

þ j ˆ • ø j T î ~ î _
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DXMN\ ^RN CS^VN 8G 6\SN`JXL
CRN 5SXJV A_VN

1 _ î

ǒ CS^VN 8G

ǒ CS^VN 8G J^ D=2 0]RN`SVVN

ǒ 0M`S]Y\ AYVN

Ø 8 î α = ~ 1 = α T S Ý

?J\UN\ ?YN `SMNY ^SWN]^JWZ ò ò
BNb_JV <S]LYXM_L^ JXM 8X^N\ZN\]YXJV ESYVNXL
^RN 5SXJV A_VNó L_\N^ ?YVSLc S] 2YWZVSJX^à
Jđ BNb_JV <S]LYXM_L^

1 = α T S Y ^ α À s ~ 8 ã = T T

ö 2 Y W Z V J S X ^ J X M = Y ^ S J L J ^ S Y X

Jö B _ Z Z Y \ ^ S ` N < N J] _ \ N] 2 Y W Z V J S X J X ^ J X M A N] Z Y X M N X ^

Kö 8 X O Y \ W J V ? \ Y L N]]

Lö 5 Y \ W J V ? \ Y L N]]

j]•Tî = _α î_ sjα = Ý îα = j_

B_ZZY\^S`N <NJ]_\N] βJZZVSNM ^Y KY^R
ZJ\^SN] OY\ SXOY\WJV JXM OY\WJV YZ^SYX]à
2Y_X]NVSXQ
2Y_\]N OMT_] ^WNX^]
2VJ]] BLRNM_VN
4]LY\^]
FY\U BLRNM_VN
=Y 2YX^JL^ >\MN\]

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ř CS^VN 8G 2YY\MSXJ^Y\ \N[_S\NM ^Y MY J MS]WS
ř CRN C8GB7 KNRJ`SY\ W_] ^ WNN^ ^RN XJ\\YaNM M
Jř 1NRJ`SY\ RJM ^Y YLL_\ SX ^RN DXS^NM B^J^N]
Kř 1NRJ`SY\ RJM ^Y WNN^ JVV ^R\NN]^JXMJ\M]ò BN`N\Nó ?N\
Lř 1NRJ`SY\ RJM ^Y ^JUN ZVJLN aS^RSX JX NM_LJ^SYXJV Z\Y
Sř >H LJWZ_] ZJ\^SN] SX aRSLR JX S]]_N YLL_\ \NM aY_ VM
SSř >X LJWZ_] ZJ\^SN]>N`NX^]>JL^S`S^SN] SXLV_MSXQ \N

S_Ã ~ α = 1 î α = j _

DXKSJ]NM JXM 8WZJ\^SJV ^Y KY^R ZJ\^SN]

SX`N]^SQJ^Y\ WYMNv

0M`JXLN a\S^^NX XY^SLN YO ^RN SX^N\`SNa JXM]L

3_\SXQ ^RN SX^N\`SNa

0M`S]Y\] LJX ^JUN XY^N] ^Y J]U ^RNS\ ZJ\^c JKY_^ VJ^N\

0M`S]Y\] LJXXY^ KN MSJ_Z^S`N Y\ SX^N\]_Z^ ^RN SX^N\`SNa

0M`S]Y\] LJXXY^ JX]aN\ YX KNRJVO YO ^RN ZJ\^c

CRN]N SX^N\`SNa] J\N Û JKY_^ ^RN ZJ\^SN] `XY^ ^RN JM`S]Y\

1N Z\NZJ\NM OY\ ^RN SX^N\`SNa] ^Y SXLV_MN JXM LY`N\ `N\c Nb

KN _XLYWOY\^JKVN

8X`N]^SQJ^Y\] aSVV JV]Y LYVVNL^ N`SMNXLN O\YW ^RN ZJ\^SN]

MYL_WNX^J^SYX JL\Y]] WJXc ZVJ^OY\W]ô JXM `N\KJV JLLY_X^] C

4JLR ZJ\^c WJc Z\N]NX^ N`SMNXLN YX ^RNS\ KNRJVO

4JLR ZJ\^c RJ] J LRJXLN ^Y \N]ZYXM ^Y ^RN N`SMNXLN LYVVNL^

8X`N]^SQJ^Y\ \NZY\^ WJc JV]Y KN \N]ZYXMNM ^Y SX a\S^SXQ Kc

HY_ WJc RNVZ cY_\ ZJ\^c aS^R ^RN]N a\S^^NX \N]ZYX]N] SO ^RN

K_^ ^RNC LJX MNXc cY_\ RNVZ aS^R XY [_N]^SYX] J]UNM

N î • = _ 1

BNb_JV <S]LYXM_L^ 7NJ\SXQ 1YJ\M ß YO WNWKN

α ~ j T ¬ α = j _

8 X O Y \ W J V

< _ ^ _ J V V c J Q \ N N M _ Z Y X Y ^ R N \ a S] N S ^ Q Y N] ^ Y J O Y \ W J V Z

= Y J Z Z N J V Y Z ^ S Y X

4 M _ L J ^ S Y X J V B J X L ^ S Y X] Y X V c

> _ ^ L Y W N] M N V S ` N \ N M S X a \ S ^ S X Q ^ Y K Y ^ R Z J \ ^ S N]

7 N J \ S X Q > N L N \]

3 \ ð 5 Y b ó 1 V J S \ 9 N X U S X] a S V V K N ^ R N M N L S] S Y X W J U N \]

5 Y \ W J V

; S ` N R N J \ S X Q \ N [_ S \ N M S X ^ R N] N L J] N]

0 M ` S] Y \] \ N [_ S \ N M O Y \ N J L R Z J \ ^ c J ^ ^ R N R N J \ S X Q

4 M] J X L ^ S Y X] Z V _]] _] Z N X] S Y X J X M N b Z _ V] S Y X J V V Y a N M R N

> _ ^ L Y W N] M N V S ` N \ N M ^ Y K Y ^ R Z J \ ^ S N] S X a \ S ^ S X Q

B N b _ J V < S] L Y X M _ L ^ 7 N J \ S X Q 1 Y J \ M ^ \ J S X N M 5 J L _ V ^ c J X

B N b _ J V < S] L Y X M _ L ^ 2 J] N] J X M] N \ ` N J] ^ R N M N L S] S Y X W J U N

0 Z Z N J V] J V V Y a N M V N ` N V]

$$\tilde{A} = \tilde{j} \cdot \alpha_j T$$

?J\UN\ ?YN ESMNY CSWN]^JWZ ò ò

0M`S]Y\ 5Y\W

0M`S]Y\] ?VJc J KJLUQ\Y_XM \YVN SX ^RN]N LJ]N

HY_ aYX ^ KN SX^N\`SNaNM

HY_ aYX ^ ^N]^SOc

HY_\]Z NJUSXQ \YVN J^ ^RN RNJ\SXQ aSVV KN VSWS^NM ^Y

YO ^RN ZJ\^c cY_ J\N]_ZZY\^SXQ

HY_ J\N XY^ NXLY_\JQNM XY\ aSVV cY_ KN J]UNM ^Y]RJ\N c

aRSLR cY_ JXM cY_\]NVO \NZ\N]NX^SXQ J ZJ\^SL_VJ\ ZJ\^c

HY_ J\N YXVc JM`S]SXQ]^_MNX^]ó cY_ aSVV XY^ JM`S]N JXc

Z\YLN]]

HY_ J\N ^RN\N ^Y]_ZZY\^ JXM JM`YLJ^N KNLJ_]N cY_ LJ\N J

cY_ JQ\NN aS^R N`N\c JL^SYX ^RN ZJ\^c cY_ J\N]_ZZY\^SXQ

$$j \cdot \hat{i} \alpha = \hat{i}^T j_{\sim} = \alpha \cdot \hat{i} = j_{\sim}$$

80 cY_\ ZJ\^c aJX^] cY_ ^Y J^^NXM J WNN^SXQ Y\ S

£ ¬ ~ α = j _ ~ # #

Öóv Öm " v i " m Ö m " B 7 viÖ§ ó 7 " v ö i
m " m Ö i K Ö ø 7 " B ø " v " B v i m óv " K B n ö

x = j

þ j ¬ • ø j T î ~ î _
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DXMN\ ^RN CS^VN 8G 6\SN`JXL
CRN 5SXJV A_VN

1 _ î

ǒ CS^VN 8G 5SXJV A_VN 2RJXQN]
ǒ D=2 0]RN`SVVN ?\YLMN_\JV 8WZJL^]
ǒ 0ZZNV] AYVN

Ø 8 î α = ~ 1 = α T S Ý

” B N b _ J V < S] L Y X M _ L ^ J X M 8 X ^ N \ Z N \] Y X J V E S Y V N X L
2 Y W Z V S J X ^ ó M N J X S ^ S Y X] R J ` N ^ Y L R J X Q N] Y ^ R Y
J ě B N b _ J V < S] L Y X M _ L ^
K ě B N b _ J V 7 J \]] W N X ^
L ě 8 X ^ N \ Z N \] Y X J V E S Y V N X L N
M ě 5 J L _ V ^ c ó B ^ J H ó J X M B ^ _ M N X ^] J Z Z V S L J ^ S Y X
” C R N 5 S X J V A _ V N S W Z J L ^ N M ^ R N Z \ Y L N M _ \ J V \ N [_
L Y W Z V J S X ^] B C S ^ V N 8 G B N b _ J V 7 J \]] W N X ^ à
J ě C R S] S X L V _ M N] ^ R N \ Y V N ó] L Y Z N J X M Z _ \ Z Y] N Y O J M ` S] Y \]
K ě 8 X L V _ M N] J X J \ \ Y a N \ M N J X S ^ S Y X Y O C 8 G B 7 Y X L J W Z _]
L ě 8 X L V _ M N] J M S] W S]] J V J X J V c] S] J X M J Z Z N J V
M ě ? J \ U N \ ? Y N C S W N] ^ J W Z ě ò F J ^ L R

1 = α T S Y ^ α À s ~ 8 ã = T T

ö 2 Y W Z V J S X ^ J X M = Y ^ S J L J ^ S Y X

Jö B _ Z Z Y \ ^ S ` N < N J] _ \ N] 2 Y W Z V J S X J X ^ J X M A N] Z Y X M N X ^

Kö 8 X O Y \ W J V ? \ Y L N]]

Lö 5 Y \ W J V ? \ Y L N]]

j]•Tî = _α î_ sjα = Ý îα = j_

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” B_ZZY\^S`N <NJ]_\N] βJZZVSNM ^Y KY^R
ZJ\^SN] OY\ SXOY\WJV JXM OY\WJV YZ^SYX]à
| 2Y_X]NVSXQ
| 2Y_\]N OMT_]^WNX^]
| 2VJ]] BLRNM_VN
| 4]LY\^]
| FY\U BLRNM_VN
| =Y 2YX^JL^ >\MN\]
|
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' = ~] = ~ ~ ^ T _ ^ T Ê ~ = ~

ř CS^VN 8G 2YY\MSXJ^Y\ \N[_S\NM ^Y MY J MS]WS
ř CRN C8GB7 KNRJ`SY\ W_] ^ WNN^ ^RN XJ\\YaNM M
Jř 1NRJ`SY\ RJM ^Y YLL_\ SX ^RN DXS^NM B^J^N]
Kř 1NRJ`SY\ RJM ^Y WNN^ JVV ^R\NN]^JXMJ\M]ò BN`N\Nó ?N\
Lř 1NRJ`SY\ RJM ^Y ^JUN ZVJLN aS^RSX JX NM_LJ^SYXJV Z\Y
Sř >H LJWZ_] ZJ\^SN] SX aRSLR JX S]]_N YLL_\ \NM aY_VM
SSř >X LJWZ_] ZJ\^SN]>N`NX^]>JL^S`S^SN] SXLV_MSXQ \N

S_Ã ~ α = 1 î α = j _

” DXKSJ]NM JXM 8WZJ\^SJV ^Y KY^R ZJ\^SN]

” SX`N]^SQJ^Y\ WYMNv

” 0M`JXLN a\S^^NX XY^SLN YO ^RN SX^N\`SNa JXM]L

” 3_\SXQ ^RN SX^N\`SNa

| 0M`S]Y\] LJX ^JUN XY^N] ^Y J]U ^RNS\ ZJ\^c JKY_^ VJ^N\

| 0M`S]Y\] LJXXY^ KN MS]_Z^S`N Y\ SX^N\]_Z^ ^RN SX^N\`SNa

| 0M`S]Y\] LJXXY^ JX]aN\ YX KNRJVO YO ^RN ZJ\^c

| CRN]N SX^N\`SNa] J\N Ū JKY_^ ^RN ZJ\^SN] `XY^ ^RN JM`S]Y\

| 1N Z\NZJ\NM OY\ ^RN SX^N\`SNa] ^Y SXLV_MN JXM LY`N\ `N\c Nb

KN _XLYWOY\^JKVN

| 8X`N]^SQJ^Y\] aSVV JV]Y LYVVNL^ N`SMNXLN O\YW ^RN ZJ\^SN]

MYL_WNX^J^SYX JL\Y]] WJXc ZVJ^OY\W]ô JXM `N\KJV JLLY_X^] C

” 4JLR ZJ\^c WJc Z\N]NX^ N`SMNXLN YX ^RNS\ KNRJVO

| 4JLR ZJ\^c RJ] J LRJXLN ^Y \N]ZYXM ^Y ^RN N`SMNXLN LYVVNL^

| 8X`N]^SQJ^Y\ \NZY\^ WJc JV]Y KN \N]ZYXMNM ^Y SX a\S^SXQ Kc

| HY_ WJc RNVZ cY_\ ZJ\^c aS^R ^RN]N a\S^^NX \N]ZYX]N] SO ^RN

K_^ ^RNC LJX MNXc cY_\ RNVZ aS^R XY [_N]^SYX] J]UNM

$$\tilde{A} = \tilde{j} \cdot \alpha_j T$$

" HY_ W_] ^ SXLV_ MN JM`S]Y\] JXM NX]_ \N ^RNS\ ZJ

" 0M`S]Y\ 5Y\W

" 0M`S]Y\] ?VJc J KJLUQ\Y_XM \YVN SX ^RN]N LJ]N

| HY_ aYX ^ KN SX^N\`SNaNM

| HY_ aYX ^ ^N]^SOc

| HY_ \]Z NJUSXQ \YVN J^ ^RN RNJ\SXQ aSVV KN VSWS^NM ^Y
YO ^RN ZJ\^c cY_ J\N]_ZZY\^SXQ

| HY_ J\N XY^ NXLY_ \JQNM XY\ aSVV cY_ KN J]UNM ^Y]RJ\N c
aRSLR cY_ JXM cY_ \]NVO \NZ\N]NX^SXQ J ZJ\^SL_VJ\ ZJ\^c

| HY_ J\N YXVc JM`S]SXQ]^_MNX^]ó cY_ aSVV XY^ JM`S]N JXc
Z\YLN]]

| HY_ J\N ^RN\N ^Y]_ZZY\^ JXM JM`YLJ^N KNLJ_]N cY_ LJ\N J
cY_ JQ\NN aS^R N`N\c JL^SYX ^RN ZJ\^c cY_ J\N]_ZZY\^SXQ

N î• = _1 ~•α = j_ 6 S_0j•]îT i•j

” CS^VN 8G 2YY\MSXJ^Y\ SJ VNJM 2YY\MSXJ^Y\ OY
Z\YLN]] _Z _X^SV ^RN RNJ\SXQ SJ]LRNM_VNMđ
” 7NJ\SXQ >NLN\] J\N VNJM MNLS]SYX WJUN\] OY\
| FN VSUNX ^RS] ^Y 0MWSXS]^\J^S`N AN]YV_^SYX] Y\ <NMSJ^
| 3SHN\NXLN]đ
v <_^_JV JQ\NNWNX^ ^Y NXQJQN SX ^RS] ^cZN YO RNJ\SX
v <_^_JV JQ\NNWNX^ ^Y SMNX^SJNM]JXL^SYX]
v CRN RNJ\SXQ W_]^ KN VS`N aS^R ^RN ZJ\^SN] JXM ^RN
v CRN RNJ\SXQ YNLN\ W_]^ JVVYa L\Y]] [_N]^SYXSXQ ^R\Y
v >XVc 4M_LJ^SYXJV BJXL^SYX] J\N ZN\WS^^NM XY]_]Z
LYX]SMN\NM
v 58XJV Y_^LYWN]ó aS^R \J^SYXJVN W_]^ KN MYL_WNX^NM
v =Y 0ZZNJV YZ^SYX OY\ NS^RN\ ZJ\^c
v >XLN ^RN LJ]N SJ \N]YV`NMó ^RN\N SJ XY]^JXMSXQ \NL

j _ ø = _ 7

” CS^VN 8G 2YY\MSXJ^Y\ S] VNJM LYY\MSXJ^Y\ YO
8X`N]^SQJ^SYXđ 0X SX`N]^SQJ^S`N \NZY\^ aSVV I
” 7NJ\SXQ >NLN\] JL^ J] VNJM LYXM_L^>RNJ\SXQ Y
YO ^RN Bnb_JV <S]LYXM_L^ 1YJ\M OY\ J VS`N RN
C8G2 S] ^RN\N ^Y]_ZZY\^ JXM Q_SMNó K_^ VN^^M
MYL_WNX^J^SYX LYWN] O\YW ^RN 7NJ\SXQ >NLN\
\N]YV`N LJ]N] ^R\Y_QR ^RN OY\WJV LYWZVJSX^ Z
” 5Y\WJV
| ;S`N RNJ\SXQ \N[_S\NM SX ^RN]N LJ]N]
| 0M`S]Y\] \N[_S\NM OY\ NJLR ZJ\^c J^ ^RN RNJ\SXQ
| 4M]JXL^SYX] ZV_]]_]ZNX]SYX JXM NbZ_V]SYX JVVYaNM RN
| >_^LYWN] MNVS`N\NM ^Y KY^R ZJ\^SN] SX a\S^SXQ <Y\N M
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? J \ UN \ ? Y N ð ò

CR \ NN ß JXM YXVc à KJ]N] OY \ JZZNJV

ð ? \ Y L N M _ \ J V 8 \ \ N Q _ V J \ S ^ c

ð 2 Y X M S L ^ Y O 8 X ^ N \ N] ^ > 1 S J]

ð = N a 4 ` S M N X L N

ë H Y _ L J X X Y ^ Q \ J X ^ J X J Z Z N J V K N L J _] N c Y _ Y \ Y X N Y

V S U N ^ R N Y _ ^ L Y W N ð H Y _ J M N X Y ^ Y L \ Y X ß N b ð S W ß J X S X C

L J] N J X M W J U N J K \ J X M X N a O \ N] R M N L S] S Y X ð H Y _ J

L Y V V N J Q _ N] K J] N M Y X ^ R N Z S N L N] Y O J X J V c] S] J K

i • j ¬ • î T S • • 1 ¬ T î • = α Ê

CRN JZZNVVJX^ W_] ^ ò

đ 8MNX^SOc J Z\YLN M_\JV S\NQ_VJ\S^c

Jđ 0ZZNJV] YNLN\] W_] ^ UXYa ^RN Z\YLN]] SX O_VV SX Y\MN\

Kđ 3S]WS]]JV 0XJvc]S]ó 8X`N]^SQJ^SYXó 7NJ\SXQó JXM A_VSX

LYX]SMN\J^SYX SX MN^N\WSXSXQ S\NQ_VJ\S^SN]

đ <JUN J LJ]N ^RJ^ S^ ß^RN S\NQ_VJ\S^cà JHNL^M

Jđ 8O ^RS] LJX KN Z\Y`NX ^RNX ^RN JZZNVVJX^]RY_VM KN]_

Kđ 8O ^RS] LJXXY^ KN Z\Y`NX ^RN JZZNVVJX^]RY_VM XY^ KN

1Y^R OJL^Y\] RJ`N ^Y KN Z\N]NX^ OY\ J]_LLN]]O_V JZZNJVđ 5JL^Y

YO CS^VN 8G a\JZZNM _Z SX R_WJX N\Y\ K_^ Z\Y`SXQ OJL^Y\

/Éî]•T

CRN SX`N]^SQJ^Y\ JJUNM ^RN \N]ZYXMNX^ ^Y QN^ J
aRY LY_VM]_ZZY\^ RN\ JVSksđ AN]ZYXMNX^ OJSVN
\N]ZYX]SKVN OY\]^JVUSXQđ CRN \N]ZYXMNX^ JZZN

XLN JXM S

RJ`N KNN

$$j_{\beta} = \alpha_j S_{\alpha} \cdot \tilde{\alpha} (= \hat{\alpha})$$

CRN 0ZZNVVJX^ W_]^ò

đ 8MNX^SOc J LYXMSL^ YO SX^N\N]^ Y\ K SJ]

/Éî]•T

8X \N]ZYX]N ^Y L_\N^ N`NX^]ó Z\YON]]Y\ ZNX] JX Y
RJ\J]]WNX^ SX`N]^SQJ^SYX] RJ`N KNLYWN aS^LR R]
O\YW JLL_]J^SYX] ^RJ^ RS] `N\c NbS]^NXLN S] YZZ\

s Ä / Ã = _

CRN 0ZZNVVJX^ W_]^ò

đ 8MNX^SOc XNa N`SMNXLN ^RJ^ aJ] XY^ \NJ]YXJK

MN^N\WSXJ^SYXđ

Jđ <_]^ MNWYX]^ \J^N ^RJ^ ^RN N`SMNXLN aJ] XY^ J`JSVJKVN

Kđ CRS] \N[_S\N] [_N]^SYXSXQ J\Y_XM aRc N`SMNXLN aJ] J`JS

JZZNJV `]đ aRNX ^RN MNLS]SYX aJ] WJMN

Sđ MJc] S] XY^ J VYXQ ^SWN ^Y]_MMNXVc RJ`N XNa N`S

KNOY\N SX]_LR J XJ\\Ya ^SWNO\JWNđ

đ <JUN J LJ]N ^RJ^ S^ JHNL^NM ^RN Y_^LYWN YO ^

Jđ FY_VM ^RN N`SMNXLNó ^RJ^ S] XYa XNaVc J`JSVJKVN aS^R

MSHN\NXLN SX ^RN _VSXQ

' = ǫ 8 = ~ ~ ¬ î Ú ǫ ǫ 8 j ¬ ǫ j] #

? \ J L ^ S L J V 2 Y X] S M N \ J ^ S Y X]

ǫ ; S] ^ ^ R N J V V N Q N M Z Y V S L c ` S Y V J ^ S Y X]

ǫ 2 J ^ J V Y Q _ N ^ R N N V N W N X ^] Y O ^ R Y] N Y H N X] N]

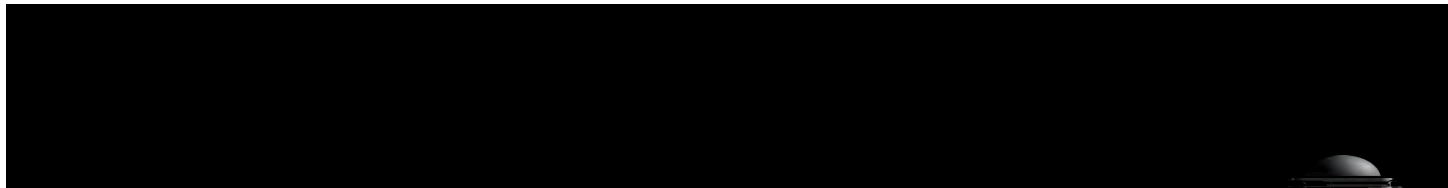
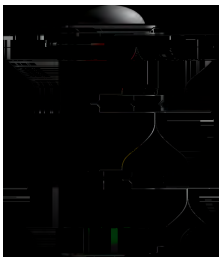
ǫ 2 Y X] S M N \ a R N ^ R N \ ^ R N S]] _ N S W Z J L ^ N M ^ R N N] ^
Z \ N ` N X ^ N M S ^ O \ Y W K N S X Q N] ^ J K V S] R N M Y \ J V V Y

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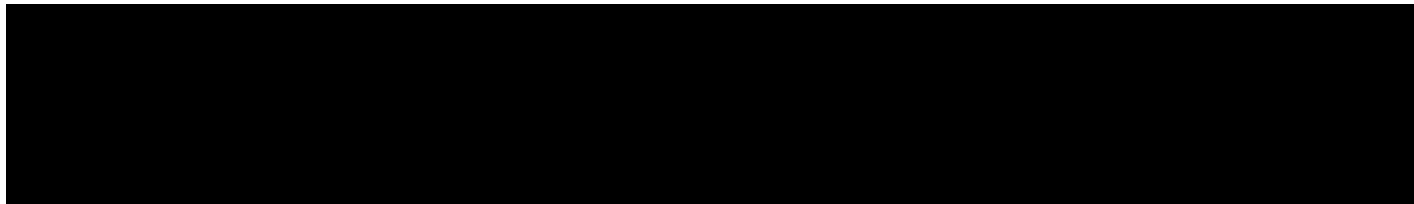
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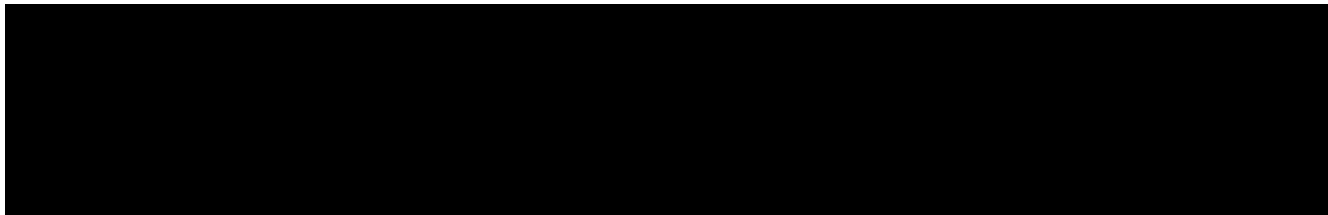
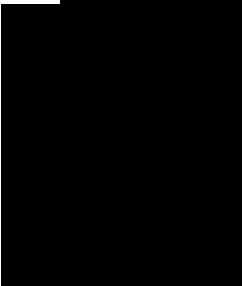
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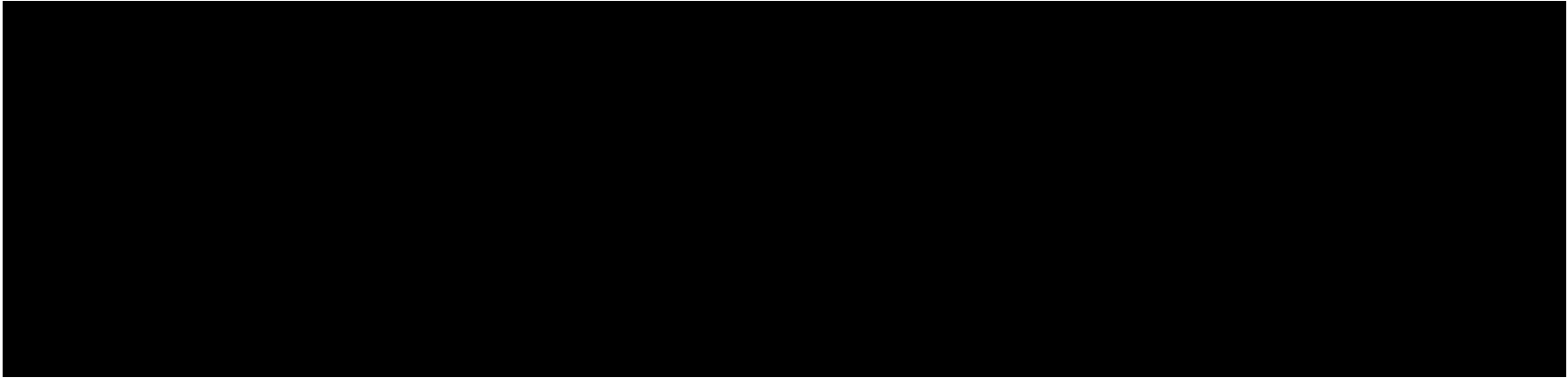
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£ ¬ ~ α = j _ ~ #

DZMJ^N] ^Y ZYVSLc ^Y SXLV_MN ^RN Z\Y_LNM_\JVV
5Y\W] OY\ JZZNJV] JXM \N[_S\NWNX^] aSVV KN]R
JVNMM
4bZNL^NM MJ^N OY\ JVV ^\JSXSXQó ZYVSLSN]ó Z
XNa _VN S] BNZ^NWKN\ ð



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LQYHVWLJDWRUV MRE"

" <HV EXW DV SHUVRQ ZKR UHYLHZV WKH LQYHVW
ZK\ ZKHUH DQG ZKDW OHDG DQ LQYHVWLJDWRU
QRW LV LPSRUWDQW DV LW PD\ FORXG \RXU MXC

” 3URFHVV RI ZHLJKLQJ WKH DFFXUDF\ DQG YHUD
” ,QYHVWLJDWRUV HYDOXDWH WKH VRXUFH WKH
RIIHUHG
” :KHQ VRXUFH FRQWHQW DQG SODXVLELOLW\ D
” &UHGLELOLW\ LV EHVW HVWDEOLVKHG WKURXJK
” &UHGLELOLW\ H[LVWV RQ D SRLQW VFDOH ZI
DQG WKH OHDVW DW
” ORVW HYLGHQFH LV OLHV VRPHZKHUH LQ EHWZH
” ,QYHVWLJDWRUV PXVW GHWHUPLQH ZKHUH EHOL
HQRXJK WR HVWDEOLVK D SROLF\ YLRODWLRQ



” 3RVLWLRQDO /RFDWLRQDO &UHGLELOLW\ &RXOO
WKH\ KHDUG VHH ZKDW WKH\ VDZ RU NQRZ ZKD
SRVLWLRQ RU ORFDWLRQ RI HYHQWV WKDW ZHU
” &UHGHQWLDQV .QRZOHGJH ([SHUWLWH ([SHUWV
HVWDEOLVKHG QRW DVVXPHG
” 1HXWUDOLW\ 7KH PRUH OR\DO D ZLWQHVV LV W
ELDVHG WKHLU HYLGHQFH PD\ EH 1HXWUDO ZLV
SDUWLVDQ ZLWQHVVHV
” ,PSDUWLDOLW\)DLUQHVV
” 2EMHFWLYLW\ \$EVHQFH RI ELDV

1RW DERXW ZLWQHVVHV DJUHHLQJ ZLWK RQH SDUV
HYLGHQWLDU\ VXSSRUW IRU ZKDW D ZLWQHVV FRQ
FRQWHQW DQG SODXVLELWL\

" 6RXUFH ,V WKH SHUVRQ SURYLGGLQJ LQIRUPDWL
KDELWXDO WUXWKIXOQHVV"

" &RQWHQW ,V WKH VXEVWDQFH RI WKH LQIRUPD

" 3ODXVLELWL\ ,V WKH LQIRUPDWLRQ EHLQJ VK



” 7KH XVH RI WZR RU PRUH GDWD SRLQWV WR H[W
SRLQW LV PRUH OLNHO\ WKDQ RWKHU SRVVLELC
| ,I ; DQG < DUH WUXH = LV PRUH OLNHO\ WR EH WUXH WKD
| ([DPSOH 5HSHDW 2IIHQGHUV RI +DUDVVPHQW RU 6H[XDO C
” \$YRLG 0LFUR ([SUHVVLQRQ DQDO\VLV DQG JHVWL
| &URVVLQJ OLPEV ORRNQJ XS WR WKH ULJKW DQG RWKH
EH GDWD SRLQWV

” +DUDVVLQJ EHKDYLRU LI LW LV HVWDEOLVKHG WKDW
SDUW\ ZDV LQIRUPHG LW ZDV XQZHOFRPH WKLW DGGV
DFFRXQW DV FRUURERUDWLYH

” 0DMRU LQFRQVLVWHQFLHV LQ WHVWLPRQ\ :RXOG OLN

” 0LQRU LQFRQVLVWHQFLHV LQ WHVWLPRQ\ :RXOG QRW
SHUVRQ OLHG WR DYRLG SXQLVKPHQW RQ DQ DOFRK
GHHUPLQLQJ LI WKH OLH SURYHV RU GLVSURYHV WK
DOOHJDWLRQ

” 'HOD\V LQ UHSRUWLQJ 'R QRW GHWUDFW IURP FUHGL
WKH SURFHVV GR QRW PHDQ D SHUVRQ LV O\LQJ

”)DOVH 5HSRUWLQJ 7KHUH LV D GLIIHUHQFH EHWZHHQ
DQG DQ DFWXDO YLRODWLRQ RFFXUULQJ WKDW LV QF

YLRODWLRQ



” 1RW NQRZLQJ EHKDYLRU LV XQZHOFRPH LV QRW D GH
VWDQGDUG LQ DVVHVVLQJ LI WKH EHKDYLRU ZRXOG K
RIHQVLYH LV HPSOR\HG

” 7KH IDFW WKDW WKH SHUVRQ ZKR PDGH WKH DOOHJDV
WKH EHKDYLRU ZDV RIIHQVLYH GRHV QRW DIIHFW FUH
| 0DQ\ SHRSOH DUH IHUHXO RI GRLQJ VR
| 7KHUH LV QR REOLJDWLRQ RI WKH UHSRUWLQJ SDU
EHKDYLRU LV RIIHQVLYH

” 0RWLYDWLRQ WR OLH H[DJJHUDWH RU GLVWRUW LQI
GLIIHUHQFHV LQ ZKDW ZDV UHSRUWHG RU TXHVWLRQV

” +RZ PLJKW D UHDVRQDEOH SHUVRQ UHDFW WR V
” :KDW ZDV WKH HIIHFW RI WKH EHKDYLRU RQ WK

\$ SUHSRQGHUHQFH FDQ EH HVWDEOLVKHG VLPSON\
SDUW\ DQG QRW WKH RWKHU EDVHG RQ WKH DVVH
HYLGHQFH SURYLGHG

3HR SOH ZKR KDYH HQJDJHG LQ VH[XDO PLVFRQGGXPF
ZD\ V WKDW GR QRW MXVWLI\ WKHLU DFWLRQV DQG

” ,W ZDV DQ DFFLGHQW , GLGQ¶W PHDQW WR PDM
WRXFKHG WKHLU FURWFK

” , GLGQ¶W NQRZ FRHUFLRQ ZDV D WKLQJ QRU GL

” 6KH ZDV JLYLQJ PH VLJQDOV WKDW OHW PH NQR
EDFN

” 6KH¶V D VOXW VR , DP VXUSULVHG WKDW VKH L

” ,W ZDVQ¶W D ELJ GHDO D VLP SOH NLVV , DP C



)UHG IRQGOHG 6KHOO\¶V EUHDVWV ZLWKRXW FRQV

)UHG DOVR WULHG WR JLYH D KDQGMRE WR %LOO
GLG QRW <

-RH FDPH IRUZDUG DOOHJLQJ WKDW KH EHOLHYHG
VOHHSLQJ LQ)UHG¶V URRP EXW LVQ¶W SRVLWLYH

)UHG OLNHV JLUOV = SRWHQWLDO DV ZH GRQ¶W

%\ WULDQJXODWLQJ ; DQG < , FDQ EHOLHYH WKH

, QYHVWLJDWRU ¶ V 1RWH

, NQRZ WKDW)UHG PD\ OLNH JLUOV ~~EKWUDHORRHZD~~;
QRW UXOH RXW = , W PDNHV = PRUH SODXVLEOH W

, DOVR NQRZ WKDW)UHG KDV IRQGOHG D SHQLV E
QR LGHD DERXW ; DQG < 7KXV = ¶ V EHOLHI WKDW
LQIOXHQFHG E\ DQ\WKLQJ EXW KLV RZQ EHOLHI +
KH FDQ ¶ W VD\ IRU VXUH WKDW WKH FRQGXFWR RFFX

7ULDQJXODWLQJ IURP ; DQG < PDNHV = PRUH OLNH
D SDWWHUQ WKDW)UHG KDV HQDFWHG EHIRUH DQ
FLUXPVWDQFHV WR =

7KLV LV KRZ DEGXFPLYH UHDVRQLQJ IRU WKH LQK
FRPHV IURP ZKDW LQYHVWLJDWRUV NQRZ DERXW ;
ZHLJKW RI = ¶ V HYLGHQFH LWVHOI

6LPLODUO\ LQYHVWLJDWRUV XVH WULDQJXODWLRQ
DQG ; GRQ¶W PDNH = PRUH OLNHO\ EXW = LV DVVH
DUH WXUH = ZLOO IDLO ZKHQ ; DQG < WULDQJXOD
WKDQ WR =

3DUWLHV ZLOO ZDQW WR YHULI\ WKH FUHGHW
 D :KHQ \RX UHFHLYH D UHSRUW IURP DQ LQYHVWLJDWRU W
 \RX FDQ DVN WKH LQYHVWLJDWRUV WR VSHDN WR WKHLU
 ([DPLQH WKH ZD\ WKH LQYHVWLJDWRU DVVHV
 D ,I LW PDNHV VHQVH WKURXJK LQKHUHQW SODXVLELOLW
 WR LGHQWLI\ DV D SDQHO
 'HWHUPLQH LI WKH LQYHVWLJDWRU XVHG D FRQ
 FUHGLELOLW\ RI DOO SDUWLHV DQG ZLWQHVVHV
 D &UHGLELOLW\ VKRXOG EH H[SODLQHG LQ WKH UHSRUW ,I
 IRU RQH SHUVRQ RYHU RWKHUV ZLWKRXW VXIILFLHQW H[S
 DGGUHVHG LQ WKH KHDULQJ
 \$VN WKH ,QYHVWLJDWRU 4XHVWLRQV QRW MXV
 D ,I WKH UHSRUW GRHVQ\W DGG XS \RX KDYH D UHVSROV
 WKH DQVZHU LV QRW VDWLVI\LQJ \RX PD\ MXVWO\ ILQG \R

3DUWLHV KDYH WKH ULJKW WR DVN HDFK RWKHU T

7KH ERDUG LV UHVSQRVLEOH IRU HQVXULQJ WKDW
UHOHYDQW 8QGHUVWDQGLQJ WKDW LUU~~ON~~HYDQW
DSSHUUDQFH DQG SDVW VH[XDO KLVWRU\ DUH QR

5HOHYDQW TXHVWLRQV FDQ FRPH WKURXJK WKH E
GHWDLOV RI HDFK SDUW\ UHJDUGLQJ WKH KRZ ZK

4XHVWLRQV"

þ j ˘ • ø j T î ~ î
N î • = _ 1 ~ Û •



DXMN\ ^RN CS^VN 8G 6\SN`JXL
CRN 5SXJV A_VN

1 _ î

ě CS^VN 8G 5SXJV A_VN 2RJXQN]

ě D=2 0]RN`SVVN ?\YLNM_\JV 8WZJL^]

ě 7NJ\SXQ >NLN\ AYVN DXMN\ ^RN XNa A_VN

1 = α T S Y î α À s ~ 8 ã = T T

ö 2 Y W Z V J S X ^ J X M = Y ^ S J L J ^ S Y X

Jö B _ Z Z Y \ ^ S ` N < N J] _ \ N] 2 Y W Z V J S X J X ^ J X M A N] Z Y X M N X ^

Kö 8 X O Y \ W J V ? \ Y L N]]

Lö 5 Y \ W J V ? \ Y L N]]

j]•Tî = _α î_ sjα = Ý îα = j_

```
” B_ZZY\^S`N <NJ]_\N] βJZZVSNM ^Y KY^R
ZJ\^SN] OY\ SXOY\WJV JXM OY\WJV YZ^SYX]à
| 2Y_X]NVSXQ
| 2Y_\]N OMT_]^WNX^]
| 2VJ]] BLRNM_VN
| 4]LY\^]
| FY\U BLRNM_VN
| =Y 2YX^JL^ >\MN\]
|
```

' = ~] = ~ ~ ^ T _ ^ T Ê ~ = ~

ě CS^VN 8G 2YY\MSXJ^Y\ \N[_S\NM ^Y MY J MS]WS
ě CRN C8GB7 KNRJ`SY\ W_] ^ WNN^ ^RN XJ\\YaNM M
Jě 1NRJ`SY\ RJM ^Y YLL_\ SX ^RN DXS^NM B^J^N]
Kě 1NRJ`SY\ RJM ^Y WNN^ JVV ^R\NN]^JXMJ\M]ò BN`N\Nó ?N\
Lě 1NRJ`SY\ RJM ^Y ^JUN ZVJLN aS^RSX JX NM_LJ^SYXJV Z\Y
Sě >H LJWZ_] ZJ\^SN] SX aRSLR JX S]]_N YLL_\ \NM aY_VM
SSě >X LJWZ_] ZJ\^SN]>N`NX^]>JL^S`S^SN] SXLV_MSXQ \N
ě 3S]WS]]NM LYWZVJSX^] _XMN\ CS^VN 8G LJX]^S
ZYVSLSN] VSUNVc JZZVSLJKVN ^Y 7_WJX AN]Y
2YWW_XS^c B^JXMJ\M]
ě ?J\UN\ ?YN CSWN]^JWZ ò ò F0C27

$$\tilde{A} = \tilde{j} \cdot \alpha_j T$$

" HY_ W_] ^ SXLV_ MN JM`S]Y\] JXM NX]_ \N ^RNS\ ZJ

" 0M`S]Y\ 5Y\W

" 0M`S]Y\] ?VJc J KJLUQ\Y_XM \YVN SX ^RN]N LJ]N

| HY_ aYX ^ KN SX^N\`SNaNM

| HY_ aYX ^ ^N]^SOc

| HY_ \]Z NJUSXQ \YVN J^ ^RN RNJ\ SXQ aSVV KN VSWS^NM ^Y
YO ^RN ZJ\^c cY_ J\N]_ ZZY\^SXQ

| HY_ J\N XY^ NXLY_ \JQNM XY\ aSVV cY_ KN J]UNM ^Y]RJ\N c
aRSLR cY_ JXM cY_ \]NVO \NZ\N]NX^SXQ J ZJ\^SL_VJ\ ZJ\^c

| HY_ J\N YXVc JM`S]SXQ]^_ MNX^]ó cY_ aSVV XY^ JM`S]N JXc
Z\YLN]]

| HY_ J\N ^RN\N ^Y]_ ZZY\^ JXM JM`YLJ^N KNLJ_]N cY_ LJ\N J
cY_ JQ\NN aS^R N`N\c JL^SYX ^RN ZJ\^c cY_ J\N]_ ZZY\^SXQ

S_Ã ~ α = 1 î α = j _

” DXKSJ]NM JXM 8WZJ\^SJV ^Y KY^R ZJ\^SN]

” SX`N]^SQJ^Y\ WYMNV

” 0M`JXLN a\S^^NX XY^SLN YO ^RN SX^N\`SNa JXM]L

” 3_\SXQ ^RN SX^N\`SNa

| 0M`S]Y\] LJX ^JUN XY^N] ^Y J]U ^RNS\ ZJ\^c JKY_^ VJ^N\

| 0M`S]Y\] LJXXY^ KN MS]_Z^S`N Y\ SX^N\]_Z^ ^RN SX^N\`SNa

| 0M`S]Y\] LJXXY^ JX]aN\ YX KNRJVO YO ^RN ZJ\^c

| CRN]N SX^N\`SNa] J\N Û JKY_^ ^RN ZJ\^SN] `XY^ ^RN JM`S]Y\

| 1N Z\NZJ\NM OY\ ^RN SX^N\`SNa] ^Y SXLV_MN JXM LY`N\ `N\c Nb

KN _XLYWOY\^JKVN

| 8X`N]^SQJ^Y\] aSVV JV]Y LYVVNL^ N`SMNXLN O\YW ^RN ZJ\^SN]

MYL_WNX^J^SYX JL\Y]] WJXc ZVJ^OY\W]ô JXM `N\KJV JLLY_X^] C

” 4JLR ZJ\^c WJc Z\N]NX^ N`SMNXLN YX ^RNS\ KNRJVO

| 4JLR ZJ\^c RJ] J LRJXLN ^Y \N]ZYXM ^Y ^RN N`SMNXLN LYVVNL^

| 8X`N]^SQJ^Y\ \NZY\^ WJc JV]Y KN \N]ZYXMNM ^Y SX a\S^SXQ Kc

| HY_ WJc RNVZ cY_\ ZJ\^c aS^R ^RN]N a\S^^NX \N]ZYX]N] SO ^RN

K_^ ^RNC LJX MNXc cY_\ RNVZ aS^R XY [_N]^SYX] J]UNM

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!K 4BK' ÖđK}v ù1}ù"óÖv"KBm }Bù i v

"Öi4 i "K Á"ù K !"? mvÖ?e ÓİõÔ∅

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>X 5\SMJcò

” 7NJ\SXQ >NLN\ AYVN SX 8XOY\WJV ?\YLN]]

” 7NJ\SXQ >NLN\ AYVN SX 5Y\WJV ?\YLN]]

” BLNXJ\SY A_X ^R\Y_QR

N î• = _ 1 ~• α = j _ 6 S _ 0 j •] î T i • j

” CS^VN 8G 2YY\MSXJ^Y\ SJ VNJM 2YY\MSXJ^Y\ OY
Z\YLN]] _Z _X^SV ^RN RNJ\SXQ SJ]LRNM_VNMđ
” 7NJ\SXQ >NLN\] J\N VNJM MNLS]SYX WJUN\] OY\
| FN VSUNX ^RS] ^Y 0MWSXS]^\J^S`N AN]YV_^SYX] Y\ <NMSJ^
| 3SHN\NXLN]đ
v <_^_JV JQ\NNWNX^ ^Y NXQJQN SX ^RS] ^cZN YO RNJ\SX
v <_^_JV JQ\NNWNX^ ^Y SMNX^SJNM]JXL^SYX]
v CRN RNJ\SXQ W_]^ KN VS`N aS^R ^RN ZJ\^SN] JXM ^RN
v CRN RNJ\SXQ YNLN\ W_]^ JVVYa L\Y]] [_N]^SYXSXQ ^R\Y
v >XVc 4M_LJ^SYXJV BJXL^SYX] J\N ZN\WS^^NM XY]_]Z
LYX]SMN\NM
v 58XJV Y_^LYWN]ó aS^R \J^SYXJVN W_]^ KN MYL_WNX^NM
v =Y 0ZZNJV YZ^SYX OY\ NS^RN\ ZJ\^c
v >XLN ^RN LJ]N SJ \N]YV`NMó ^RN\N SJ XY]^JXMSXQ \NL

α 7 _ _ = _ 1 î _ S _ 0 j •] î T g = Ñ N î • =

8XS^SJV B^NZ] ß2YWZVN^NM Kc C8G2à

Y\

j _ ø = _ 7

7NJ\SXQ

- " DJN ^RN RNJ\SXQ jL\SZ^ ^Y WJUN SX^\YM_L^Y\c \NWJ\U] JXM NbZVJSX RNJ\SXQ V
- " 0]U NJLR ZJ^\c aRJ^ Y_^LYWN ^RNc J\N RYZSXQ OY\ Kc NXQJQSQ SX ^RN SXOY
- " 0VVYa KY^R ZJ^\SN] ^Y \NLY_X^ ^RNS\ j^Y\SN]ó J]U cY_\ Z\NZJ\NM Y\ OYVVYa _Z
- " 0VVYa OY\ L\Y]] [_N]^SYXSXQ Kc ^RN ZJ^\SN] JM`S]Y\]đ
- " 0O^N\ NJLR L\Y]] [_N]^SYX ZY]NM Kc J ZJ^\c] JM`S]Y\ó MN^N\WSXN aRN^RN\ ^Y J
OY\ JXc NbLV_]SYXđ

?Y]^ 7NJ\SXQ CJ]U]

RN
SYX

j _ ø = _ 7

” CS^VN 8G 2YY\MSXJ^Y\ S] VNJM LYY\MSXJ^Y\ YO
8X`N]^SQJ^SYXđ 0X SX`N]^SQJ^S`N \NZY\^ aSVV I
” 7NJ\SXQ >NLN\] JL^ J] VNJM LYXM_L^>RNJ\SXQ Y
YO ^RN Bnb_JV <S]LYXM_L^ 1YJ\M OY\ J VS`N RN
C8G2 S] ^RN\N ^Y]_ZZY\^ JXM Q_SMNó K_^ VN^^M
MYL_WNX^J^SYX LYWN] O\YW ^RN 7NJ\SXQ >NLN\
\N]YV`N LJ]N] ^R\Y_QR ^RN OY\WJV LYWZVJSX^ Z
” 5Y\WJV
| ;S`N RNJ\SXQ \N[_S\NM SX ^RN]N LJ]N]
| 0M`S]Y\] \N[_S\NM OY\ NJLR ZJ\^c J^ ^RN RNJ\SXQ
| 4M]JXL^SYX] ZV_]]_]ZNX]SYX JXM NbZ_V]SYX JVVYaNM RN
| >_^LYWN] MNVS`N\NM ^Y KY^R ZJ\^SN] SX a\S^SXQ <Y\N M
|

α 7 _ _ = _ 1 î Fj•]îT g=Ã N î•=_ 1

8XS^SJV B^NZ] ß2YWZVN^NM Kc ^RN C8G2à

8XS^SJV B^NZ] ß2YWZVN^NM Kc ^RN 7>à

8XS^SJV B^NZ] ß2YWZVN^NM Kc ^RN B<71à

" DJN NVNWNX^] YO ^RN Z\YRSKS^NM LYXM_L^ MNJXS^SYXß]à ^Y Q_SMN cY_\ Z\NZ

j _ ø = _ 7

? \ N 7 N J \ S X Q ß 7 > à

j _ ø = _ 7

7NJ\SXQ ß7>à

SXQ

j _ ø = _ 7

?Y] ^ 7NJ \SXQ ß7 > à

" 1N J`JSVJKVN ^Y Z\Y`SMN jJXL^SYX LYX]_V^J^SYX ^Y ^RN B<71 aRNX JZZVSLJJKV
" ANLNS`N ^RN MYL_WNX^ L\JO^NM Kc ^RN B<71 ^RJ^ Z\Y`SMN] ^RN \J^SYXJVN OY
" 2\JO^ ^RN JXJV Y_^LYWN VN^^N\ KJJNM YX ^R SQ YMYN`SMNaó
" >XLN \N`SNaNMó jNXM ^RN 5SXJV >_^LYWN ;N^^N\ó aS^R JZZNVVJ^N SXOY\WJ^SY

?Y] ^ 7NJ \SXQ ßB<71 à

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?J\UN\ ?YN

CSWN]^JWZ

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q = ~ TTî_ j¬~

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" 0^^Y\XNc 5Y\W      1NSXQ _ZMJ^NM
" 54A?0 5Y\W      1NSXQ _ZMJ^NM
" B<8?E ?YVSLc    DZMJ^NM Kc BZ\SXQ BNWN]^N\
" 0ZZNJV]
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@_N]^SYX]ú

þ j ¬ • ø j T î ~ î
N î • = _ 1 ~ Û •



DXMN\ ^RN CS^VN 8G 6\SN`JXL
CRN 5SXJV A_VN

B < 7 1

1 _ î

ǒ CS^VN 8G 5SXJV A_VN 2RJXQN]

1 = α T S Y ^ α À s ~ 8 Ñ = T T

ö 2 Y W Z V J S X ^ J X M = Y ^ S J L J ^ S Y X

Jö B _ Z Z Y \ ^ S ` N < N J] _ \ N] 2 Y W Z V J S X J X ^ J X M A N] Z Y X M N X ^

Kö 8 X O Y \ W J V ? \ Y L N]]

Lö 5 Y \ W J V ? \ Y L N]]

j]•Tî = _α î_ sjα = Ý îα = j_

```
” B_ZZY\^S`N <NJ]_\N] βJZZVSNM ^Y KY^R
ZJ\^SN] OY\ SXOY\WJV JXM OY\WJV YZ^SYX]à
| 2Y_X]NVSXQ
| 2Y_\]N OMT_]^WNX^]
| 2VJ]] BLRNM_VN
| 4]LY\^]
| FY\U BLRNM_VN
| =Y 2YX^JL^ >\MN\]
|
```

' = ~] = ~ ~ ^ T _ ^ T Ê ~ = ~

ř CS^VN 8G 2YY\MSXJ^Y\ \N[_S\NM ^Y MY J MS]WS
ř CRN C8GB7 KNRJ`SY\ W_] ^ WNN^ ^RN XJ\\YaNM M
Jř 1NRJ`SY\ RJM ^Y YLL_\ SX ^RN DXS^NM B^J^N]
Kř 1NRJ`SY\ RJM ^Y WNN^ JVV ^R\NN]^JXMJ\M]ò BN`N\Nó ?N\
Lř 1NRJ`SY\ RJM ^Y ^JUN ZVJLN aS^RSX JX NM_LJ^SYXJV Z\Y
Sř >H LJWZ_] ZJ\^SN] SX aRSLR JX S]]_N YLL_\ \NM aY_VM
SSř >X LJWZ_] ZJ\^SN]>N`NX^]>JL^S`S^SN] SXLV_MSXQ \N
ř 3S]WS]]NM LYWZVJSX^] _XMN\ CS^VN 8G LJX]^S
ZYVSLSN] VSUNVc JZZVSLJKVN ^Y 7_WJX AN]Y
2YWW_XS^c B^JXMJ\M]
ř ?J\UN\ ?YN CSWN]^JWZ ò ò F0C27

$$\tilde{A} = \tilde{j} \cdot \alpha_j T$$

" HY_ W_] ^ SXLV_ MN JM`S]Y\] JXM NX]_ \N ^RNS\ ZJ

" 0M`S]Y\ 5Y\W

" 0M`S]Y\] ?VJc J KJLUQ\Y_XM \YVN SX ^RN]N LJ]N

| HY_ aYX ^ KN SX^N\`SNaNM

| HY_ aYX ^ ^N]^SOc

| HY_ \]Z NJUSXQ \YVN J^ ^RN RNJ\ SXQ aSVV KN VSWS^NM ^Y
YO ^RN ZJ\^c cY_ J\N]_ ZZY\^SXQ

| HY_ J\N XY^ NXLY_ \JQNM XY\ aSVV cY_ KN J]UNM ^Y]RJ\N c
aRSLR cY_ JXM cY_ \]NVO \NZ\N]NX^SXQ J ZJ\^SL_VJ\ ZJ\^c

| HY_ J\N YXVc JM`S]SXQ]^_ MNX^]ó cY_ aSVV XY^ JM`S]N JXc
Z\YLN]]

| HY_ J\N ^RN\N ^Y]_ ZZY\^ JXM JM`YLJ^N KNLJ_]N cY_ LJ\N J
cY_ JQ\NN aS^R N`N\c JL^SYX ^RN ZJ\^c cY_ J\N]_ ZZY\^SXQ

S_Ã ~ α = 1 î α = j _

” DXKSJ]NM JXM 8WZJ\^SJV ^Y KY^R ZJ\^SN]

” SX`N]^SQJ^Y\ WYMNv

” 0M`JXLN a\S^^NX XY^SLN YO ^RN SX^N\`SNa JXM]L

” 3_\SXQ ^RN SX^N\`SNa

| 0M`S]Y\] LJX ^JUN XY^N] ^Y J]U ^RNS\ ZJ\^c JKY_^ VJ^N\

| 0M`S]Y\] LJXXY^ KN MS]_Z^S`N Y\ SX^N\]_Z^ ^RN SX^N\`SNa

| 0M`S]Y\] LJXXY^ JX]aN\ YX KNRJVO YO ^RN ZJ\^c

| CRN]N SX^N\`SNa] J\N Û JKY_^ ^RN ZJ\^SN] `XY^ ^RN JM`S]Y\

| 1N Z\NZJ\NM OY\ ^RN SX^N\`SNa] ^Y SXLV_MN JXM LY`N\ `N\c Nb

KN _XLYWOY\^JKVN

| 8X`N]^SQJ^Y\] aSVV JV]Y LYVVNL^ N`SMNXLN O\YW ^RN ZJ\^SN]

MYL_WNX^J^SYX JL\Y]] WJXc ZVJ^OY\W]ô JXM `N\KJV JLLY_X^] C

” 4JLR ZJ\^c WJc Z\N]NX^ N`SMNXLN YX ^RNS\ KNRJVO

| 4JLR ZJ\^c RJ] J LRJXLN ^Y \N]ZYXM ^Y ^RN N`SMNXLN LYVVNL^

| 8X`N]^SQJ^Y\ \NZY\^ WJc JV]Y KN \N]ZYXMNM ^Y SX a\S^SXQ Kc

| HY_ WJc RNVZ cY_\ ZJ\^c aS^R ^RN]N a\S^^NX \N]ZYX]N] SO ^RN

K_^ ^RNC LJX MNXc cY_\ RNVZ aS^R XY [_N]^SYX] J]UNM

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$$\begin{aligned}
 \hat{E}^{-1} \hat{T} q &= \tilde{j}_- \alpha \hat{i}_- S_- \alpha \dots \tilde{j}_- \\
 x &= jT \quad ijT = \hat{E}
 \end{aligned}$$

$\mathbb{R} \hat{A} \hat{0} \hat{z} i Q \hat{0} \# / 36 > c \hat{A} \hat{S} \wedge \hat{Q} \wedge \hat{N} \hat{S} \hat{a} \hat{\#} i Q_6 \cdot '2 '2 \hat{j} \hat{T} \hat{g}' \hat{C} \hat{E} \hat{C} \hat{P} \cdot \hat{C} \hat{Q} \hat{C} \hat{W} \hat{P} u1)3\& \quad 0 \hat{a} \hat{`} \hat{a} 0 1! \quad ijT =$

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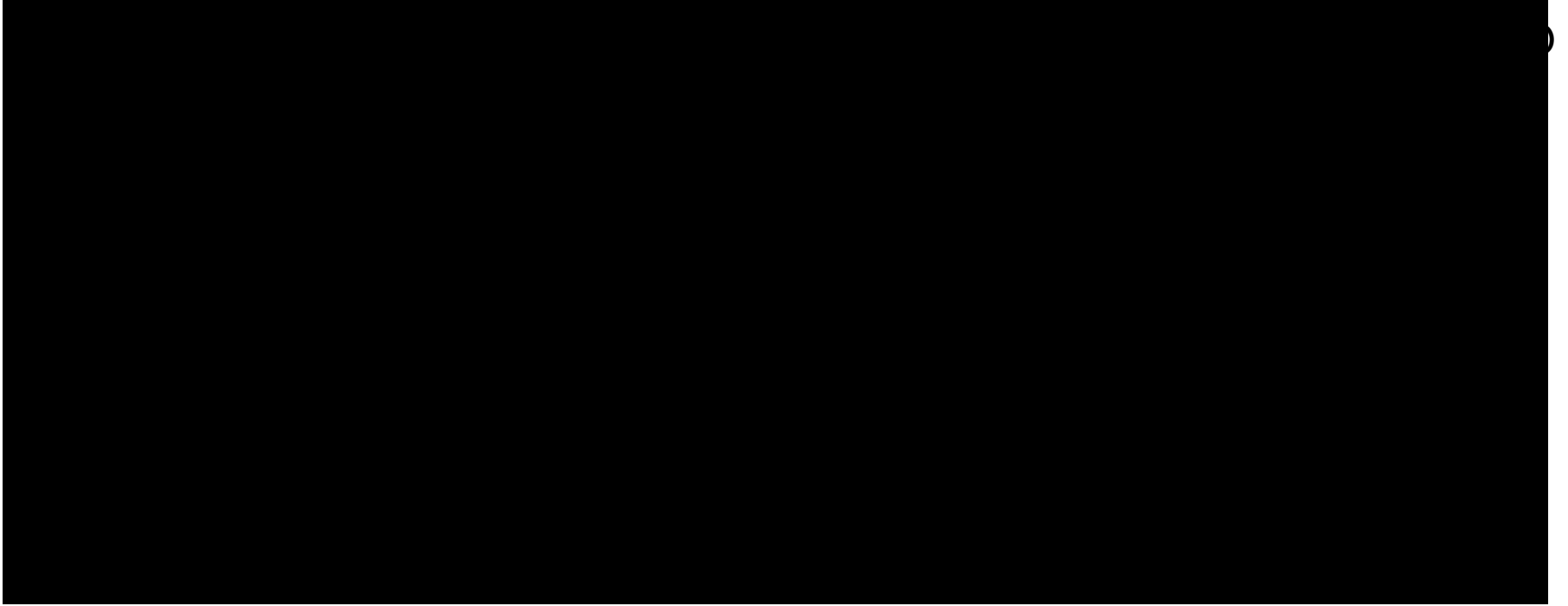
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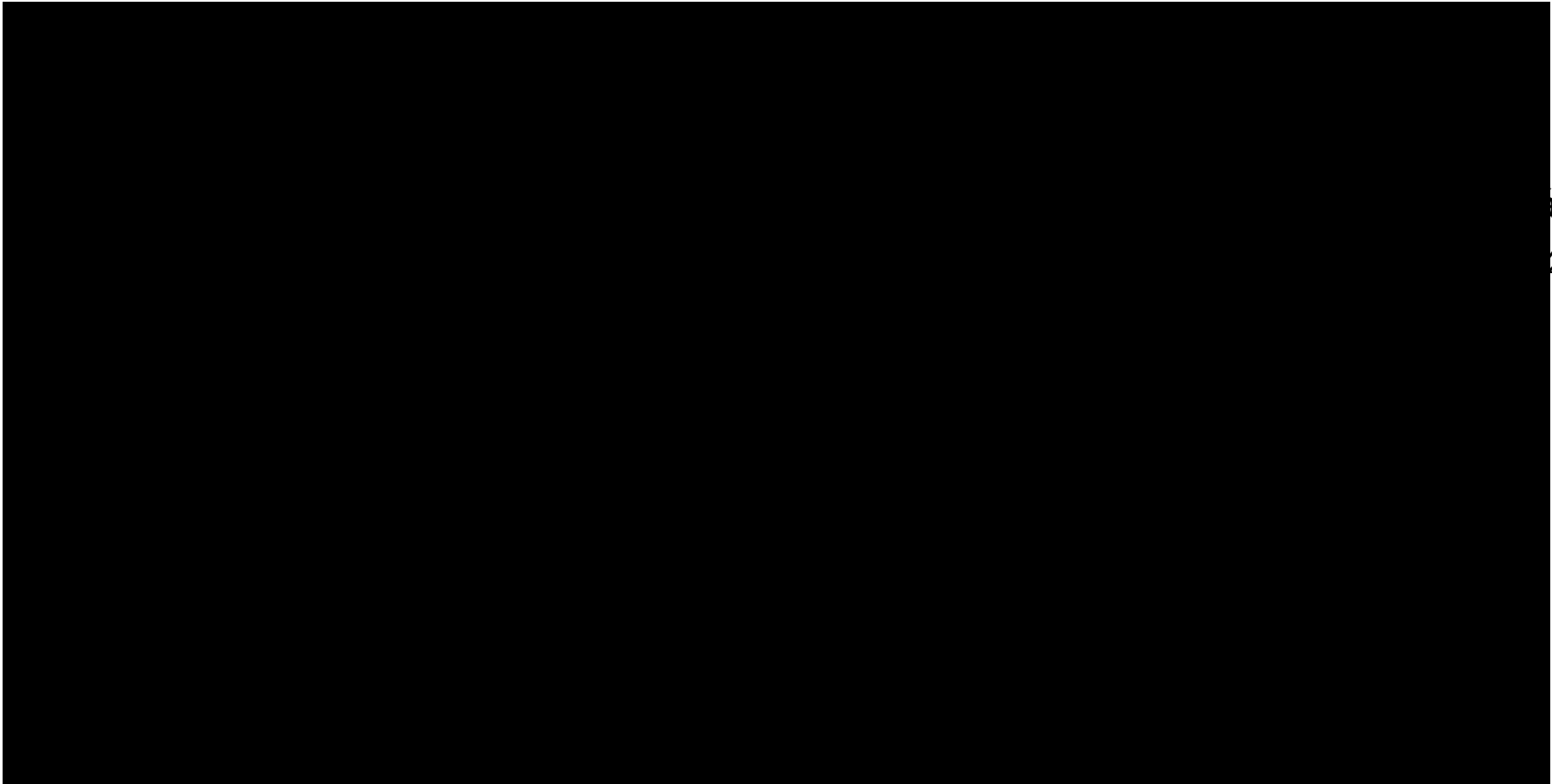
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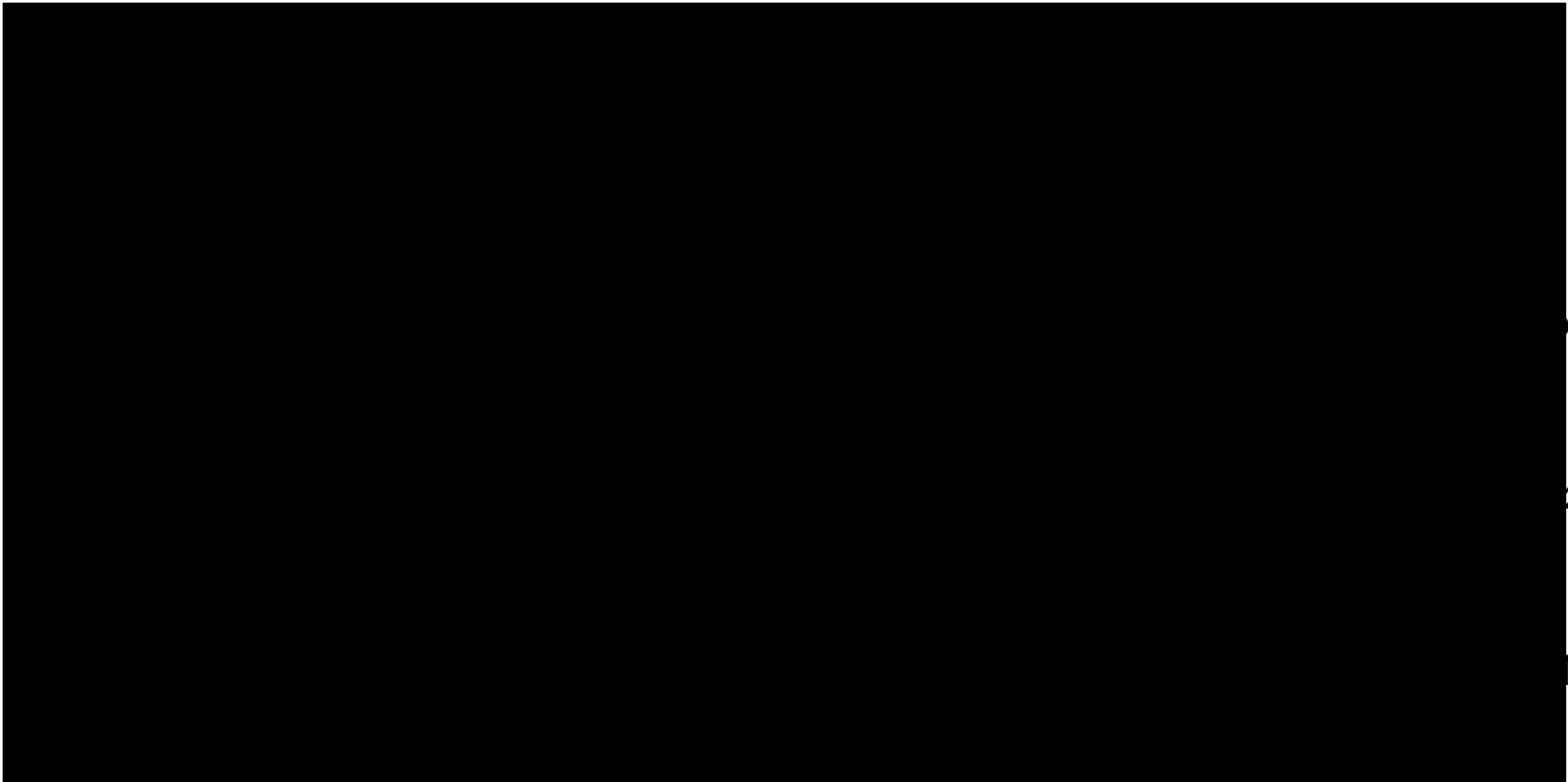
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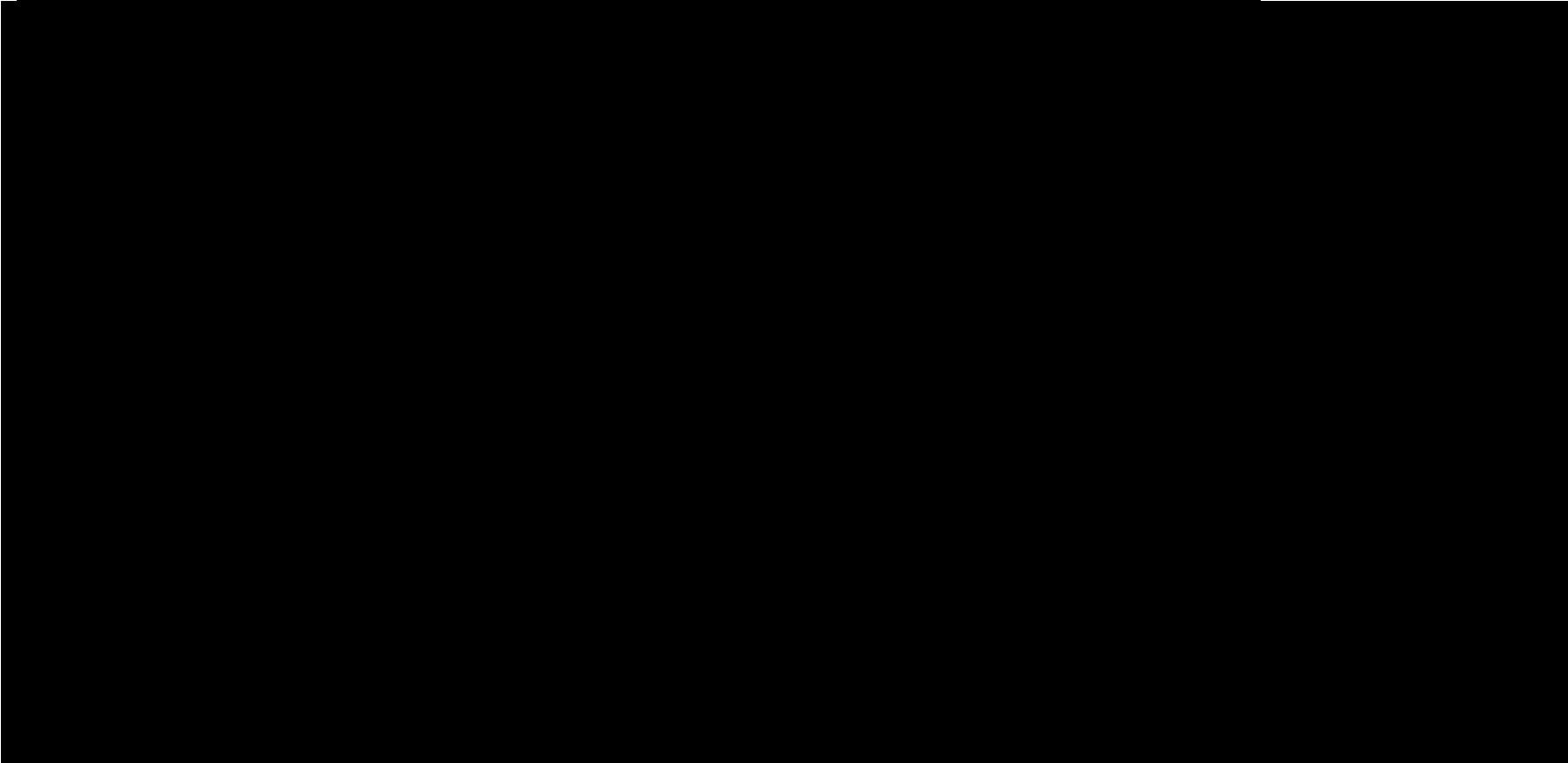
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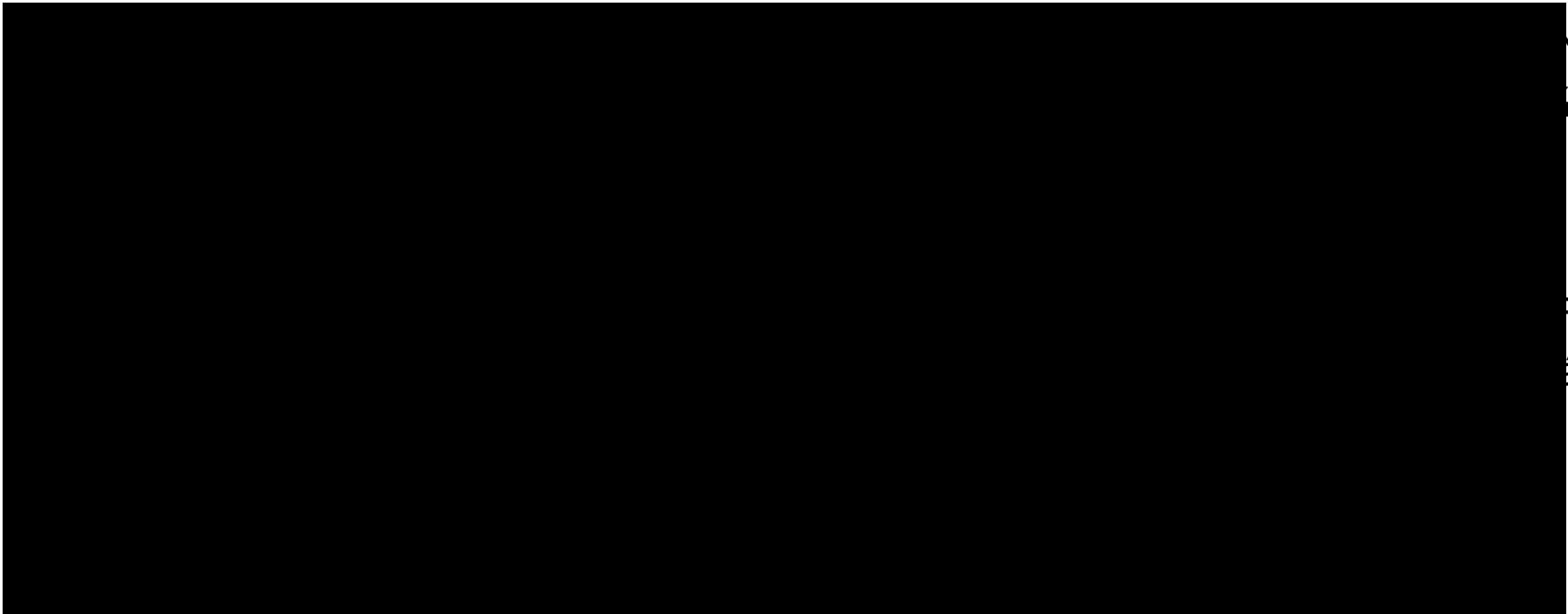
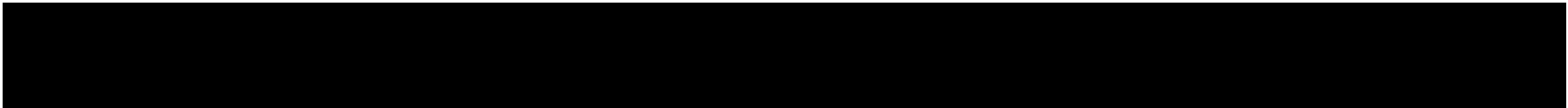
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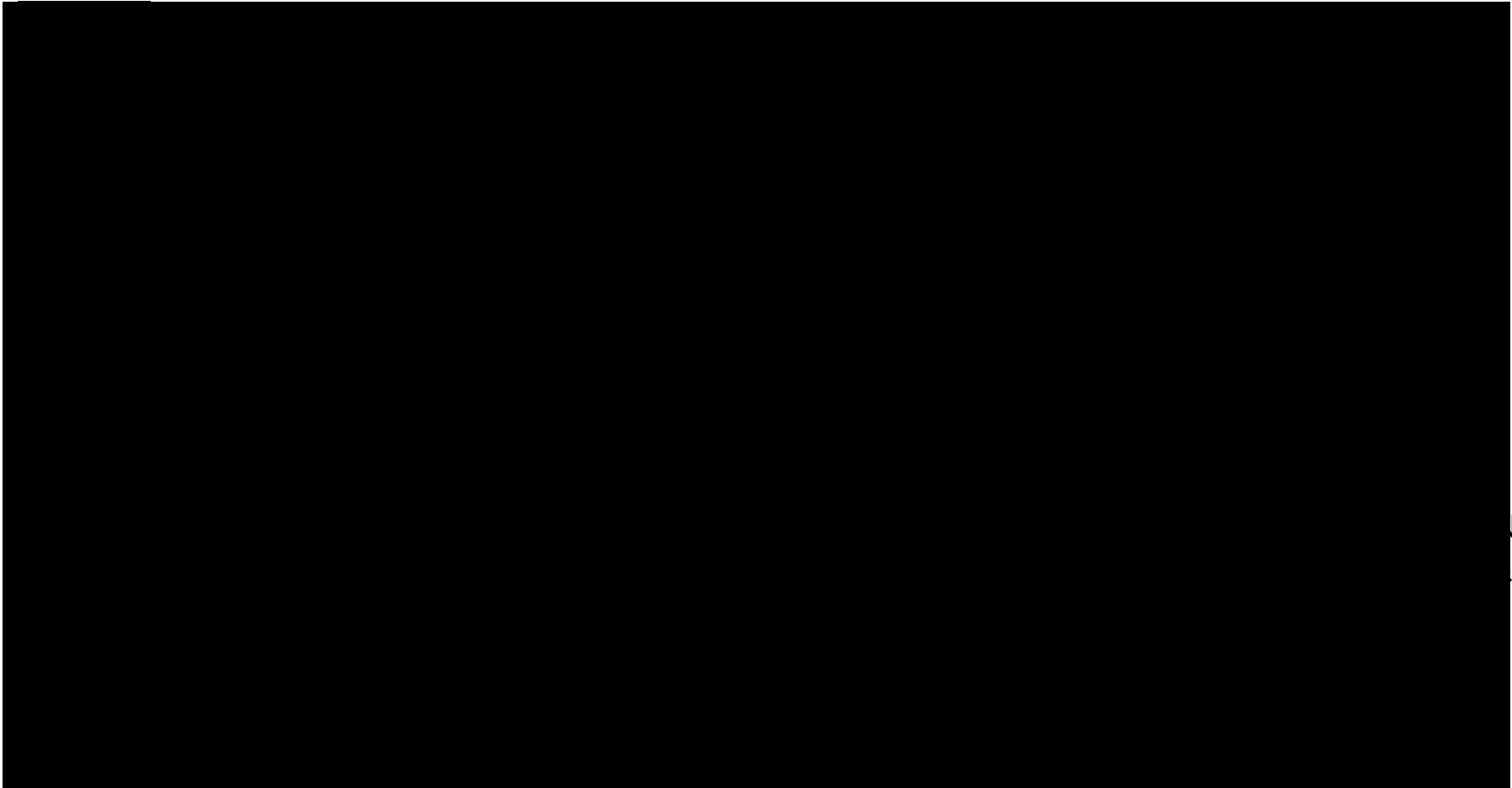
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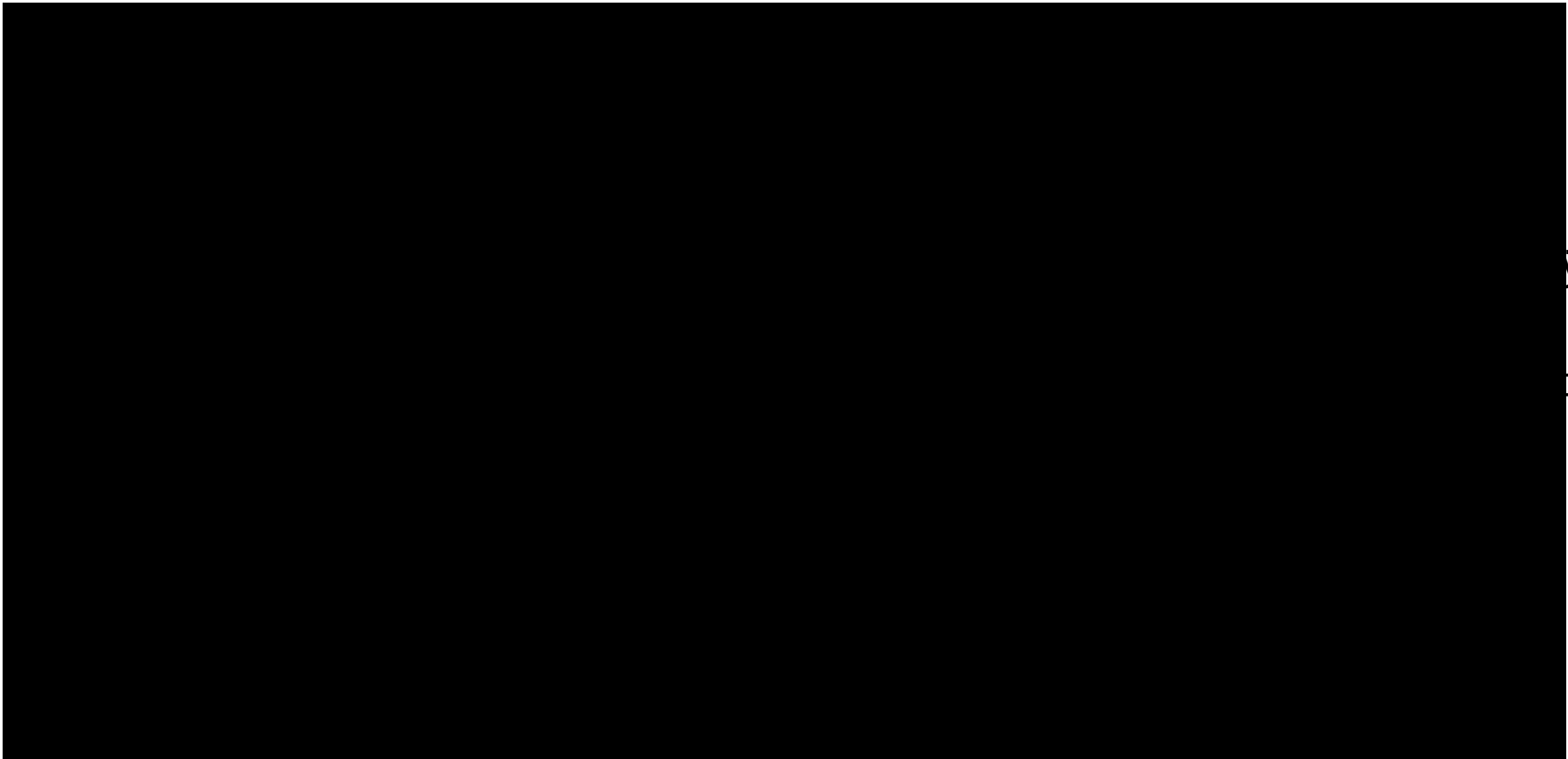


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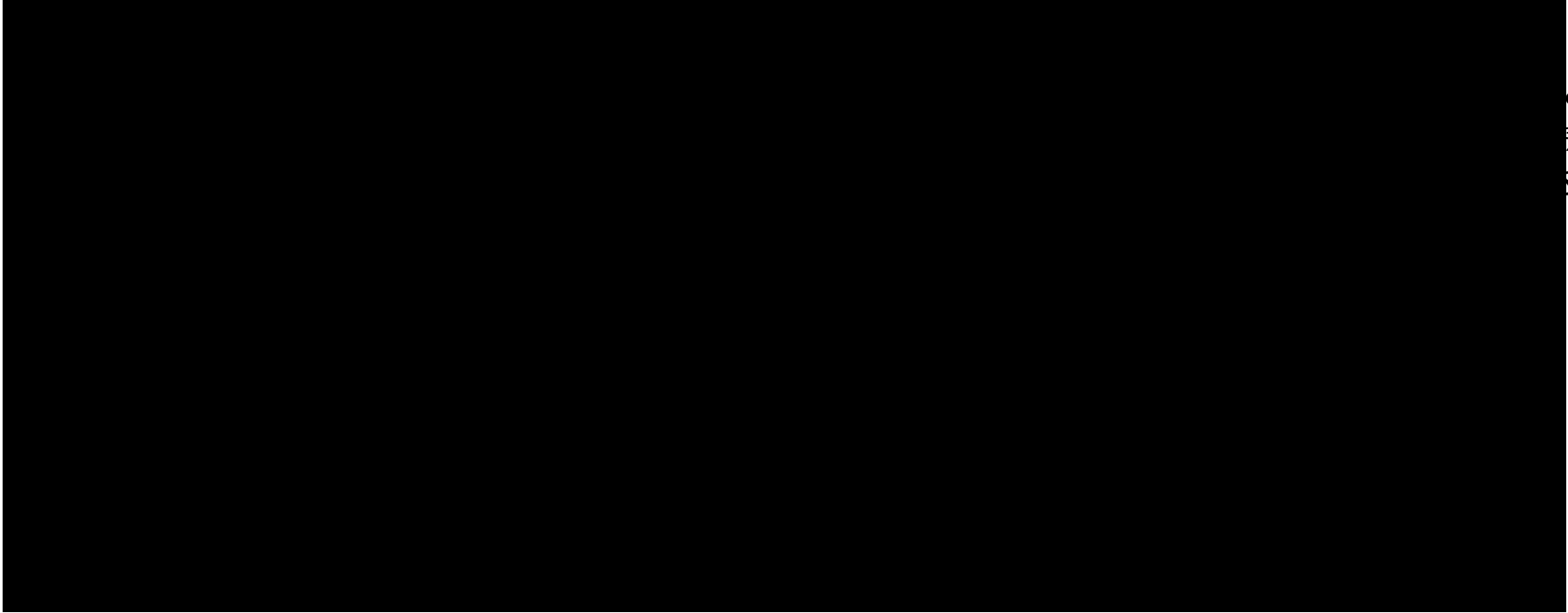
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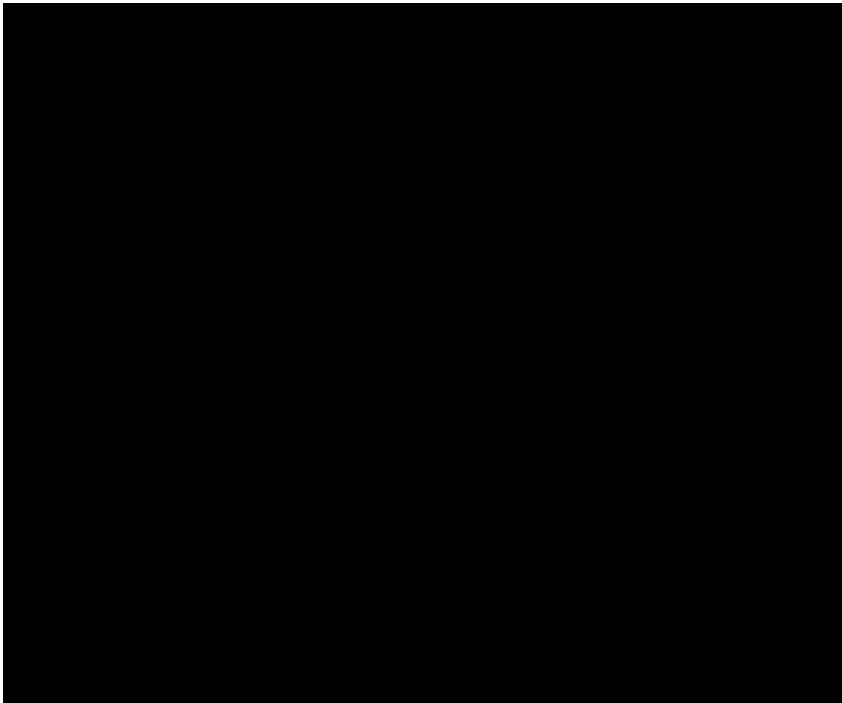
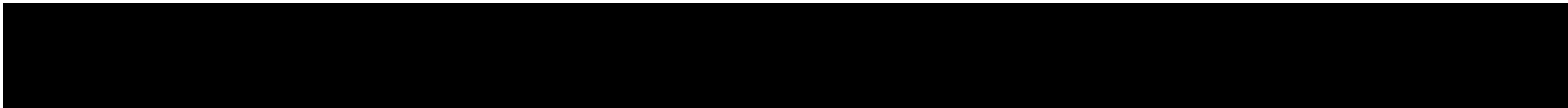
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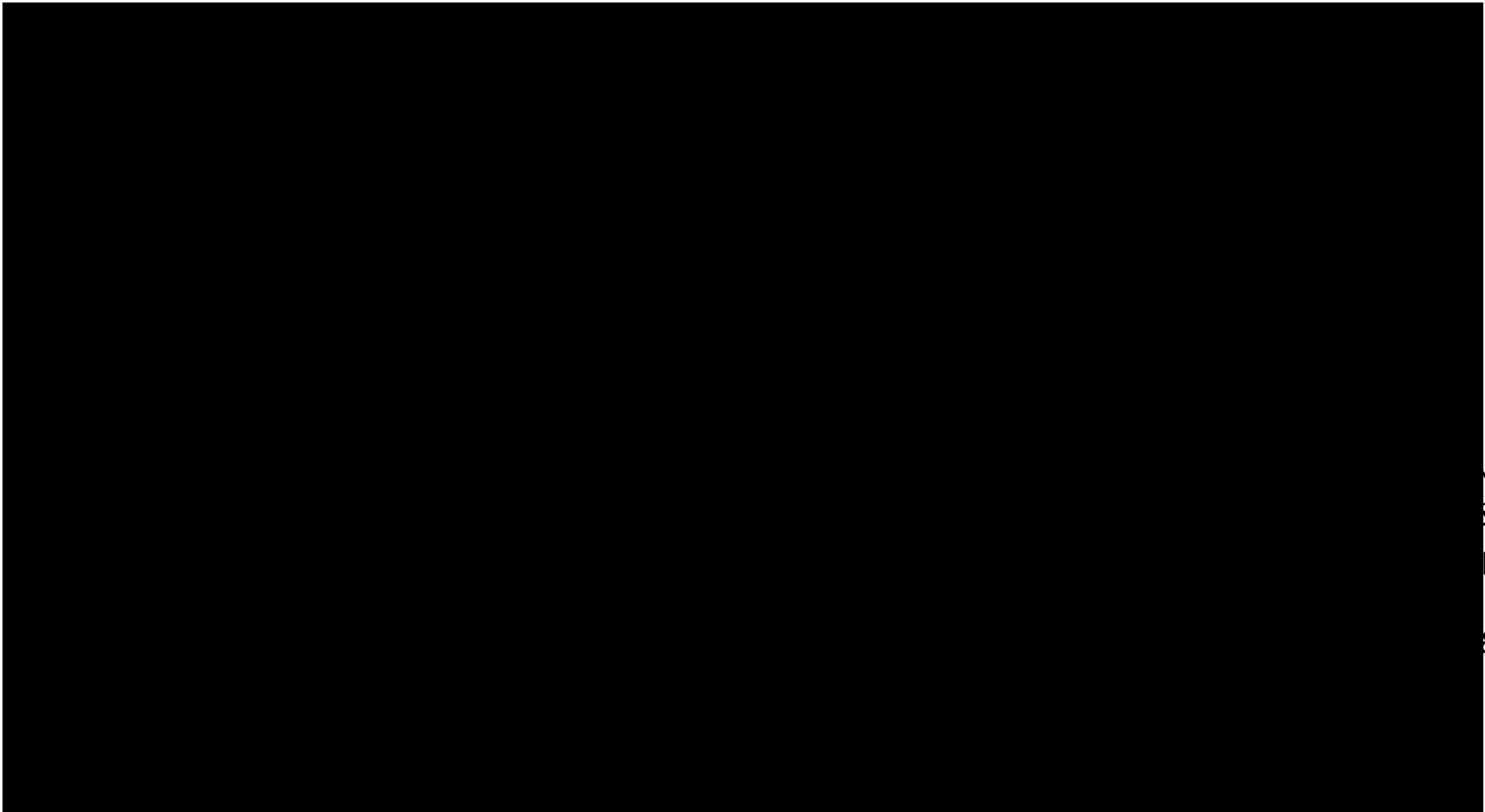
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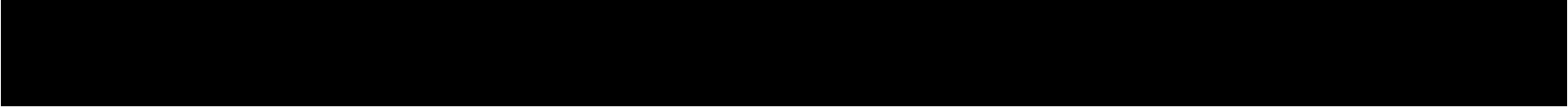
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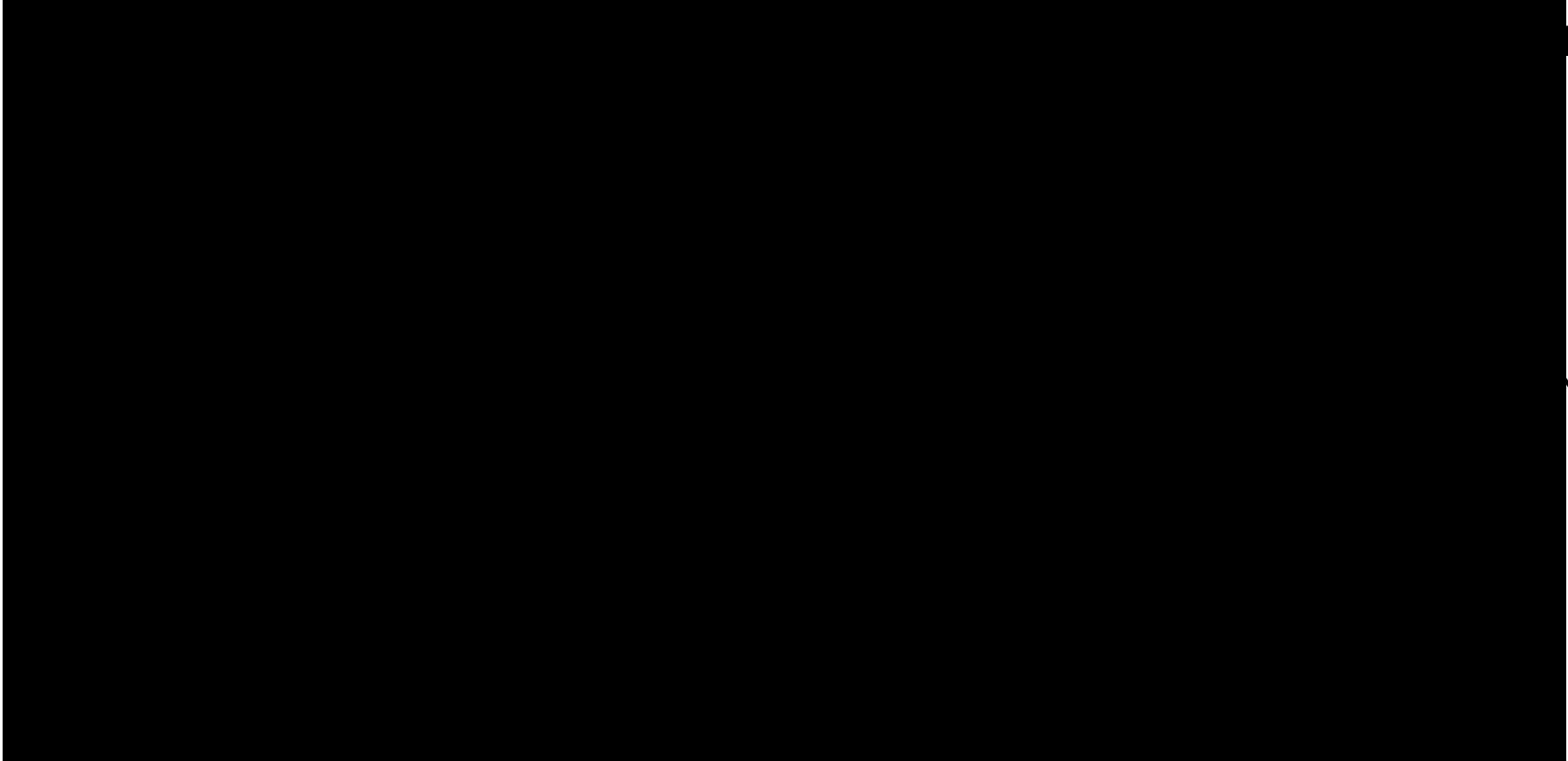
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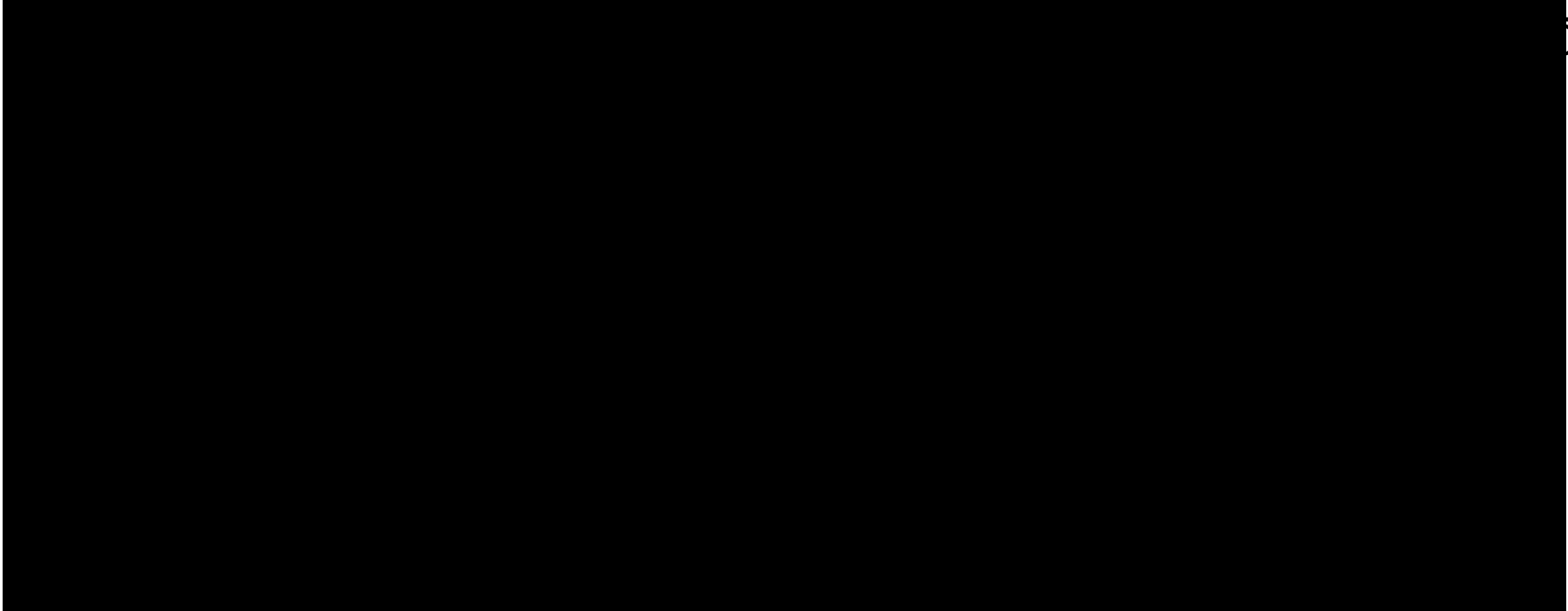


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” , QWURGXFWLRQ WR 7UDXPD
” , PSDFW RI 7UDXPD
” &RQVLGHUDWLRQV
” 8QLTXH &RQVLGHUDWLRQV
” &DVH VWXG\

! ÿ ¾ N p F p Œ B ¾ S ¾

([SRVXUH WR DQ HYHQW RU HYHQWV WKDW FUHDW
RU VHQVH RI ZHOO EHLQJ DQG ERGLO\ LQWHJULW\

” :DU

” 1DWXUDO 'LVDVWHUV

” 6H[XDO 9LROHQFH

” 5HODWLRQVKLS 9LROHQFH

” 6WDONLQJ

} á B x á g á Ý p Œ ÿ B á ¾ N

:KHQ WKH \$P\JGDOD VHQVHV D WKUHDW LQ WKH IR
+\SRWKDODPXV ZKLFK VLJQDOV WKH SLWXLWDUW J
ZKLFK UHOHDVHV KRUPRQH V RU FKHPLFDQV WKURX
WKUHDW DQG OLNHO\ WUDXPD

” 7KH \$P\JGDOD GRHV QRW GLVWLQJXLVK EHWZHH
VWUDQJHU RU DFTXDLQWDQFH EXW LQWHUSUHV

” 7KH SK\VLRORJLFDO UHVSRQVH RI WKH EUDLQ W
DFFRXQWV IRU WKH EHKDYLRUV WKDW DUH FRPI
WUDXPD

A & B & ¾ p 8 & & Ý

&DWHFKRODPLQHV DGUHQDOLQH UHVSQRQVLEOH
PRELOL]DWLRQ LPPRELOL]DWLRQ EXW LPSDLU UD

2SLRLGV UHOHDVHG WR GHDO ZLWK SDLQ FUHDW

&RUWLVRO HIIHFWV HQUJ\ DYDLODELWL\

2[\WRFLQ SURPRWHV JRRG IHHOLQJV WR FRXQWHU

” 9LFWLPV WDNH GD\V WR JHW WR D FRKHUHQV
KDYH WR EH FRPSOHWHG IURP VWDUW WR QLVK

8 & & Ý ÷

7KH KRUPRQDO RRG PD\ ODVW IRU KRXUV DQG P
HYHQW

+RUPRQHV DUH UHOHDVHG LQ YDU\LQJ DPRXQWV D
DPRQJ YLFWLPV

")LJKW)OLJKW)UHH]H UHDFWLRQV DUH QRW
WKDW LPSDLUV WKHLU DELOLW\ WR UDWLRQDOO

" OD\ SUHVHQW WR \RX DV FRQIXVHG ODXJKLQJ

Œ & x p E & Ö N n p X 8 B á á v á Y

+RUPRQDO RRG DQG G\VUHJXODWLRQ RI WKH DXW
ERG\ WR VKXW GRZQ

5DSH LQGXFHG SDUDO\VLV

8S WR • RI WKRVH ZKR H[SHULHQFH D VH[XDO DVVD
LPPRELOLW\ ZKHUH WKH\ NQRZ ZKDW LV KDSSHQLC
UHVSRQVH EDVHG RQ VXUYLYDO

] á & B n p ¾ Ý p „ á m S ¾ p F F ¾ S N

+LSSRFDP SXV LV WKH êPHPRU\ PDNHUë SURFHVVHV
0HPRU\ LV IRUPHG LQ VWHSV

” (QFRGLQJ RUJDQLJLQJ VHQVRU\ LQIRUPDWLRQ

” &RQVROLGDWLRQ JURXSLQJ LQWR PHPRULHV D

7KH KRUPRQDO RRG GRHVQèW LQWHUIHUH ZLWK W
DFFXUDF\ EXW GRHV LPSDLU WKH DELOLW\ RI WKH

” 0D\ FUHDWH IUDJPHQWHG PHPRULHV

” 5HFDOO FDQ EH VORZ DQG GLI FXOW

” \$OFRKRO ZLOO LQWHUIHUH ZLWK HQFRGLQJ WK

E ? $\frac{3}{4}$ x N p & ö p Œ B $\frac{3}{4}$ S $\frac{3}{4}$

¥ × N p B á F ? & F á p N & p N B ¾ S ¾

” 3 H U V R Q D O L W \

” & R S L Q J 6 W U D W H J L H V

” \$ Y D L O D E O H V X S S R U W V \ V W H P V D Q G U H V R X U F H V

” * H Q H U D O U H V L O L H Q F H

” 3 D V W K L V W R U \ R I W U D X P D W L F H [S H U L H Q F H V

”

• S á F N & ÷

" %H DZDUH RI ZK\ YLFWLPV UHVSQRQVHV ZLOO YD
" %H PLQGIXO WKDW UHFDOO LV RIWHQ GLI FXOW
WUDXPD
" &ODULI\ GRQèW SDUDSKUDVH
" 'R QRW MXGJH RU EODPH ODQJXDJH PDWWHUUV
" \$YRLG UH WUDXPDWLJDWLRQ
"

Œ B ¾ S ¾ p E ö & B á Ý p € á F ? & F á

” 3URPRWHV VDIHW\

” 5HFRJQLJHV WKH LPSDFW RI WUDXPD RQ FRJQLV

¥ × N F p ÷ ÿ N p F ÿ S N p Ý & h p ö l l

" <RX JLYH XQVXSSRUWLYH UHVSQRQVHV
" <RX WDNH FRQWURO RI FRQYHUVDWLRQ PRUH W
" <RX HVFDODWH WKH VLWXDWLRQ
" <RX GH QH RU ODEHO WKHLU H[SHULHQFH
" <RX DVN ê:K\ë TXHVWLRQV
" <RX YHUEDOLJH MXGJHPHQW
" <RX LQVLVW WKDW WKH\ PXVW SUHV V FKDUJHV

‘ A S á p x & F Ý á B $\frac{3}{4}$ N & F

3RSXODWLRQV

” 0DOH 9LFWLPV
” /*%74, 9LFWLPV
” ,QWHUQDWLRQDO YLFWLPV
” 9LFWLPV ZLWK GLVDELQV
” 9LFWLPV ZLWK PHQWDO KH
” 9LFWLPV RI GUXJ IDFLQV
” 9LFWLPV RI UHSHDW DVVD

$\frac{3}{4}$ F á p „ N S Ý n

'U 5R JHUV DQG +HOHQ

” +HDULQJ 2I FHU V 6SHFL F

} ¾ B N p p & ? á N á

1 H [W W L P H 3 D U W

” ” ” ”

€ S ÷ p ¾ p A á ¾ B ÷

" ,QLWLDO 6WHSV
| 5HSRUW (YLGHQFH 5HYLHZ
| (OHPHQWV RI 3URKLELWHG &R
" 3UH +HDULQJ
| &UHDWH UHYLHZ DQG SUDFW
| 3UHSDUH GLUHFH H[DPLQDWLR
" +HDULQJ
| 8VH WKH VFULSW
| 'HWHUPLQH LI RIIHUG FURVV
TXHVWLRQV DUH SHUPLVVLEOH
| \$VN ERDUG TXHVWLRQV
| 0RGHUDWRU 5ROH
" 3RVW +HDULQJ
| 3UH SRQGHUDQFH RI (YLGHQFH
| 6DQFWLRQV
| 'RFXPHQDWLRQ DQG 5DWLRQDOH

'HFLVLRQ 0DNHU &KHFNOLVW
" 5ROH RI 7LWOH ,;
" 5ROH RI +HDULQJ 2I FHU
" 5ROH RI 60+%
&KHFNOLVW

Œ & p F ? á ¾ p & B p & N p N & p F ? á ¾

:ULWH D VFULSWđ

3UDFWLFH WKH VFULSWđ

&RPH EDFN DQG VKDUH WKH VFUL

%UHDNRXW 5RRPV

PLQXWHV

6DUDK &DWH -RUGDQ

6WDQ 5REHUW

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\$WWRUQH\ V 6FKRRO \$VVLJQH G 3

3DUHQWV *XDUGLDQV DQG)ULHC

")(53\$ 5HOHDVH 5HTXLUHG
" &DQQRW DQVZHU IRU VWXGH
" ,V WKHUH WR VXSSRUW
" &DQ UHTXHVW D EUHDN
" &DQQRW EH DVNHG TXHVWLR
" 0XVW EH UHVSHFWIXO DQG Q
RWKHU SDUW\ GLUHFWO\

" 6HUYHV DV WKH SHUVRQ WR
EHKDOI RI WKH SDUW\ WKH\
" &DQQRW UHVSRQG RQ EHKDC
" &DQ DGYLVH WKH VWXGHQW
TXHVWLRQV
" &DQ UHTXHVW D EUHDN
" &DQQRW EH DVNHG TXHVWLR
" 0XVW EH UHVSHFWIXO DQG Q
RWKHU SDUW\ GLUHFWO\
" \$WWRUQH\ 5HOHDVH DQG 1R
UHOHDVH PXVW EH FRPSOHW
FKRLFH

")(53\$ 5HOHDVH PXVW EH FRP
\$GYLVRU RI &KRLFH

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'HWHUPLQDWLRQ

" 'HWHUPLQDWLRQ RI 5HVSQRQV
UDWLRQDOH EDVHG RQ SURKL
| RI WKH PHPEHUV PXVW DJU

" 'HWHUPLQH VDQFWLRQV
| \$OO PHPEHUV PXVW DJUHH W

&KHFNOLVW

2XWFRPH /HWWHU

" 5DWLRQDOH IRU GHWHUPLQ
LV FOHDUO\ GRFXPHQWHG D
DOO PHPEHUV RI WKH ERDU

" 2XWFRPH OHWWHU OLVWV D
WDNHQ IURP WKH WLPH WKH
LVVXHG

| 8VH WKH KHDULQJ RI FHU UR
WKLV DQG HQVXUH LW LV FR
UXOH

! ÿ ¾ N p F p h B & ÷ p h N ÿ p N ÿ F p ? x

5HDG WKH RXWFRPH OHWWHU

,GHQWLI\ LVVXHV

,GHQWLI\ ZKDW LV PLVVLQJ

&RPH EDFN DQG VKDUH

6WDQ DQG -RUGDQ

5REHUW 6DUDK &DWH

PLQXWHV LQ %2 5RRPV

] ^ } B ¾ x N x á

C8G2 LJX T_J^SOc cY_\ jN\`SLN aS^
CYY j^SLUc SX \NQJ\M] ^Y ^RN \N]Z

?Y^NX^SJVvc \NL_]NM O\YW LJ]Nđ

" ,V WKHUH D &KQ LFW RI ,QWHUHVW %LDV&" +RZ Z

" 3ROLF\ DQG 3URFHGXUH UHYI H7 SODO TXHVWLR

| :KDW SDUW RI WKH SROLF\ GR WKH DOOHJDWLRQ 2VN\c BAJ

| :KDW TXHVWLRQV GR \RX KDYH UHODWHG WR WKDW SROLF

" 5HYLHZ RI FRPSODLQW DQG RWIEH RI DOOHJDWLRQ

| 'R WKH DOOHJDWLRQV PDMF 5Y\ ^RN KNXNJ^ YO jYWNyXN Y^RN\ ^R
VJLU YO LYXjNX^đ j_\`S`NM ^RN MSjW

| \$UH WKHLU OLQJHULQJ TXHVWLRQV DERXW WKH G&VPLVVD

" (OHPHQWV RI DOOHJDWLRQV VKRXOG EH VHHQ L

| :KDW DUH WKH HOHPHQWV WKH LQYHVWLJDWLRQ ZLOO SXU

4bZVYS^J^SYXó 2YXjNX^ó 1NXNJ^ YO Y^RN\jó \NójM&jK\SM&XjY
NHNL^

] p ^ p } B 3/4 x N x á p

+HUH LV ZKDW \RX NQRZ

" SDUWLHV WKDW DWWHQGHG WKH YLHZLQJ GLG QRW WKLQN LW ZDV
WKHLU SODFH WR WHOO WKH UHSRUWLQJ SDUW\ WKDW WKH YLGHR
H[LVWHG WKH\ GLG QRW NQRZ LI WKH YLGHR ZYXSRQVHWRXW WKH GL
WR E\ ERWK SDUWLHV DOO KDYH VDPH VWRIW
" 7KH UHVSRRGLQJ SDUW\ VD\ DOO VWHŠV ZHUH FRQVHQRWHG WR
E\ WKH UHSRUWLQJ SDUW\
" 7KH UHSRUWLQJ SDUW\ VD\ VKH MXVW OHDUQHG WKDW WKHLU VH[
DFW ZDV UHFRUGHG DQG VKH GLG QRW JLYH SHUPLVVLRQ DQG
VKH GLG QRW JLYH SHUPLVVLRQ WR KDYH LW YLHZHG
" 7KH YLGHR ZDV PDGH \HDU DJR EDVHG" RQ\ WKDW LW DSHOHDQW" 'LUHF
" 7KH YLGHR ZDV VKRZQ WR RWKHUV PRV DJR DFRUGLQJ WR
ZLWQHVV VWDWHPHQWV
" 5HSRUWLQJ SDUW\ VD\ UHVSRRGLQJ SDUW\ LV PDQLSXODWLYH
DQG LV FXUUHQWO\ DEXVLQJ KLV JLUOIULHQG E\ @\$@ \$€ À0 p

,Q WKH KHDULQJ

" 'R \RX DVN WKH ZLWQHVVH
VWRULHV"
R ZYXSRQVHWRXW WKH GL
KHDULQJ ZLWK WKH SDUW
ZHUH FRQVHQRWHG WR
R \RX YLHZ WKH YLGHR"

5HODWHG

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-HQQ\ DQG %HQ

” :KDW DUH WKH DOOHJHG SRO

” :KDW IDFWV ZLOO \RX EH ORR
LQYHVWLJDWRUV”

” +RZ ZLOO \RX DVVHV V FUGLE

” ,V WKHUH DQ LVVXH RI FRQVH
GH QHG”

” ,V WKHUH DQ LVVXH RI LQFDS

-R\FH DQG 'U 5ROOLQV

” :KDW DUH WKH DOOHJHG SR

” :KDW IDFWV ZLOO \RX EH OR
LQYHVWLJDWRUV”

” +RZ ZLOO \RX DVVHV V FUG

” ,V WKHUH DQ LVVXH RI FRQV
GH QHG”

” ,V WKHUH DQ LVVXH RI LQFD

UV DQC

! ÿ ¾ N p A S á F N & F p h p n & S p ¾ F

^ á h p E ö & B ¾ N &

-R\FH DQG 'U 5ROOLQV

-R\FH UHSRUWHG D VLPLODU FRPSODLQW DJDLQVW D
GLIIHUHQW SURIHVVRU RQH \H DU DJR 7KH
GHWDLOV RI WKH FRPSODLQW KDYH WKH IROORZLQJ
LQ FRPPRQ

D -R\FH GUDQN WRR PXFK DOFRKRO

E -R\FH èV PHPRU\ ODSVHG

F -R\FH LQVWLJDWHG PHHWLQJV ZLWK PDOH

SURIHVVRUV LQ FRXUVHV VKH ZDV QRW GRLQJ ZHOO

LQ

'U 5ROOLQV ZDV UHSRUWHG IRU VH[XDO

KDUDVVPHQW \H DU DJR E\ D IHPDOH

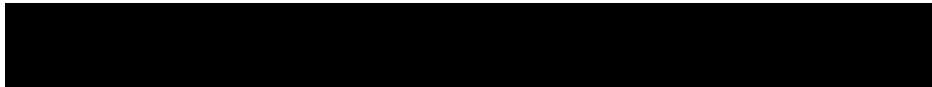
FROOHDJXH ZKR DOOHJHG WKDW KH DVNHG KHU W€P•W€P'7@ T

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\$UH \RX UH DG\ IRU \RXU UVW KHDULQJ"



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& U H G L E L

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€ á F & S N & p 8 $\frac{3}{4}$ x

% O D F N R X W V

& F á N

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" Om'D¼!Jö!J R>x!J'JÔ!L

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" yx' !'ö¼<D' Jm 'D! m!<ö'JÔ!L

" šöž'x; ö >x!J'JÔ! J! ¼!!JxmL

" !b!öžG öm jmxŌJm<G öm ßxb¼m'öžÛ [xž ö;ěžkö'JÔ!G xml Jx¼!G örr<J(x!b¼



& ö S F ÷ p f E g p h & B Ý F

” , Q XHGFH WKH PRPHQW VRPHRQH FRQVXPHV D
” , PSDLUPHQW UHODWHV WR WKH DOFRKRO LQ W
” , QWR[LFDWLRQ &RQGLWLRQ RI EHLQJ GUXQN
” , QHEULDWLRQ &RQGLWLRQ RI EHLQJ GUXQN

7KRVH OLVWHG DERYH DUH QRW , QFDSDFLWDWLRQ
XQGHUVWDQG WKH ZKR ZKDW ZK\ ZKHUH DQG KP
DOFRKRO WKRXJK D SHUVRQ FDQ EH LQFDSFLWDW

E $\times \frac{3}{4}$? $\frac{3}{4} \times$ N n p pđ“0 €

$\frac{3}{4} \times$ & S N F p

%ODFNRXW \$PQHVLDIRU SODFHV SHRSOH ZHQW
FDQ LQYROYH VSRWW\ PHPRU\ IUDJPHQWU\ EODF
HQ EORF EODFNRXW

%ODFNLQJ 2XW YV 3DVVLQJ 2XW

" %ODFNLQJ RXW IURP DOFRKRO LPSOLHV WKDW D
XQDEOH WR FUHDWH PHPRULHV IRU HYHQWV DQ
" 3DVVLQJ RXW LPSOLHV D SHUVRQ LV DVOHHS RU
" 7KH WZR VWDWHV DUH TXLWH GLIIHUHQW

& N S á Ý

ê7KH PRVW FRPPRQ IRUP RI EODFNRXW LQYROYHV

& & p $\frac{3}{4}$ x & S N F

ê'XULQJ D EODFNRXW WKH DELOLW\ WR UHPHPEHU

\$ p & x p $\frac{3}{4}x$ & S N F

ê(Q EORFë EODFNRXWV DUH VWUHWFKHV RI WLPH Z
PHPRU\ DW DOO %ODFNRXWV GR QRW LQYROYH D

” ÷ F

” *URVV PRWRU LPSDLUPHQW
” /DFN RI SK\VLFDQ FRQWURO
” %OXUUHG 9LVLRQ
” /RVV RI EDODQFH
”)HHOLQJV RI (XSKRULD WXUQ WR XQSOHDVDQW
” -XGJHPHQW DQG SHUFHSWLRQ LV VHYHUHO\ LPS
” 2QH PD\ EHFRPH DJJUHVVLYH
” 7KHUH LV DQ LQFUHDVH ULVN RI LQMXU\ WR VHO



B á Ý Ö N n

6HUYHV DQ DLG LQ \RXU DVVHV VPHQW DQG DQDO\W
HYLGHQWLDU\ SHUVSHFWLYH

& N S á Ý

\$V \RX ZHLJK HYLGHQFH WR GHWHUPLQH ZKHWKHU
VXSSRUWV D QGLQJ RI UHVSQRVLELOLW\ HDFK DO
EH HYDOXDWHG IRU LWV FUHGLELOLW\

” ,I D SLHFH RI HYLGHQFH LV PRUH FUHGLEOH WK
DQG FDQ LQ XHQFH WR VRPH GHJUHH WKH EURD

” ,I HYLGHQFH LV QRW FUHGLEOH OHVV WKDQ
SUHSRQGHUHQFH VFDOH LQ IDYRU RI WKDW HYL

” ,PSRUWDQWO\ UHJDUGLQJ D SLHFH RI HYLGHQFH
HYLGHQFH KDV QR LPSDFW RQ WKH QGLQJ

” (YLGHQFH WKDW LV QRW FUHGLEOH PD\ WLS WK
XQGHUPLQHV WKH FUHGLELOLW\ RI RWKHU HYL

\$ m ³/₄ ? á

3DUW\ \$ LQWURGXFHV D ZLWQHVV ZKR SURYLGHV V
GSHQGLQJ RQ KRZ IDU DORQJ WKH FRQWLQXXP W
SHUFHQW WKDW ZLWQHVVèV WHVWLPRQ\ PD\ DOVF
RI WKH SDUW\ ZKR SURYLGHG WKH ZLWQHVV 3DUW

” (YLGHQFH LV LQWHUOLQNLQJ WR IRUP FRPSOH[
SLÀ`W@ L LH FUHGLELO@H LPSDFQ WKH FUHGLEL
SLÀ`UWQ•ì€ pp À0 pđ€0 Àp €Àp€ 00P YLXfURYLGH

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&RUURERUDWLRQ %HVW HVWDEOLVKHV FUHGLELOLW\ ZI
HYLGHQFH VXSSRUWLQJ IDFWV

0XOWLGLPHQVLRQDO /RFDWLRQ DQG SRVLWLRQ FDQ LP

1HXWUDOLW\ ZLWQHVVHV ZLWK QR OR\DOWLHV WR WKH

,PSDUWLDOLW\ 2EMHFWLYLW\ WKH PRUH OR\DO D ZLWQ
WKHLU WHVWLPRQ\ PD\ EH 5HODWLRQVKLSV RI WKH SDU

3UR[LPLW\ :KDW VRPHRQH ZLWQHVVHV LQ SHUVRQ LV P
DIWHU WKH IDFW LV OHVV YDOXDEOH ZKDW WKH\ KHDUG

,QKHUHQW 3ODXVLELOLW\ *LYHQ ZKDW \RX NQRZ GRHV

ÝÝ N & ¾ p x & F V Á Ð ¾ N Q E

\$FFRXQWV WROG WR WKHVH IRON
KDYH WKH LQIRUPDWLRQ XQ OWHU
ELDV

%L 0XVW EH FRQVLGHUHG L H YLFWLP EODPLQJ

:LWQHVV ZKR ZHUH WROG LPPH
LQFLGHQW EXW QRW LQYROYHG

\$QDO\VLV RI PLFURDJJUHVVLRQV

\$GGLWLRQDO DOOHJDLRQV LUD
6KRXOGQèW EH U
DQG PDA LPSDFW

,QFRQVL\

([DPLQH DQG UHPHPEHU PHPRULHV
FDQ QDWXUDOO\ HYROYH

\$FWV WKDW ZHUH FRQ... DOO
1R ,PSDFW

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3HRSOH FDQ OLH LQ RQH DUHD DQG WHOO WUXWK LQ DQRWKHU VR LW V QRW D
WRWDO NLOOHU GHWHUPLQH LI WKH OLS \$ SHUVRQ GWG WR WHOO DW RQH

\$ SHUVRQ GWG WR WHOO DW RQH

'HOD\ LQ UHSRUWLQJ

WLPH RI WKH... LRU

'RHV QRW DIIHFW FUHGLELQW\ FRPPRQ

&KDQJHV LQ EHKDYLRU

([SODLQLQJ ZK\ WKH PLVFRQGX

OD\ DGG WR FUHGLELQW\ RU QRW
DQG WKDW LV RND\

IRONV UHDFW GLIIHUHQ' 'R QRW DGG WR
" , GLGQèW NQRZ
" 6KHèV D LUW
" ,W ZDVQèW D ELJ GHDO

B á Ý Ö N n p E N á F p Ö n p } ¾ B N n

5HSRUWLQJ 3DUW\ 'R QRW DGG

" &ORWKLQJ
" \$SSHDUDQFH
")OLUWLQJ %HKDYLRU
" 0DOH 9LFWLPV
" 6H[XDO 2ULHQWDWLRQ

5HVSRQGLQJ 3DUW\ 7KHVH DU

" &KDUDFWHU ZLWQHVVHV DQ
" HYLGHQFH WKH\ SURYLGH
" 3RSXODULW\ ZLWK VWDII DQ
" 1R KLVWRU\ RI SDVW SUREO
" \$FDGHPLF SHUIRUPDQFH
" ,PSRUWDQFH WR D WHDP RU

• S á F N & F p N & p x & F Ý á B K

" +RZ PLJKW D UHDVRQDEOH SHUVRQ UHDFW WR WKH LQFLC
" :KDW ZDV WKH HIIHFW RI WKH EHKDYLRU RQ WKH UHSRUW
" 'LG WKH LQGLYLGXDO KDYH D SDUWLFXODU UHDVRQ QRW
" ,V WKH HYLGHQFH RIIHUG LQKHUHQWO\ SODXVLEOH"
" ,V WKHUH HYLGHQFH FRUURERUDWLQJ WKH LQIRUPDWLRQ
" ,V WKHUH DQ\WKLQJ PLVVLQJ IURP WKH WHVWLPRQ\ WKDW
" 'LG WKH LQGLYLGXDO KDYH WKH RSSRUWXQLW\ DQG DELC
" ,V WKHUH UHOHYDQW SDVW FRQGXFW WKDW QHHGV WR E
" :DV WKH ZLWQHVV SDUW\ XQGHU WKH LQ XHQFH RI DQ\ VX
WKHLU WHVWLPRQ\"

} $B^{3/4} \times N$ \times á p $\mathcal{O}E$ á

& R Q V H Q W D Q G

2 F W R E H U

+ H D U L Q J 2 I F H

$p \} B^{3/4} \times N \quad \times^{3/4} \quad p B S \ddot{O} B \quad \times M P$

7KH DOOHJDWLRQV ZH DGGUHV V DUH QHYHU HDXTG

} & x n p á f N & F

1 R Q & R Q V H Q V X D O 6 H [X D O & R Q W D F W L V

" \$ Q \ L Q W H Q W L R Q D O V H [X D O W R X F K L Q J

" + R Z H Y H U V O L J K W

" : L W K D Q \ R E M H F W

" % \ D S H U V R Q X S R Q D Q R W K H U S H U V R Q

" 7 K D W L V Z L W K R X W F R Q V H Q W D Q G R U E \ I R U F H

6 H [X D O F R Q W D F W L Q F O X G H V L Q W H Q W L R Q D O F R Q V

J H Q L W D O V R U W R X F K L Q J D Q R W K H U Z L W K D Q R I \ R

W R X F K \ R X R U W K H P V H O Y H V Z L W K R U R Q D Q \ R I W

L Q W H U Q D W L R Q D O E R G L O \ F R Q W D F W L Q D V H [X D O F

] & Ý á p & ö p } B & & ö

,V WKH GH QLWLRQV LQ WKH SROLF\ LWVHOI 7KHV
ZLWK QRQ FRQVHQVXDO VH[XDO WRXFKLQJ WKHU
H[LWV LQ QRQ FRQVHQVXDO LQWHUFRXUVH

” 6RPHRQH FDQ DFFLGHQWO\ EUXVK VRPHRQHèV E
” ,W LV KDUG WR LPDJLQH WKDW VRPHRQH GRHV
VRPHRQH HOVH

1RQ FRQVHQVXDO ,QWHUFRXUVH LV D W\SH RI QRQ
ZK\ WKH GH QLWLRQV RYHUODS KRZHYHU ZLWK LQ
VHULRXV FRQGXFW ZKLFK UHTXLUV D PRXHOVHRQ
VXVSHQVLRQ LQ PDQ\ FDVHV

á N á B ÷ p ö p & ^ x & F á F S ¾
& x x S B B á Y I I I

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:DV WKHUH VH[XDO FRQWDFW E\ RQH SHUVRQ XS  
GH QHG LQ WKH SROLF\ " , ) <(6  
:DV LW LQWHQWLRQDO" , ) <(6  
:DV LW E\ IRUFH" , ) <(6 SROLF\ ZDV YLRODWHG  
:DV LW ZLWKRXW FRQVHQW DV FRQVHQW LV GH  
SROLF\ YLRODWLRQ , I 12 WKHUH LV QR SROLF\
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! ÿ ¾ N p F p N ÿ á p € S Ö B x p N ÿ á P

7KH 5XEULF LQWHQGV WR DQVZHU GHSHU LVVXHV

8 & B x á J p x ¾ ? ¾ x N n J p ¾ Ý p x &

, QFDSDFLW\ LV D IRUP RI QRQ FRQVHQW EXW WKH
ZLOO JHW LQWR LQ D IXWXUH PHHWLQJ

<RX VKRXOG DQDO\]H ERWK IRUFH DQG FRQVHQW F
YLRODWHG EXW LQ DQ DOOHJDWLRQ FRQZKHXU WR
ZKDWHYHU \RX ZDQW LW LV WKH IRUFH DQDO\VLV
6RPHWLPHV IRUFH UHVXOWV LQ FRQVHQW DV ZLWK
%HFDXVH WKLV FRQVHQW LV QRW YROXQWU\ LW
WKH RQH WKDW PDWWHUV ,W LV EHVW WR DQDO\]

”)RUFH

” , QFDSDFLW\

” &RQVHQW

$\frac{3}{4}$ n v ÷ p 8 d € \$

,I IRUFH LV SUHVHQW LQ DQ\ IDFWV RI D FDVH WK
EH DVVHVVG ,I VRPHRQH LV QW LQ •0` 0€ \$0 KXSDI
DUUHO\ LHUHO\$ DQPG OWKH IRUFH LV WKQW FL DV

T

” 1RW DOO IRUFH RI YLROHQFH LV QRQ FRQVHQVX

” .LQN UHODWLRQVKLSV WHQG WR YDOXH FRQVHQ

D ORW RI FRPPXQLFDWLRQ DERXW LW IDU PRU

” :KHQ IRUFH LV EHLQJ DQDO\]HG LQ .LQN HQFRX

FRQVHQW H[LVWHG RU ZKHWKHU XVH RI IRUFH

RU ZKHWKHU IRUFH FRQWLQXHG GHVSLWH WKH

RWKHU QHJRWLDWHG ERXQGDUHV

| 7KXVH ZRXOG EH SROLF\ YLRODWLRQV

| (YHQ LI VRPRHRQH LV KDUPHG LQ WKH VHX[DO LQWHUDFW

EHLQJ KDUPHG WKHUH LV QR EDVLV IRU D SROLF\ YLROD

2XWVLGH RI .LQN WKH IRUFH SDUDGLJP LV RQH ZI

DQG RU DJDLQVW WKH ZLOO RI WKH UHSRUWLQJ S

IRUPV 3K\VLFDQ 9LROHQFH 7KUHDWV ,QWLPLGDV

} ÿ n F x ¾ p ¥ & á x á

” 1R PDWWHU KRZ VOLJKW WKH LQWHQWLRQDO S
SK\VLFDU UHVWUDLQW RU WKH SUHVHQFH RI D
FRQVWLWXWH WKH XVH RI IRUFH

| 3K\VLFDU 3UHVXUH YV 3K\VLFDU 9LROHQFH 7KH DQDO\
LQWLPDF\ ZKLFK RIWHQ KDV VRPH SK\VLFDU HOHPHQWV W
v 6RPHRQH XVHV SK\VLFDU SUHVXUH WRKHOS IDFLOLWD
v 6RPHRQH SODFHV WKHLU KDQGV RQ VRPHRQHèV KHDG
v 2U VRPHRQH SUHVVLQJ GRZQ RQ VRPHRQH LQ PLVVLRQ

” 7KH NH\ TXHVWLRQ LV LI VRPHRQH XVHG SK\VLFDU
WR JDLQ VH[XDO DFFHVV

Œ ÿ B á ¾ N F

” , I D W K U H D W L V X V H G W R R E W D L Q V H [I R U F H L Y
W K U H D W L V X S W R W K H X Q L Y H U V L W \ L Q Y H V W L J

” \$ Q \ W K U H D W W K D W F D X V H V V R P H R Q H W R G R V R
D E V H Q W W K H W K U H D W F R X O G E H H Q R X J K W R S U

” 7 K L V L V H V S H F L D O O \ W U X H Z K H Q W K H S H U V R Q E
W K U H D W H Q H U K D G W K H Z L O O D Q G F D S D F L W \ W R

” 7 K L V F R Q V W U X F W G R H V Q R W D S S O \ W R Q H J R W L
R X U F R H U L F L R Q G L V F X V V L R Q / H Y H U D J H D Q G S R
W K U H D W V

| , I \ R X G R Q R W K D Y H V H [Z L W K P H , Z L O O N L O O \ R X

| , I \ R X G R Q R W K D Y H V H [Z L W K P H , Z L O O K D U P V R P H R Q H \

| , I \ R X G R Q R W K D Y H V H [Z L W K P H , Z L O O W H O O S H R S O H \

| , I \ R X G R Q R W K D Y H V H [Z L W K P H , Z L O O I D L O \ R X L Q P \ F



} B $\frac{3}{4}$ x N x á p Œ á

5XEULF

&DVH 6WXG\ \$ 5REHUW 6WDQ %ODLU

&DVH 6WXG\ % -RUGDQ DQG 6DUDK

&RHUFLRQ YV 6

1RYHPEHU

+HDULQJ 2I FH

& á B x &

WK DQG QDO HOHPHQW RI)25&(

- " ,QFOXGHV HOHPHQWV RI SUHVXUH GXUHVV FD
- " 7KH PRVW FRPPRQ W\SH RI)RUFH VHHQ RQ FRO
- " ,Q DVVH[XDO FRQWH[W FRHUFLRQ LV DQ 815(\$62
- HQJDJH LQ VVH[XDO DFWLYLW\
- " ,W LV KHOSIXO WKHQ WR FRQWUDVW FRHUFLRQ
- GLVWLQFWLRQ LV NH\ LQ FDVHV RI DOOHJDWLRO
- " %RWK LQYROYH FRQLQFLQJ VRPHRQH WR GR V
- GR WKH\ WUXO\ GLIIHU"

& á F p N ÿ á p ? á B F & p Ö á ÷ p ? B á F

Ö á p x & g x á Ý

6HGXFWRQ

" 6H[XDO DGYDQFHV DUH XOWI

" 2QH ZDQWV WR GR VRPH FRQ
SHUVRQ ZKR LV WKH REMHFV
DWWHQWLRQ ZDQWV WR EH F

" 6HHN WR SHUVXDGH RQH DQ
ZLOOLQJ WR JR DORQJ

" 7ZR SHRSOH DUH SOD\LQJ W

" 6HGXFWRQ FDQ EHFRPH FR
PXFK SUHVXUH FURVVHV W

&RHUFLRQ

" 2QH ZDQWV WR FRQYLQFH V
SHUVRQ PDNHV LW FOHDU W
WR EH FRQYLQFHG

" 7KH\ GR QRW ZDQW WR SODV

" 7KH\ GR QRW ZDQW WR EH S

" &RHUFLRQ EHJLQV QRW ZKH
VH[XDO DGYDQFHV %87 ZKH
WKH RWKHU GRHV QRW ZDQV
\$1' WKH SHUVRQ SUHVXULC
DFWLYLW\ SXVKHV SDVW WK

" &RHUFLRQ LV D PDWWHU RI
RQ RII VZLWFK WKH PLQXWH

WKH SRLQW RI ZKDW LV ZHO

A & h p Ý & p h á p & h p h ÿ ³/₄ N p × B & F F

E N á F N n

:HèUH DW WKH EDU DQG ,èP WU\LQJ WR FRQYLQFH
KDOI KRXU WHOOLQJ \RX DOO WKH UHDVRQV ZK\ \R
GRLQJ D JUHDW VHOO MRE DV , NQRZ P\ SURGXFW
EHVW ORYHU \RXèOO HYHU KDYH , FKDOOHQJH \RX
YRXXFK IRU P\ SURZHVV , WHOO \RX WKDW \RX RZH
LV RQH UROOHU FRDVWHU ULGH \RX MXVW GRQèW
/LJDUG DFW 1RW EX\LQJ LW" , NQRZ ZK\ 7KH SURE
ZRXOG MXPS RQ WKH H[SHULHQFH , DP RIIHULQJ 7
6R , FKDQJH WDFWLFVě

E N á F N n p & N S á Ý

, WHOO \RX YDULRXV LWHUDWLRQV RI WKH IROORZ

<RX FRPH LQWR D EDU GUHVHVG WR NLOO LUW Z
DQG VD\ QR" <RXèUH MXVW D WHDVH <RX OLNH WF

<RXèUH SUREDEO\ IULJLG <RX VKRXOG WDNH D FK
VRPH VRUW RI UHOLJLRXV IUHDN" *RG ZRQèW NQRZ

:KDW DUH \RX WKH ODVW YLUJLQ LQ FDSWLYLW\ ((ZD\ RYHUUDWHG

\$UH \RX DIUDLG \RXU SDUHQWV DUH JRLQJ WR QG
XS 5HOD[

& p n & S p F á á p N y á p N á F N n p Ý

, FDQ W DON P\VHOI XS WR \RX X
IDFH DQG , KDYH D)LUVW \$PHQ
\RX KRZ JUHDW , DP LQ WKH VDF
LWèV REQR[LRXV

%87 LI , WXUQ RQ \RX DQG VWD
UDWKHU WKDQ VHOO P\VHOI WK
GLIIHUHQFH

, I , DVVDLO \RXU FRUH YDOXH
UHOLJLRQ , YHU\ ZHOO PD\ EH V
FRPPXQLW\ VWDQGDUG RQ LQWH

, Q VXPPDU\ RQFH \RX GUDZ D C
\RX GRQèW ZDQW WR SOD\ P\ JD
\RX EH\RQG WKDW SRLQW VHGX
FRHUFLYH

:KDW DPRXQW RI SUHVXUH LV
IXQFWLRQ RI WKH GXUDWLRQ I
LQWHQVLW\ RI P\ SUHVXUH

2QFH RXU FRPPXQLW\ VWDQGDUG
DSSURSULDWH IRU \RX WR ODEI

EBB $\frac{3}{4}$ N & $\frac{3}{4}$ p á f N & Fp & ö p &

ê&RHULFLRQ LV WKH XVH RI HPRV
WR SHUVXDGH VRPQRQH WR GR V
QRW ZDQW WR GR OLNH EHLQJ
FHUWDLQ VH[XDO DFWV ([DPSOH
VWDWHPHQWV LQFOXGH

- ” ,I \RX ORYH PH \RX ZRXOG KD
- ” ,I \RX GRQÈW KDYH VH[ZLWK
VRPQRQH ZKR ZLOO
- ” ,èP QRW VXUH , FDQ EH ZLWK
GRHVQÈW ZDQW WR KDYH VH[

ê&RHULFLRQ FDQ DOVR WDNH W
KDYH VH[ZLWK PH ,èP EUHDNL
LI LWÈV QRW DV H[SLFLW OLNH
UHODWLRQVKLS KDV FUHDWHG
ZKHU H\RX IHHO OLNH \RX KDYH
WKHP WR NHHS WKHP LQ WKDW
GH QDWHO\ EH D IRUP RI FRHUF
VD\ \RXÈUH QRW JLYLQJ FRQVH
SROLF\ FRQVHQVXDO XQZDQWH
FRQVLGHHG FRQVHQVXDO VH[D
WKURXJK D IRUPDO VH[XDO PLV

€ á ¾ N n

:H GR QRW KDYH DQ HVWDEOLVKH
SROLF\ DV WKH SUHYLRXV GH QI
VWDQGDUG IRU QHJRWLDWLRQ LQ

7KHUH LV VXFK D WKLQJ DV XQZD
EXW DV WKH GHVFULSWRU LQGLF

7KLV LV LPSRUWDQW

,W LV QRW VH[XDO PLVFRQGXF
RXU SROLFLHV RU EHOLHIV DERX

,Q HYHU\ JHQHUDWLRQ WKHUH KI
EHKDYLURV WKDW GRQèW FURVV
PLVFRQGXFW EXW DUH VWLOO G

\$Q LQGLYLGXDO PD\ UH HFW RQ
DQG ZLVK WKH\ KDG DFWHG GLI
HPEDUUDVVHG E\ WKHLU RZQ S
GRHV QRW ZLWKRXW DGGLWLR
FULWHULD IRU 1RQFRQVHQVXDQ

6WXGHQWV KDYH FDOOHG LW è
VH[ë èUDSH\ë DQG èXQZDQWHQ

'HFLVLRQ PDNHUV DUH WKH UDV
ZDONLQJ WKLV DGPLWWHGO\ Q
HYHU\WKLQJ LV GLVFULPLQDWR
GLVFULPPLQDWLRQ PHDQV QRW

:KHQ WKH DVVHVPHQW RI ERX
EHKDYLURV KRQRUV WKH VXEMHI
UHSRUWLQJ SDUW\ RYHU WKH R
D UHDVRQDEOH SHUVRQ ZH VV
VORSH

& F á N p F p ? á B ö á x N

¾ F á p „ N S Ý n

/L] DQG | HYHDK

” %UHDNRXW *URXSV

| %ODLU 3DWULFN 6DUDK

| -RUGDQ 6WDQ 5REHUW 0HODQLH

” 'LVFXVLRQ

| 'RHV WKH WRWDOLW\ RI WKH HYLGHQFH VR IDU VXJJHVW

| 'R \RX KDYH HYLGHQFH WKDW 1HYHDK ZDV WU\LQJ WR JUR

| 'RHV WKH EHKDYLRU FURVV WKH OLQH RI VHGXFWLRQ LQW

FRQVHQW DQG RXU SROLF\”

| :KDW LV \RXU QGLQJ” 6DQFWLRQV”