



**URSA**

UNDERGRADUATE RE

& SCHOLARLY ACTIVITY

!"#\$%&'()\*+,-./0\*1/#2/'0!  
!"3%&4&/35/(%6%'&78\*/'3\*978+./&.)\*-7(#\$(\*)\*! 69 - ;!  
- ""5/.\*6%<+&(\* - =\*>?>@>?>>!

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"#\$!%&'()\*+,-./012'32!42k.52)3'!6, 047!(\*k8\$(\*) , )9\$. : .29;2+!<\$' \$2.8#12)9!8#(12.1/!08+k-k+/!6, <=07! ?#k8#!  
?2'!' +25!k'#\$9!k)!@ABB>!'!+(!';CC(.+>9\$-\$1(C>12)9!k)' +k+;+k()2!kD\$, 04E'!9k-\$.'\$!2)9!. (5;'!; )9\$. : .29;2+!.\$' \$2.8#12)9!8#(12.1/!  
28+k-k+/!C. ( : .2% 'F!' #k'!28+k-k+/!.\$\*\$.'!+(!'+;9\$)+G\*28;1+!/8(1125(.2+k())!k)!#k\$18.\$2+k()!( \*!9k'8kC!k) \$G' C\$8k\*8!2)9!k)+\$.9k'8kC!k)2./!  
3)( ?!\$9:\$F! "#\$!C.k%2./!%\$2)'!5/! ?#k8#!, <=0!\*;1\*k!1!'!k+'!%k' 'k()!2.\$!2!'\*(11(? 'H!!

!

BF I. (-k9\$!\*; )9k):!\*(.!) ;9\$. : .29;2+!'!+;9\$)+!2)9!28;1+/?#(!8(1125(.2+\$!)!)!.\$' \$2.8#12)9!8.\$2+k-\$!C. (J\$8+'!2)9!28+k-k+k\$'K!  
!  
@F =\$. -\$!2!'!2!8!\$2.k):#( ; '\$!\*(.!C. (J\$8+'!+2+!(\*\*\$.!; )9\$. : .29;2+!'!+;9\$)+!2)9!28;1+/(CC(.+; )k+k\$'!+(!8(1125(.2+\$!k)!  
.\$' \$2.8#1(.!8.\$2+k-\$!C. (J\$8+'!2)9!28+k-k+k\$'K!

!

LF 0''k'+! , 04!\*28;1+>!'!+2\*;>!C( '+G9(8+(.2!.\$' \$2.8#12'' (8k2+\$>12)9! : .29;2+!'!+;9\$)+! ?#(!'+.k-\$!+(!8.\$2+\$!(. !%2k)+2k)!  
; )9\$. : .29;2+!.\$' \$2.8#12)9!8.\$2+k-\$!'8#(12.1/!C. ( : .2% 'K!

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MF N.\$2+\$!.\$ : ;!2!.\$-\$)+!+2+!'\$. -\$!2'!-\$); '\$!\*(.!) ;9\$. : .29;2+!'!+;9\$)+!+(!C.\$'\$)+!+#\$k!.\$' \$2.8#12)9!8.\$2+k-\$!C. (J\$8+'!2)9!  
28+k-k+k\$'K!!

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OF N2+21( :!2)9!2.8#k-\$!, 04!; )9\$. : .29;2+!'!+;9\$)+!C2.+k8kC2+k()!k)!.\$' \$2.8#12)9!8.\$2+k-\$!C. (J\$8+'>12!' ?\$!1!2!'!+#!( ;+8(%\$'  
2)9!C. (9;8+'!(\*!+#!('\$!C. (J\$8+'K!2)9!!

!





9F ` 29\$!k)\$!0)9.&\$'\$>!T\$)J2%&!0)9\$. '(>!d.28\$!42.\$!>!W!&\$!` 2.+&)'(>!` 2.&2)2!T\$3'>!0.&2)2!a(C\$D>!"2/1(!  
X\$)9.&83'>!0.&2)2!N2..(!!!6Na 0!p!` ;&87!2.\$!C2.+(!\*, 04R!\C\$.2!g (.3'#(C!C.( :.2%! ?#&8#!? (.3\$9!

!"#\$%&'()\*+,-./0\*1/#&2/'0\*  
!"3%&4&/35/(%6%'&/78\*/'3\*978+./&.)\*-7(#\$#()\*:!\*69-;!  
- =\*>?>@A>>\*E8/..%'4%\*'/'3\*F+/.!'  
!!

BF!!! E+'(#'5%\*(+\*&/#'%\*(8%\*<&+,#.%\*+,\*5'3%&4&/35/(%&%'&/78\*/'3\*78+./&.)\*/7(#\$#()\*!/( \*! - 16!!  
0!\*; )92%\$)+2!2'C\$8+!( \*! , <=OR'!%&'&'&()\*!&'!+(!\$)' ; .\$!+#2+! , 04!' +; 9\$)+>\*28; 1+ />!2)9! +2\*\*!2.\$!2?2.\$!( \*!+#\$(CC(.+; )&+&\$'!  
2-2&125!\$\*(.1; )9\$. : .29; 2+.\$!.\$'2.8#!2)9!8.\$2+&-\$'8#(12.1/!28+&- &+&\$'F!!" ( !288(%C!&'#!+&#k'! : (2!>!+&\$. \$!.\$%2&)'!2)!&8.\$2'\$9!  
\$\*(.+'!+(!C.(% (+\$! , <=0!\*; )9& ) :!(CC(.+; )&+&\$'! - &2!%2&1!6\$F:F!9&.\$8+\$9!\$%2&1'!+(!28#18(1!\$: \$j'8#((!>! , 04G'C()'(.\$9!  
8(%% ; )&82&()\*'!' ; 8#!2'!'#N(.).\$.'+()\$>'!+.2+\$: &8211/!C!28\$9!2) ) ; )8\$%\$)+!'!#.( ; :#(+; +82% C; '>!C.\$'\$)8\$!2)9!C2.+&8&C2&()\*!  
&!) , 04!\$-\$)+!'!6\$F:F!







!"#\$%&'()\*+,-./0"122345164+&7"80227D;"1C1\*97;"1&9"6+613"9+331\*"1 (+ '&6"1C1\*9%9"8L+331\*"0 (6!D")K"1C1\*9"6K2%",+\*"15\$"5+33%=%B75\$++3"1&9"9%21\*6 (%&6B' &46"C46\$4&"%15\$"5+33%=%B75\$++3",+\*"0 EFGFHIFGFF!"

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