

,Q RXU VHFRQG DQSL AMZDUMGLERBODHWHGRLURFXOWXUH '73 ZDV SRVLWLYH VXJJH
 VHVV RI EORRG FXOWXUH LQ DEVHQFHQRHFVQSLGQVHDSWLLW DIEDW E QHHQF W HSHR U W FIC
 +HSDULQ IOXVK ZDV FXOWXUH WR ORFRQRUD PLQHDWRIGUEGWEKDY ZORXIRXVRO XWRL E E
 VWHULOH 7KHUH ZDV D +LFNPDQQ FDWREGBHFUHQV ULOV X LZKLV K FRO QZGUR WQEFU LVPL

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|---|--------------------------------------|----------------------|-------------------------|---|---|--------------------------|--|
| -RXUQDO | <HDU SXEOLVKL | SHIHUHQFH QQXPEHU | HIR SDWLHQ | R6RXUFH WEDFWHUHPLD UHSRUWHG | \$QWLELRWLF VHQV LWEXQW\VSDDW VXWQRPH | | |
| -RXUQDO RI OLFURELROJ\ | FOLQLFDO> @ | | | &KORUKH[LG DTXHRXV VRO | LGHQVLWLYH WR XHMDRQOLQ WHWUDF\ WULPHWKRSLP VXOSKDPHWKR[D]ROH | 1RWP LHFQWDRQKIG LYHG | |
| &OLQLFDO 'LVHADVHV | ,QIHFWLRXV> @ | | | ,QWUDYHQRX 5DQLWLGLQH | MRW PHQWLRQHG VROXWLRQ | 1RW PHQWLRQKIG LYHG | |
| -RXUQDO RI OLFURELROJ\ | FOLQLFDO> @ | | | 3RUW D FDW FHIWD]LGLPH | K6HQVLWLYH WR LFLSHSURPLVH DQXUYLYHG | | |
| -RXUQDO RI +HPDWRO 2QFRORJ\ | 3HGLDWU > @ | | | 3RUW D FDW K1RW PHQWLRQHG | FRPSURPLVH PDOLJQDQF\ | DQXUYLYHG | |
| 3HGLDWU -RXUQDO | ,QIHFV 'LV > @ | | | +HSDULQ IOX MRW PHQWLRQHG | 1RW PHQWLRQKIG LYHG | | |
| %UD]LOLDQ LQIHFWLRXV | MRXUQDO GLVHADVH | R> @ | | 'LDO\VLV VIV WD]REDFWDP FHIWULD[RQH FHIHSLPH PHURSHQHP DQG VXOSKDPHWKR[D]ROH | &SURIOR[DFLQ FLSURHOR[DFLQ FHIWD]LGLPH LPLSHQHP WULPHWKRSLP | VXWQRPH LYHG | |
| ,QGLDQ -RXUQDO RI PHGLFDO PLFURELROJ\ | > @ | | | 1RW PHQWLRQ WLJHF\FOLQH | GHQVLWLYH WR FRPSURPLVH PDOLJQDQF\ | DQXUYLYHG | |
| (XURSHDQ FOLQLFDO PLFURELROJ\ LQIHFWLRXV | MRXUQDO RI > @ DQG GLVHADVH | | OXOWLS UHSRUW > @ | OXOWLS UHSRUW VUHSRUW | OXOWLS UHSRUW FDVH UHSRUW | FRPSURPLVH DQXUYLYHG | |

7DEOH DOVWRQLD DFLWVWHMFLDL a %ULHI 5HYLHZ RI /LWHUDWXUH

\$QWLELRWLFV ZKLFK KDYH DWHMFLSHU DEDMCOLO HW DO KDYH UHSRUWHG 9,0
 WD]REDFWDP FHIWULD[RQH FHIHSLPHUORF DFLWVWHMFLDLHFLSUFORBRGDFLQ FR
 WULPD[D]ROH DQG PHURSHQHP > @ \$OVR LW KDV EHHQ UHVHDUEKHG WKDW WKL
 EDFWHULD SURGXFHV PDQ\ EHDW ODFWDPDFHV \$O LPLSKHQH & EUHDNSRO QWV R
 HQ]\PH 2;\$ KDV EHHQ LVRODWHG IURP 5DOVWRQLD > @ SHFHQWV

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|---------------|---|-----------------------|---|---------------------|---|---------------------|
| \$QWLELRWLFV | | LVRODWHLQWHUSUHWDWLRQ | | RODWHLQWHUSUHWDWLRQ | | RODWHLQWHUSUHWDWLRQ |
| \$PLNDFLQ | • | 5 | • | 5 | • | 5 |
| *HQWDPLFLQ | • | 5 | • | 5 | • | 5 |
| &HIWD]LGLPH | | 6 | | 5 | | 6 |
| &HIHSLPH | , | | | 6 | | 6 |
| &,SURIOR[DFLQ | | 6 | | | | |

" pE0\$ 3B... st(P)*igB... TM -pVv%`À ýñ òh@6€ \z7ñ TM%1 `P

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|---|---|---|---|---|---|---|
| &ROLVWLQ | . | 5 | . | 5 | . | 5 |
| ,0,&±PLQLPXP LQKLELWRU\ FRQFHQWUDWLRQ | | | | | | |
| 5 UHVLVWDQW 6 VHQLVLWLYH , LQWHUPHGLDWH | | | | | | |

7DEOH &RPSDULVRQ RI 0,&i EUHDNSRLQWV RI DQWLELRWLFV IRU WКУНН LVRODWHV

\$OVR LW LV ZRUWKZKLOH 5HSURGXFLH\ WKDHWLV 5DOVWRQLD (\$IGLQ +, \$EORRG LQ WКУНН SDWLHQWV FDQQRW EH ZW\FPHGRD\ DQWRQWDE\ 3LFNHWWLL DQG SDWLHQWV ZHUH DGPLWWHG LQ GLIIHUHQW XWL\WLFH SHULRGV RI WКУНН 3RYU \$ &RYK\ DQWLPLFURELDO VXFVHFWLELWLW\ RI DOO WKH VH LVRODWHV ZHUH YDULDEOH >

1RYHO JUDP QHJDWLYH EDFLOOL OLNH 5DOVWRQLD FDVH UHODUHDV\ XUNKROGHULD LVRODWHG IURP LQWHQVLYH FDUH DQG RQFRORJ\ XQLWV \$OO RXU FDVHV FRXOG OLQH DVVRFLDWHG \$Q DWWHPSW WR ORRN LQWR WKH SUREDEOH FDXVH RI WKH LVRODWHV ZDV QRW GLDJQRVWLF DQG ZDV LQFRQFOXVLYH +RZHYHU LQIHFWLRQ FRQWURO SURWRFROV KDYH EHHQ UHLQVWLWXWHG DQG ZH DUH YLJLODQW IRU QHZ FDVHV 7KH OLPLDWRQ RI RXU VWXG\ LV WKH LQDELOLW\ WR VHTXHQFH W WКУНН VWUDLQV 7KLV ZRXOG KDYH VKHG OLJKW RQ WKH H[LVWLQJ KRVS LWDO ZH HSLGHPLRORJ\ 3UHYLRXVO\ EHLQJ UHSRUWHG DV %XUNKROGHULD VSHFLHV DQG UHFHQWO\ DV 5DOVWRQLD HPSKDVL]HV WKH REVHUYDWLRQ WKDW LGHQWLILFDWL QRW HDV\ DQG PLVGLDJQRVLY LV DQ LVVXH ,Q GHYHORSLQJ FRXQWULHV ZKHUH VRSKLVWLFDWHG 0LFURELORJ\ ODERUDWRULHV DUH IDU IURP UHDOLW\ LW LV LPPHQVHO\ GLIILFXOW WR FRUHFWO\ LGHQWL\ WKH VH IRQ IHUPHQWUHV :H KDYH XVHG 9LWHN *1 FDUG IRU LGHQWLILFDWLQJ DQG \$671 SDQHO IRU DQWLPLFURELDO VXFVHFWLELWLW\ 5HSURGXFLH\ RI WKH 9LWHN FRPSDFV V\ VWHP LV ZHOO HVWDEOLVKHG QRZ .QRZOHGJH DERXW ORFDO HSLGHPLRORJ\ DQG WKH VH QRYHO EDFWHULD KDV LPPHQVH VLJQLILFDQFH LQ GHVLJQLQJ LQIHFWLRQ FRQWURO SROLFLHV DQG DQWLELRWLF VWHZDUGVKLS SURJUDPPHV

6WXGLHV OLNH RXUV FDQ FUHDWH DZDUHQHV DQG KHOS LQ UHGXFHQJ DQWLELRWLF UHVLVWDQFH KRVS LWDO DVVRFLDWHG LQIHFWLRQV DQG LPSURY SDWLHQW RXWFRPH

5HIHUHQFHV

&RHQ\H9DQGDPPH 3 /L3XPD - ,QIHFWLRQ E\ 5DOVWRQLD 6SHFLHV LQ &VWLF)LEURVLY 3DWLHQWV ,GHQWLILFDWLQJ RI 5SLFNHWWLL DQG 5PDQQLWROLO\WLF D E\ 3RO\PHUDVH &KDLQ 5HDFWLRQ (PHUJLQJ ,QIHFWLRXV 'LVHDSHV %DWH\DHUW 6 :DWHUV * 9RW BORULV - &RHQ\H 7 &ODVVILFDWLQJ RI 5DOVWRQLD 3LFNHWWLL ELRYDU dWKRPDVLLdVWUDLQV 3LFNHWW DQG RI QHZ LVRODWHV UHODWHG WR QRVFRPLDO UHFHUHQW PHQLQJLWLW DV 5DOVWRQLD PDQQLWROLO\WLF VS QRY ,QW - 6\ VW (YRO 0LFURELRO 'RWLV3ULQWJD 1 2UIDQRX \$ 3DSDWKDQDVLRX (3DSDFKULVWRX) 3HULWRQLWLW GXH WR 5DOVWRQLD PDQQLWROLO\WLF DQ D SHGLDWULF SHULWRQH DGLDO\VLV SDWLHQW 1HZ 0LFURELRO