfc'YWhg'k] \ ``VY'fYZYffYX'hc'gi dYfj] gcfg'hc'[i] XY'h\Ya']b'ghfi Whi f]b['a UhYf]U``Zcf Z hi fY'< | A G&$$*'fYgYUfWk'] bhYfbg'': YYXVUW_cb'h\Y'Wci fgY'k] \ ``VY'i gYX'hc'UX'\ gha cXYg'cZ UggYgga Ybh''$

Gi Va]gg]cb cZ5ggYgga YbhHUg_g Hi fb]h]b Gi Va]gg]cb

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

D`U[]Uf]ga `]g`i g]b['h\Y`k cfXg`cf`]XYUg`cZch\Yfg`UbX'dfYgYbh]b['h\Ya 'Ug`mci f`ck b"'=h\Wb'hU_Y`a Ubm Zcfa qžZfca 'XY`]VYfUhY'W\YUh|b['hc`UWW]XYbhU`mWcdm]b['Zfca 'U'gci fW'k]h\ci h'UW_bck 'YX[Ya Ybh'

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

7 cdm]b[.'i g]b['h\Y'gUa Y'cf'] Yfmg]a]`Uf'k cfXg'hc'h\Y'cf][]bU`h\I hcf']XYU'k]h\ci hUW_bck `YX[]b['h\Y gci fW'cf'i g]b['ei chUh]cb'a Uf_g"'H\]g'U'gc'Udd`]Yg'hc']a U[Ygž'Ufh'UbX'XYg][b'dfc'YWgž'Ug'k Y``'Ug dfYgYbhUh]cbg'k \YfY'gca YcbY'dfYgYbhg'Ubch\Yf'g']XYUg'cf'k cfXg'k]h\ci h'WfYX]h'

⇒ Uddfcdf]UhY 'dUfUd\fUg]b[...7\Ub[]b['U'ZYk 'k cfXg'UbX'd\fUgYg'k \]'Y 'a cghmfYhJ]b]b['h\Y'cf][]bU` ghfi Wh fY 'UbX#cf'dfc[fYgg]cb'cZ]XYUg'cZh\Y'cf][]bU'žUbX']bZcfa Uh]cb'k]h\ci hUW_bck `YX[Ya Ybh'H\]g'U`gc Udd`]Yg']b'dfYgYbhUh]cbg'k \YfY'gca YcbY'dUfUd\fUgYg'Ubch\Yf'g']XYUg'cf'k cfXg'k]h\ci hWfYX]hUbX'hc d]YW]b['hc[Yh\Yf'ei chYg'UbX'dUfUd\fUgYg']bhc'U'bYk 'k \c`Yžk]h\ci hUddfcdf]UhY'fYZYfYbW]b["

7 c``i g]cb. 'k cf_jb['k]h\ 'ch\ Yfg'Vi h'dUgg]b['cZZh\ Y 'k cf_'Ug'U'dYfgcb'g']bX]j]Xi U``k cf_"'7 c``i g]cb'U`gc]bWi XYg'dfcj]X]b['mci f'k cf_'hc'Ubch\ Yf'ghi XYbhVYZcfY'h\ Y 'Xi Y 'XUhYzcf'Zcf'h\ Y' di fdcgY'cZh\ Ya d`U[]Uf]g]b['Uh'Ubmh]a Yz'dUm]b['Ubch\ Yf'dYfgcb'hc'dYfZcfa 'Ub'UWUXYa]WhUg_z'ghYU']b['cf'UWei]f]b[Ubch\ Yf'dYfgcb'g' UWUXYa]Wk cf_'UbX'Wcdm]b[']hz'cZYf]b['hc'Wca d`YhY'Ubch\ Yf'dYfgcb'g' k cf_'cf'gYY_]b[dUma YbhZcf'Wca d`Yh]b['UWUXYa]Wk cf_"

±bUddfcdf]UhY`W]hUh]cb.`7]h]b[ˈgci fW/gˈk \]WX`\Uj Y`bchVYYb`fYUXžk]h\ci hUW_bck`YX[]b[ˈh\Y`″gYWcbXUfm″gci fW/Zfca ik \]WX`_bck`YX[Y`cZh\Ya`\UgʻVYYb`cVhU]bYX"

8 i d`]\WUh]cb`ffgY`Zd`U[]\Uf]ga "Ł`gi Va]\h]b[`mci f`ck b`k cf_ž]b`k \c`Y`cf`]b`dUfhžk \YfY`]h\Ug`dfYj]ci g`m VYYb`dfYdUfYX`cf`gi Va]\hYX`Zcf`Ubch\Yf`UggYgga Ybhcf\Wci fgY`UhI BGK `cf`Ubch\Yf`i b]j Yfg]\m'

7 cffYWhfYZYfYbWb[dfUWhWyg.

- DUfUd\fUq]b[žgi a a Uf]q]b[žYggUmk f]h]b['UbX'h]a Y'a UbU[Ya Ybh
- 5ddfcdf]UhY'i gY'cZUbX'Uhff]Vi h]cb'Zcf'U'fUb[Y'cZa UhYf]U`g']bWi X]b['hYl hž']a U[Ygž'Zcfa i `UY'UbX WbWYdhg"

±0X]j]Xi U``Ugg]ghUbWr`]g`Uj U]`UV`Y`cb`fYei YghZfca `H\Y`@YUfb]b[`7 YbhY`f\hd.#k k k "`Wi bgk "YXi "Ui #£" Ghi XYbhg`UfY`U`gc`fYa]bXYX`h\UhWUfYZ ``h]a Y`a UbU[Ya Ybh']g`Ub`]a dcfhUbhdUfhcZghi XmUbX`cbY`cZh\Y]XYbh]Z]YX`WUi gYg`cZd`U[]Uf]ga `]g`dccf`h]a Y`a UbU[Ya Ybh'`Ghi XYbhg`g\ci `X`U``ck `gi Z]W]Ybh'h]a Y`Zcf fYgYUfW\z`XfUZh]b[`UbX`dfcdYf`fYZYfYbW]b[`cZgci fWg`]b`dfYdUf]b[`U```UggYgga Ybh']hYa g"

IBGK @]VfUfmU`gc`\Ugʻh\Y`9@&9`hcc``UjU]`UV`Y`hc`Ugg]ghmci`k]h\`mcif`ghiXmUhIBGK"`9@&9`]g XYg][bYX`hc`]bHfcXiWY`bYk`ghiXYbhg`hc`ghiXm]b[`UhIBGK`Vih]hWUb`U`gc`VY`U`[fYUhfYZfYg\Yf`Xif]b[`mcif

- i bXYfghUbX'mci f'f][\hg'UbX'fYgdcbg]V]`]h]Yg'Ug'U'ghi XYbh'Uhil BGK
 VY'Uk UfY'cZd`U[]Uf]ga ž'Wcdmf][\hžI BGK 'Ghi XYbh'7cXY'cZ7cbXi Wh'UbX'5WW'dhUV`Y'I gY'cZ I BGK '=7 H'F Ygci fWfg'Dc`]Wh

5WUXYa]W±bZcfaUhjcb

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