

DfygXbhB YXghc'< YU': fca 'Mti

DYGXYOGA YGLY

FUZZYEi] h&\$%% J]gh]b['Mtif'; i]`X

G bg\]bYUbXG\UXck g! @c]g; chgWž 8 YYdYghi Gna dUh Yyž

&\$\$- "UbX &\$%\"A Ya cf]U";]Zfrg "DUY(

H\fYU\g5\McggB Y\fUg_Uz BYk DiV/Wm7caa lhhYž K \]hY; `cj YK cf_YfgB YXXXž F Yei YghiZfca <]ghcf]Ub

Ei]'h]b['G\cdg'UbXFYUhX6iglbYggž ± G7A '9j Yblg'UbX@cWhlcbg'

Ei]'h]b['9jYbhg

""""""DUY+

BCE; '5k UfXgFYa]bXYfz (!< 'Ei] 'hgcZJ Ucf'7\U 'Yb[Yž FY[]cb=; UhYf]b[žFY[]cb=: UhYf]b["""""DU Yg,

B Œ; *&\$%6i XĮ Yhž

BCE; '&\$%\S'MMJ'9bXFYdcflž

5 B][\hUhh\YA i gM a

9 Y Ubhi; Yca Yffmi91 \] Y liž

DUgglb['h\Y; U'Y

9 ¹

B Wflg_UEi]`hg9l \]Mh

"DUY%

EB 9 &\$%%

"DUY‰

MCI F DF9G=89BHKCI @8 @=?9 HC < 95F : FCA MCI

< ck 'Wb' BCE; ']bWfWgY]lg' a Ya VYfg\]d3 AcfY la dcflibhìnă dYf\ldgž lg lh Y ei Yghcb cZK < Mg\ci XB Yyfly U Ei] httgk UbhUBCE; a Ya Vttg\]d35 "Ukcg hYWi blfm Î | fci dg" UfYXk |bX|b| |b bi a VYfg"9Wbca |WYJa YgUfYdUhcZh |gHfYbXzVi h h\YXckbkUfXhifbi]bicifa Ya Wfg\]dWJUbWZcfYh\YWWbca [WWJ]gg'''

DYN Udgmi Ug_žÎK \Uhk |``=[Yhci hcZh\Ycf[Ub]nUhcb cbWa ma Ya Wfg\]d gdUX3 = VY]Y1 Yh\YfYUfYUXX[h]cbU g[[b]ÚWbhei Ygh]cbg hc Ug_g W Ug

- ÎK \UhWub=Vf|b| hch\lgcf|Ub|nUhcb3'''
- ÎK \m|gh\|gcf|Ub|nUhcb |a dcfhUbhhc a Y3
- ÎK \mg\ci XBCE; VY]a dcfHJbhlrcch\YfdYcd\Y3"
- Î=gBCE; Uj Ui WYhcc`]bhMfa gcZei]h\]ghcfnžei]h ``dfYgYfjUhcb'UbX'diV]WUkUfYbYggji`
- Î<ck WokYVY| |b hc |bhhfYghmi b| Yfkca Yb |b B YvfUg_U|b

······VXWva |b| a Ya VYfgcZBCE; 3

ÎK \mg\ci X=WobHbi Yho dUma Ya Wfg\|d Xi Ygho B GE; k\Yb= ········Wobbc `cb[YffYaUbUbUMjYaYaYaVYffUhk\UMyYfgYUYcZ`]ZM3`

H\YW`hc`VYcb[hcžcfhcdufh]Mduny |bžuxx|hcbu`[fcidg#Y] Ybhg |b`h\Y ei | hlb | kcf X a UmVY \U | b | U bY U | Y |a dUM | b B Œ; a Ya Wfg |d" A Ubmei | 'hhfg | b B YvfUg UVYcb| hc ch\Yf `cW' ei | 'h| i | 'Xg' `A Ubmei | 'hhfg | b ' BYMIg_UNU_YWIggYgUbXfYMfYUgUdUfhZfca BCE; NiEi]YBYMIg_UVch\]b gtlYUbXci hcZgtlY" A Ubnei | hYfg|b B YVfUg_U\U Y |bVMYgYX |bhYfygh|b h\Y =bh/fbUfjcbUEi]'hChi Xm7Ybh/f'UbXAigYia' [b'@|bW/b"'''

K\nth\Ybg\ci X=Ugc\Ycb[hcBGE; 3=Zmi Wb UffWUYfYdgcbgcf Ubgk Yfg hc h\ygy ei Yghcbg fffca Yhl\yf h\ydfc cf Wb dYfgdYMij Ytž=kci X `LYhc`\YufZfca mii "=Zmi Ya U`a Yž=k]``Ya U`mi UfYgdcbgY''=Zmi gYbX a YUgbU``a U``Wa d`YhYk ||\\ fYh fb UXXfYggz=k |```Vi mmi 'UfUXÛY HWYhZcf' h Y & S % f U L Y ei | hz î Chtfg 5 Vhcgg B YVf U L U L U L O Yngb X i ' 6 Yhk Y b bck ' UbXE i] 1B YVfUg_Uz=k] ` Wa d] YfYgdcbgYgUbX[YhVUV] hc mi "

H\Ub Mi Zca Mif &\$\%B GE; Df\alpha\Xb\z Giglb'>"K WYZgiglbk WYf(4 rb\\cc\'\\dag{b}\c\'\\dag{b}\c\'\\dag{z}DC 6d \' ((\tilde{z}A\)\\Zf\\tilde{z}B9\'*, (\$)

DfYg|XYbh&A YggU Y "

; fYYHb[ghc: Y`ck BCE; A Ya VYfgUbX: f]YbXg

6YZcfYh\Y>Ubi UfmivcUXa YYfjb[k\]WkUg\YX]b GYkUXZQUbXmk Ubgcb gdYbhih.Yb][\hUha m\ci gY' = hU_YZcf [fUbhXh.YXWvfUljcbg]b a m[i Ygh fcca žVi hQbXnXfYk a mUhhbhjcbhc jhha gjbh\Uhfcca "H\YfY]gUVVU hJZ ` ; fbxach Yng: b Ei]ha Why dywx k h c x gwld zwf by bx gh hc[Yh\YfVmUa]Xb][\hViYZVf]WH\YaUW]bYkcf_UbX\UbXei]Hb[kUg XcbYVma ma ch\Yf!]b!`Ukz`CUfU\K\YYf`fk\c cb`mVY[Ub`\Yf`ei]}t]b[`WfYYf` UZMfg\Yk Ug*) 'L 5bch\Yfd[YW]gUga U```Udei] 'hcZVVU hZ ``mXcbYWfU' ZWF|WUdd`|ei YXcbYVma ma ch\Yfz; k YbYh\9|Wa UbzYbHhYXÎA mH`|d` ; UfXYbÏ""H\]ga UV]bYd]YVMZ\UbXUdd`]ei fYXUbX\UbXei]`HYXkcf_kUg XcbY]b'%,,""A ch\YfzhcczVY[Ub'\Yf'ei]'h]b['WfYYf'i dcb'\Yf'fYh]fYa Ybh'' H\ci[\g\Yk\g\Ub`cihgtUb\zib][g\Ua\ghf\ggk\c`Yb^cm\XaU]b[`\Yf`ckbz` a mglgMfgNUbXa miWch\Yg k\Yb kYkYfY [fck]b[idzg\Y\UXbchYbMfYX h\YkcfXcZei |hb| ibh`kYkYfYU`ci hcZh\Y\ci gY''CbWg\YgHfhXz \ck Y Yfzg\Yk Ugdfc`]ÚW

A ma ch Yf lgbch_bck b Zcf gybha YbhU UhUWa Ybhhc cV'YMg' K Ya cj YX gy YfU Ha Ygk ||h||b? Ubg bžhc HM Ubž UbXhc 7f YhZB 9 k \Yb = k Ug | fck ||b|| id" A i Wk UgXlgdcgYXcZ |b cbYk Uncf Ubch Yf k |h YUW a cj Y A mglgMfg UbX=gl: V/a cUb l\YZUMl\UhA ca [chf|XcZ ci f 18 Ugm7\UbI XfYgyg kYkcfYZcfcifUbhYkYXXb[k\Yb=kUg]b\]|\gWcc\"CifUbh\UX 8%b|YWg'Cifach\YfgaUXYU`cZig|XYbhWViYXfYgYgk|h\gc\XViY kUghiHYg]bhYVU<u>W</u>zUddjei fYXk\JHYXUgYgcbhYViYWr`UfzUbXgaU` Wdd gYY Yg |b h Y ÚthYX VcX|W XfYggYg k |l \ Z ``g_|ffg cZ Ugdf|dYXÎ \c`Yn"i ZWIWN Unig\UXhc XYgWiWY``=b hMfa gcZj jej U UddYUzh\YXfYggYgk YfYZ `` cZjUf|YmiUbXhY hifY'H\Y&6b|YWgkYfYh\Y:`ckYf; |f`g\8Ugmi7\Ub`|b` h\Yk\YX\]b["KY`cj\Xh\cg\Xf\yg\Yg\Yg\Yj\K\Ih\Yf\Ach\Yf\bcf\kY[]f`g_bck` k\Yb'h\YXfYggYgXJgUddYUfYXZfca cif\cigYÅcfk\YfYh\YmkYbH'H\Uh k YXX[b[k lg]) \$ mYlfg l[c 'lghg a a Yf]b 7 \ YgMzB YVflg_l'''

H\igiz=Wb\UfXmVY[Y]Yh\Uha ma ca `UMiUm_Ydha mXc```ei]hZfca ` W]X\ccXh\fci [\ 'U` h\cgYa cj Yg' 'A UbmnYufg 'Unf g\Y [U Y]hhc a Y' = \U Y |hUbX |higcbYcZa mifYUg fYgUbX h\Uh=WbUMiU mdi ha m\UbXgcb |hlg=kf||Yh\|g"H\Y'\\$\"L'\\$\"Vi\YU\Xf\Xdf|a\Um\\cfg\Xc\``ei\]h\\\g, Vm VcWgcb lcd XcbY lb fYXd UXgk lh UlMfbUlb gc XfYXVcWg H\Y VVW k ||h ÎVfci | \hhc h\YZfcbh YbX||b| ||g ||b Vi Y'' = h ||g a UVV||bY d|YVX UbX a UW|bY ei | hX cb hY X|U cbU k |h k \ hY hfYX" H\Y d'UX VcWg UfY' ||b| bUi fY ga U` fYXWYWYXd'UX ||b| \Ua z`V|| | Yf fYXWYWYXd'UX []b[\Ua`cb`l\YX]UcbU`UbXUV][[Yf`d`UX]b`fYxz\ViYz\V\\ZmY`ckz\UbX k \]hY' J]g U'm]h]gj Yfm]bhYfYg]b["H\YfY]gbc VUH]b[VYHk YYb h\Yhcd UbX h\YVVVa U_lb['lhij YfmgcZhZcf Umi b[W|Xhc WVVYhc kfUdi dUXc``rhi=' Xc bchfYa Ya VYf d'Unib[k ||\lambda ||\text{hin} ||\text{restricted in the F9A 9A 69F ||\text{hfIZ} \text{h} Una U YggYbgYL = Uhf | Vi hY a m | bhYygn | b FcVyfhU < cfhcb d'UXg hc h | g W | X \ccX ei | h | A Ya cf [Yg W.b `Uzh U@CB; 'ha Y'

H\lgdUhZUž=lf]YXlrc a U_YUa Ya cfmk |l\\ a m| fUbXXU [\lhfz< cdYzU Y' ""=XXV|XXXg\YbYXXXhckUNVaYaU_Y\YfUXc``mei]'h'' G\Y[chhcd]W ci hhY(dUW Ubhei YZMfWWcWgUgkY`UghYZYXgUWVUMb[k\]W kci XVYÎ Vîci [\hhc`h\YZfcbhi``Ug`V]bX]b["`G\Y\YdYXa YWhh\Yh\fYUX UbXaU_YghMYg'G\Yd]WYXgcaYVcWghckcf_k]h\\YfgYZUbXgdYbh U[fYLhXYUcZha Ydihhb[d]bg]bhc \Yf VcW'< Yf Xc`mei]hlgVch\\UbX d]\\X\\bXei]\\X\\gkY`\\gh\\X'`K\\b=\\a'\b\\Y\\ca\\zh\Y\Xc``mei]\h]g j Yfm; |gVYdfcVVVmVYWJ gYg\Y\UgckbYfg\]d |b |lgWbgffi Wqcb"K \Yb = h.]b_cZ\Yfd`Un]b[k]h.h.Yei]hz=Ua `YZhk]h.k.Ufa h.ci[\bg'

Pgdtcumc"Uvcvg" S wknv" I wkn f Dact f"qh"Fktgevqtu

Uwucp" Y gdgt"""""""""""""""""""""""""""""""""""
Ucpftc"Mquej """"""""""""""""""""""""""""""""""""
$\label{eq:NggCpp} \textbf{NggCpp"Ogfwpc"} \textbf{Ugetgvct} \{ 94:63"V"Tf.""""""""""""""""""""""""""""""""""$
$ \begin{array}{l} \textbf{Rcvv}\{ "[qwpi""""""""""""""""""""""""""""""""""""$
$ \begin{array}{l} \textbf{Ujctqp"Enctm""*4pr'\{t+"""""Tgikqp"K"Fktgevqt} \\ 4636"R"Uv0""""""""""""""""""""""""""""""""""$
$Inqtkc"Dgtpcfv"*3""\{t^{""""""""""Tgikqp"K"Fktgevqt344"Ncytgpeg"Tf0"""""""""Jgdtqp."PG"8:592624/98:/8884"""""inqdgtpcfvBjqvockn0eqo$
Lqegn{pp" I tc{"*4pf"{t+"""""""""Tgikqp"KK"Fktgevqt 634"Octvkp"Ft0"P"""""""Dgnngxwg."PG"8:227 624/4;5/539:""""""""""""
Ncwtc"Htcpejkpk"*3""{t+""""Tgikqp"KK"Fktgevqt RQ"Dqz"787"""""""""""Ykupgt."PG"8:9;3 624/74;/54::""""htcpejkpk99Biockn0eqo
Rc o "V j q o cu" *4 ^p f"{t+""""T g i kqp "KKK" F ktgevqt 5;2:"Cxg"G""""""""""""""Mgctpg{."PG"8::69
$\label{eq:continuity} \begin{aligned} & \textbf{Guvjgt"Mngkpmcwh"*3"'}\{t^{\text{"""}}\textbf{Tgikqp"KKK"Fktgevqt}\\ & ; 23"Vqocjcym"Tf"""""Pqtvj"Rncvvg."PG"8; 323\\ & 52:/754/3623""""""""""""""vqujkpfq937Boupleqo \end{aligned}$
$ \begin{array}{l} \textbf{Ucpf} \{ \text{"} \textbf{J} \textbf{cpuqp} """"""""""""""""""""""""""""""""""""$

Ogodgtujkr""kp"""PUS I"""ku"""qrgp"""vq""cnn" kpfkxkfwcnu0""Pgy" o g o dgtu"y knn"eqpvkpwg"vq"dg" y gneq o g f"cv"cp $\{$ "vk o g \emptyset ""Og o dgtu j kru"twp"htq o " Lcpwct { " 3"" v j tqw i j " Fgeg o dgt " 53"0" " Fwgu " ctg " &42022""" rgt""" { gct0"" Rngcug" ugpf" cnn" e j cp i g" qh" cfftguu"kphqtocvkqp"cpf"fwgu"vq"Fctkeg"Egekn<

Fctkeg"Egekn"""""""Og o dgtujkr"Ejckt"PUS I 4847"Tcvjdqpg"Tf0"""""""""Nkpeqnp."PG"8:724" 624/698/;346"""""""""""<u>fegekn B pgd0tt0eq o</u>

Í Pgdtcumc"Uvcvg" Swknv" I wknf



JlghcifkYVghYUbX_YYdWffYbh cbh\YgHLhY[i]XAg YjYbhg UbX"bYkg"

Pgdtcumc"Uvcvg" S wknv" I wkn f Pg y ungvvgt"1"Cfxgtvkukpi

KY''|bj |hY'hY'g Va |gg|cb'cZ'dfYj |ci gmi b! di V|g\YX''''XcWa Yblg'''''UbX''''''dYgcbU' WyffYgdcbXYbW'Zfca'ci f'fYUXfg'''KYfYgYfj YhYf||\h\n'c' di V|g\z |b'k\c'Ycf'|b'dUflz Ubm'Yhhfg cf'g Va |hhX UflyWg kYfYWj Y''K\]YkY WybchiUWydh fYgdcbgV|`|hmZcf'i bgc`|WhX'a Uhf]UzkYkci XVY\Uddntc'fYhifb'|h''lc''|g'Uh\cf''|Z''UgHa dYXz''gYZUXXfYggXYbj YcdY |g|bWXXX'

H\Y'YX|\ref"f\g\fj\gf\\Yf|\\hir UW\dheff\Y\\i U\fy\f\gb| f\ei\gg"5Xgaig\tVei]\hf\Y\b\X' 5Xj\f\gb| "aig\tVg\Va|\h\X\\m\h\Y\88\\ cZ\YUW\df\j|cig\diV]\W\fcb\"ach\z\"]\Y' : Wfi\Um\\$\\\Zcf\h\Y\5df\\diV]\W\fcb\"

 $\begin{array}{l} \textbf{Dgv} | "\textbf{OeOcjqp}" """"" \textbf{Pgyungvvgt}" \textbf{Gfkvqt}" \textbf{PUSI} \\ \textbf{RQ"Dqz": 87"""""""""""" Ykupgt." \textbf{PG"8: 9; 3""} \\ 624/74; /5765""""""" \underline{\textbf{dgv} \mid oeBecdngqpg0pgv} \end{array}$



6C5F8'A=BI H9G

; i]Xa Ya VYfgg\ci XWYWhYBŒ; kWghYZcf'h\YWffYbhUbXdUghVcUfXa]bi h\g Uhwwwhgaboog cf WoblUmBŒ; GYWMUfm @YY5bb'A YXi bUUha YXi bU4 [ha WoYniZcf' UXX|h|cbU']bZcfa Uhcb" ÎK Ufa 'H\ci [\bg' |g Ubch\Yf |h\a' |b a m[i Yghfeca "'C b h\Y WW cZ h]g : fla YX 7fcgg G|hW d|YW XcbY |b %, 'z = XcWa YbhX |lg \graffik Ufa H\ci [\bg UddYUYX Ug UdUhYb |b ÎE i]hXB Yk gYhYff a U Uh|bY |b 5df|z %, \$"H\Y dcYa |g VmA UfW `U6YWHY `UbX YUW gei UfY cZ h\Y Wcgg g|hW VcfXYf fYdfYgYblg Uei |hVcW XYg[b"H\YfY UfY ** ga U `Wcgg g|hW ei]h VcWg ZUa |b| h\Y dcYa `Ugc XcbY |b Wcgg g|hW'' = UXdhXX h\Y cf][|bU dUhYb UX\b[h\fY ci lg|XY VcfXYfg k |h \UbX ei |h|b| cb h\Y ci lg|XY UbX |bg|XYcZh\YhchU VcfXYf XYg[b"H\Ydfc YWhIcc_\%\$\$\ci fg lc Wa d YhY `A m \i g\UbXzA Uj |bza UX\h\YfXXWXI ZUa YZca `fUk kccX" H\]g\% L \% I d|YW |g fY||ghYX k |h h\Y B YWUg UE i |h Dfc YWhUh @cj Y @VYUn#GUhY < |gcf|W CcV|Yhn|b @|bWbzB YWUg U'' < cdYZ `nzi|hk |``VY UdUfhcZ a m W|XYb\ya Ya cf|Yggca YXJh"=\xx\ci Yhc `YJ Ymi k |h h\Y dcYa .

Ktfa H\ci[\lg

@gYlgUei]hi Uei]hlgghh
6dh`gYUbXUei]hgha XVY
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; YbYraigYbai[\hrVeiXxrai
@][\hYbai[\hrVeixhrai agYZYm
GhdhYbai[\hrVeixhrai hyVeihrai
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ÎKUfa H\ci[\hgi [ccihhcU`cZmoiZfca





FUÑYE i] h&\$% î Glifg5WcggBWllg_Ü Ei] h



FUŹŶŢŊĿŶſġUXBchYWſXġUYġŢŢŶŲŲVYY"H\YdſJWZcſUdUWhicZhYbbbchY WſXġſġ~-""H\YfYġlcbġY\UġVYYbhfſſÚW'Ccź[Zmi'\UjYbÑidifWUġXXŊWſŊġcſ WſXġXcbÑikUhhcc^cb[*"J]WmC_icXlġWbYYfYWYXUh('%9%)h\Gfz7fYhzB9* *,'''z(\$&, &*!)\$\$, z̃[g&\$-'+4 k]bXġfYLb "bYh"

G Va JHNX VmJ JWmG_i cXUxx8\$%Ei] hA ca

J=GHB; MIF; I=@8

=žlými f 88%BCE; DrygXxblžkci X`_Yhoj jghlýa Ubni[i] Xghlfci [\ci hih Y gllh y dcggVY]b h Yi dwa]b[a cbh g` D Y gy W bg Xh Yi h b Xb[Ub]bj]h H jcb ho a Y Uhcb Y cZ mi f [Uh Yf]b[g` = kci X`_Y Uci h % a]bi h g cZ mi f Ha Y ho dfca ch Yh Ya]gg cb Ub X Vi gb y g cZ BCE; " = kci X Ugc ` Yho Vf]b[h Y 85% f UZY ei] h Zcf Xgl Uhk \ b = j]gh Ho a U Y Uff Ub [Ya Ybh g d Y Ugy W bh Uhia Y Uh G g b > K Y M Z D C 6cl ' ((ZA] Zcf X B 9 *, (\$) Z (S& +* & & S W ` . (S& * (%(*+) Z g y b \ Y \ Y M (4 nb) cc "Wa" G Va [M X V M G y b K Y M Z B CE; Dryg X b h

9` YWfcb] WBYkg` YhhYf

H\YBCE; "byk g`yHhf` jg U UVYhc BCE; a Ya Vfg jb Ub 'YYMfcb]Vj Yfglcb""H\YUy UhU Yghc fYWj jb imi f byk g`yHhf` jb Ub YYMfcb]Vj Yfglcb UfYh Yd\chcgë [fUd\]Vg UbXHh HUFY bZ "W`cf""5 gc mi Wb\Yd h\YÎ [fYyb Ybj]fcba YbHU YZCfHÏ VniWccg |b[k\Yh\Ycf bchmi kUbhUdf|bHXWdnžef Vnidf|bHb| cb mbYMggImdU Yg""H\YbYk g`yHhf` jg |b UD8: UYUbX mi "k] "bYX5XcVY5WcVhFYXXf hc j Jkk UbX#cf df|bhH\YUY"5XcVY5WcVhFYXXf jg ZYYhc UbmbYk\c kci X`LYhc Xck b`cUXhYgcZkUYZca \www.xadobecom"=Zmi "k]\"e"\YjY h\YYYMfcb]Vj Yfglcb cZhYbbk g`yHhfzd YgYbcHZmi f a Ya Vfg\]d WJf. 8 UJW7YW UbXMW4 bWff'Wa" _

"G BC =B95B8C 58CKG

Cb'xlbi Um) z&\$%@clg; chhyWXJYXUzhf'U`cb[']`bYgg*UbXh\Yei]`hfgcZB WfUg_U\UjY`cghiUXYUf'Zf]YbX'`@clg kUgcbYcZ'h\YÚfghei]`hhYUWfg]b'ci f'UfYU'' < Yf'a chj Uhcb'kUgga d'Y'`hc'g\UfY\Yf'dUgglcb''' G\Y`cj YXh\Y dfcWgg h\YghHW]b['UbXh\YWMUhj Yci hYh/g\Y`cj YXh\Yf]W`\]ghcfmcZei]`h]b['UgUkca Yb\y\fullfubXg\YYgdW]U`m`cj YXh\YWbbYWJcb'VYkYb'kca Yb'UMcggci f'ghUh'

G\YfYMj YXh\Y; c`XYb`H\fYUX5k`UfXžUbX`]b`&\$\$\$ž@c]gk`Ug`]bXi`WMX`]bhc`h\YB`GE; < U``cZ: Ua Y`

@clgsgîcii a gycb h y <] 'i ei] h lo Wygyg XY k ghi Xybhg Zica k Yghnfb 8 ci [`Ug'7 ci bhnz6 `Ufz` Ca U.Uz@b Wyb 'Ubx': f Ya cbh' ' < Yf 'Ubbi U 'ei] h go k g]b `\Yf `\ca Y g\ck Wyg X h Yf k cf_z` UbX g\YZcfa YX 7 chhobk ccXE i] h f gî Ho [] YU 'h YgYk cbXYfZ ``dYcd YUWUbW ho _bck YUW ch Yf I

G\Yk\Ug`Ua Ya VYf`cZ`@|b\W`b`Ei]`Hyfg; i]`Xz`Ca U\UEi]`Hyfg; i]`Xz`UbX`: fYa cbhiDfUff]YD]YWa U_Yfg'``5 ZHf``a cj]b[`hc`Ca U\Uzg\YUgc`g\fjYX\UgDfYg\X\bhcZCa U\UEi]`Hyfg; i]`X'

@c|g`\UX`gYj YfU`V}fVVYg`cZ``]ZY`cb[`ei]`H]b[`Zf]YbXg``Î:f]YbXg`5```5fcibXi`zÎ?bchm@UX]Yg`izUbXÎH\YK`YXbYgXUm;fcidi`gdYbhaUbm\cifgcZZf]YbXg\]d`UbXei]`H]b[`hc[Yh\Yf'

@c|gsgrata|mi\UgaUXYWfHJbih\Uni\Yf``Y[UWnk]```VYfYaYaVYfYX''`H\Ub_ghcih\Yf`[YbYfcghnzih\Yf^@c]g; chlgWi; U`YfnjiUh=EG7A]b@|bWfbk]```dfcachY\Yf``cjYcZei]'h]b[Zcf`[YbYfUhcbghcWaY''

5 'A Ya cf]U': i bX`\Ug`VYYb 'YgHV`]g\YX`]b`\Yf`a Ya cfn'i '8 cbUf]cbg a UniVY`gYbhhc 'h\Y=bhYfbUf]cbU'E i]'h'Qh Xm 7YbhYf 'UbX'A i gYi a z̃% & B c"' ' ^{fX}'Qhz@|bWr`bzB9*,),'!\$,', zXYg[[bUhXZcf h\Y@c]g; chngW'A Ya cf]U': i bX' G Va]hhX VnrDU `YhYDYnYg'UbX'7Ufc` '7fUbghcb

899D9GHGMAD5Hk =9G

CifXYdYghgnadUh]Yg[ccihhcAU]Ub:cgYfz`cb[!h]aYaYaYaVYfcZBCE; "'<Yf\igVUbXz8UYzfYWbhindUgYXUkUhiGnadUh]YghcU`cZ8UYyjZha]nhi8UYkUgaiW`cjYXUbXUddfYWJUhX''<Yk]``VYjYfmaiWa]ggYzbchcb`mWni2gZha]`nzwihVnze[YbXgUbXUggVWHygZfUbXk]XY''ÎKY`cjYmaiAUf]UbYUbXcif\YUflgUYk]hhmai'Ï

G Va]hhX`Vm8Uf]W17W]VZA YaVVfg\]d'7\U]f

88\$ '5B8'88'6'A 9A CF=5@; = H8CB5H=CB

G Va JHNX VmG d,b K YVYfzB GE; 8\$9%DfYg|XYbh

H\fYUXg5VIcggBYVfUg_U&\$%



H\f\Uxg5VicggBVvfUg_U&&%d`Ubg`UfYdfc[f\xgb]b["KYWbh]biYhc`f\W]jYjYbXcffYeiYggZcfH\f\Uxg''6nh\YhaYmiUfYf\Ux]b[h\]gih\Yei]hfYeiYghZcfagZcfh\Yg\ckk]``\UjYVYbYaUjYXhch\YfYdf\xgbhUhjYcZY\W[i]X"=_bckUchcZh\Y[i]XgXcbchaYhcjYfh\YgaaYf''=kciXUddf\y\Uh\]hjZh\Y[i]XfYdf\xgbhUhjYkciXWbhUMaYjZmiXcbchf\W]jYUbnh\]b[UcihY]\]ei]hg''KY\UjYh\Ycddcfhib]hnhcg\ckacfYuf[Yei]hg

h]gnYufVYWIgYcZh\YgdUVYkYk]``\UjY'

FYa Ya Vnf >hbniF Una cbXk] "VYci f ZtUli fYXei] hhf" G\Y]gj Yfmill V|MiXhc g\UY\Yf VMYU]cbgk]h\h\YfYgficZi g'
DYUgYa U_h\YXLhigcZiC VncVnf+/; cbmi f WYbXLf Zcf H\fYUXg5 VncggB YVfUg_U"=hk] "VY\YX]b? YUfbYniLhi
h\Y6i ZtUc 7ci bhm Uff fci bXg]bh\YbYk 9l dcghlcb Vi |X|b["

DYLYYN]b_Uci hij c'i bhYYf]b[hc\Yd"H\YZcfa Zcf'j c'i bhYYf]b[k]``VY]bUZ hi fYbYk gYHYf'



G Va]hhlX`Vm@Y5bbY?]`]cbžH\fYUXg'7\U]f

BŒ; : cfa g5 Di V]V/mi7ca a]lhyY

BCE; `\Lig XJi YcdYX`UbYk `Wa a]lthY hc \Yd dfca chY mi f `cW`UbXh\YgtUhY[i]XUMJi]ltyg `KY\UjYh\YYa U`UXYYggYgZcf U`h\YbYk gdldYfgUbXh\YVfcUMJgigtIt]cbg]b h\YgtUhY `K]h\ h\Ui]b a]bXzkYWb htf[Yiih\YUfYUkY k Ubhlr dfca chYk\YfYUMJi]ltygUfYhU_]b[d'UW' ``8 cYgbNi h\Uigci bX[fYUh***

H\Y cbmh\|b[|g kY bYX MCIF \Yd" KY WbNi [Yhh\Y kcfX cih Wcihh\YgY Whj |h\Yg |Z mi XcbNi [Yhh\Y |bZcfa Uhch hc @Y5bbY?]``]cb Uh`YUghUa cbh\]b Uy UbW' H\|gk|```U`ck ig hc \YJYh\Yha Yhc [Yhh\Y]bZcfa Uhch hc h\YWffYMUYJg" @Y5bbYk|```XfYMh\Y bZcfa Uhch hc

8 Lf]W 7 W}žk \c \ Ligh YXLHW gYgYhi d k]h U`h YgY UXXFYgYg" @Y5 bbY Ugc \ Lig UW gghc U`c W bYk gdldYf h Uh ZWhi FYgUei] hdU YcbW Ua cbh žUbXg\Yk ci XVYk]``]b[hc di hmi f]bZcfa Uljcb h\YfY Ligk Y``

DYLGY\YdigdfcachYh\YUfhcZei]hlb[UbXgddcfhh\YgUhY]bh\]gYbXYUjcf***

G Va]hhyx'Vm@Y5bbY?]``]db



:]fgh7U`Zcf`ClUY: UfK\]hY; `cjYKcf_Yfg

G Va]hhyx`Vm>Ub`G]hh`Yf

FYei Yelg: fca BCE; <]glcf]Ub

D`YlgY\Yd'h\Y`cghiUbXh\YffkUn`\ca\Y``@cghiUYUgWbbYfh\UhkUg'difWUgYXUZ\k\nYUfgU_chcUX]b`UfW]j]b[h\YBCE; g\NUdVcc_gUbXh\Y&\$\$%g\NUdVcc_"``=Zmi`\UjYUbn'WiYhck\YfYh\YgY]h\aga][\h\VYd`Y\UgYWbhU\naY

G Va JHNX VriGLbXfU5bXYfqcb