[] Dendrochronology Program Library Run RSAS3 Program COF 14:09 Mon 27 Jun 2016 Page 1

[] P R O G R A M C O F E C H A Version 6.06P 29765

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QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

Title of run: MMRB2200A\_ACSA\_Corr3

File of DATED series: MMRB2200A\_ACSA\_Corr3

CONTENTS:

Part 1: Title page, options selected, summary, absent rings by series

Part 2: Histogram of time spans

Part 3: Master series with sample depth and absent rings by year

Part 4: Bar plot of Master Dating Series

Part 5: Correlation by segment of each series with Master

Part 6: Potential problems: low correlation, divergent year-to-year changes, absent rings, outliers

Part 7: Descriptive statistics

RUN CONTROL OPTIONS SELECTED VALUE

1 Cubic smoothing spline 50% wavelength cutoff for filtering

32 years

2 Segments examined are 50 years lagged successively by 25 years

3 Autoregressive model applied A Residuals are used in master dating series and testing

4 Series transformed to logarithms Y Each series log-transformed for master dating series and testing

5 CORRELATION is Pearson (parametric, quantitative)

Critical correlation, 99% confidence level .3281

6 Master dating series saved N

7 Ring measurements listed Y

8 Parts printed 1234567

9 Absent rings are omitted from master series and segment correlations (Y)

Time span of Master dating series is 1863 to 2015 153 years

Continuous time span is 1863 to 2015 153 years

Portion with two or more series is 1879 to 2015 137 years

>> 1164B 2014 absent in 1 of 28 series, but is not usually narrow: master index is .908

>> 1162B 1966 absent in 1 of 28 series, but is not usually narrow: master index is .437

>> 1162B 1968 absent in 1 of 28 series, but is not usually narrow: master index is -.353

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*C\* Number of dated series 28 \*C\*

\*O\* Master series 1863 2015 153 yrs \*O\*

\*F\* Total rings in all series 2974 \*F\*

\*E\* Total dated rings checked 2958 \*E\*

\*C\* Series intercorrelation .599 \*C\*

\*H\* Average mean sensitivity .297 \*H\*

\*A\* Segments, possible problems 7 \*A\*

\*\*\* Mean length of series 106.2 \*\*\*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ABSENT RINGS listed by SERIES: (See Master Dating Series for absent rings listed by year)

1164B 3 absent rings: 2010 2014 2015

1162A 2 absent rings: 1960 2010

1162B 5 absent rings: 1966 1968 1988 2006 2007

1062A 1 absent rings: 2010

1065A 1 absent rings: 1959

1066B 1 absent rings: 2015

13 absent rings .437%

PART 2: TIME PLOT OF TREE-RING SERIES: MMRB2200A\_ACSA\_Corr3 14:09 Mon 27 Jun 2016 Page 2

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1050 1100 1150 1200 1250 1300 1350 1400 1450 1500 1550 1600 1650 1700 1750 1800 1850 1900 1950 2000 2050 Ident Seq Time-span Yrs

: : : : : : : : : : : : : : : : : : : : : -------- --- ---- ---- ----

. . . . . . . . . . . . . . . . . . <========> . 1180A 1 1920 2015 96

. . . . . . . . . . . . . . . . . <==========> . 1180B 2 1902 2015 114

. . . . . . . . . . . . . . . . . .<=========> . 1165A 3 1912 2015 104

. . . . . . . . . . . . . . . . . .<=========> . 1165B 4 1912 2015 104

. . . . . . . . . . . . . . . . . .<=========> . 1164A 5 1916 2015 100

. . . . . . . . . . . . . . . . . .<=========> . 1164B 6 1916 2015 100

. . . . . . . . . . . . . . . . . . <=======> . 1163A 7 1931 2015 85

. . . . . . . . . . . . . . . . . . <========> . 1163B 8 1923 2015 93

. . . . . . . . . . . . . . . . . .<=========> . 1162A 9 1914 2015 102

. . . . . . . . . . . . . . . . . . <========> . 1162B 10 1922 2015 94

. . . . . . . . . . . . . . . . . . <========> . 1161A 11 1921 2015 95

. . . . . . . . . . . . . . . . . . <=======> . 1161B 12 1933 2015 83

. . . . . . . . . . . . . . . . . <============> . 1160A 13 1889 2015 127

. . . . . . . . . . . . . . . . . . <=======> . 1160B 14 1937 2015 79

. . . . . . . . . . . . . . . . . .<=========> . 1159A 15 1910 2015 106

. . . . . . . . . . . . . . . . . <==========> . 1159B 16 1908 2015 108

. . . . . . . . . . . . . . . . . <==========> . 1157A 17 1909 2015 107

. . . . . . . . . . . . . . . . . . <========> . 1157B 18 1929 2015 87

. . . . . . . . . . . . . . . . . <=============> . 1500A 19 1879 2015 137

. . . . . . . . . . . . . . . . . <=============> . 1500B 20 1879 2015 137

. . . . . . . . . . . . . . . . .<==============> . 1062A 21 1863 2015 153

. . . . . . . . . . . . . . . . . <=============> . 1062B 22 1879 2015 137

. . . . . . . . . . . . . . . . . <===========> . 1065A 23 1897 2015 119

. . . . . . . . . . . . . . . . . <===========> . 1065B 24 1897 2015 119

. . . . . . . . . . . . . . . . . . <========> . 1066A 25 1929 2015 87

. . . . . . . . . . . . . . . . . .<=========> . 1066B 26 1919 2015 97

. . . . . . . . . . . . . . . . . .<=========> . 1067A 27 1914 2015 102

. . . . . . . . . . . . . . . . . .<=========> . 1067B 28 1914 2015 102

: : : : : : : : : : : : : : : : : : : : :

1050 1100 1150 1200 1250 1300 1350 1400 1450 1500 1550 1600 1650 1700 1750 1800 1850 1900 1950 2000 2050

1900 -.119 7 1950 .021 28 2000 -.858 28

1901 .900 7 1951 -.017 28 2001 -1.924 28

1902 .001 8 1952 .963 28 2002 .428 28

1903 .735 8 1953 .227 28 2003 .021 28

1904 .068 8 1954 -.340 28 2004 .409 28

1905 -.523 8 1955 1.398 28 2005 1.467 28

1906 .596 8 1956 -.684 28 2006 -1.512 28 1

1907 .376 8 1957 -.102 28 2007 -.689 28 1

1908 1.282 9 1958 -.549 28 2008 1.141 28

1909 1.036 10 1959 -1.922 28 1 2009 .325 28

1910 .306 11 1960 -.958 28 1 2010 -1.077 28 3

1911 .414 11 1961 -.224 28 2011 .005 28

1912 .735 13 1962 .423 28 2012 .985 28

1863 1.134 1 1913 -.567 13 1963 .850 28 2013 .377 28

1864 -1.031 1 1914 .014 16 1964 -.101 28 2014 .908 28 1<<

1865 -1.771 1 1915 -.211 16 1965 -.904 28 2015 -1.369 28 2

1866 1.395 1 1916 -.246 18 1966 .437 28 1<<

1867 -.058 1 1917 -1.234 18 1967 .713 28

1868 -2.360 1 1918 -1.356 18 1968 -.353 28 1<<

1869 -.240 1 1919 -.651 19 1969 .028 28

1870 .017 1 1920 .443 20 1970 .676 28

1871 -.452 1 1921 1.301 21 1971 .274 28

1872 -1.329 1 1922 .409 22 1972 .531 28

1873 .449 1 1923 -.604 23 1973 .568 28

1874 1.025 1 1924 .082 23 1974 .521 28

1875 .925 1 1925 -1.163 23 1975 .656 28

1876 1.274 1 1926 -.288 23 1976 .802 28

1877 2.064 1 1927 -.046 23 1977 .113 28

1878 2.231 1 1928 .460 23 1978 1.107 28

1879 .853 4 1929 .444 25 1979 -.198 28

1880 .165 4 1930 -.118 25 1980 -4.181 28

1881 .785 4 1931 .876 26 1981 -1.606 28

1882 -.940 4 1932 -.362 26 1982 -.694 28

1883 .465 4 1933 -.243 27 1983 -.177 28

1884 .328 4 1934 .777 27 1984 -.062 28

1885 1.006 4 1935 .682 27 1985 .888 28

1886 .671 4 1936 -3.747 27 1986 -.270 28

1887 1.859 4 1937 .844 28 1987 1.214 28

1888 -.311 4 1938 1.000 28 1988 -1.108 28 1

1889 .052 5 1939 .596 28 1989 -1.535 28

1890 -.299 5 1940 -.366 28 1990 .497 28

1891 -1.192 5 1941 -.601 28 1991 .582 28

1892 -1.337 5 1942 -.447 28 1992 .058 28

1893 -1.796 5 1943 .853 28 1993 .241 28

1894 -2.112 5 1944 .330 28 1994 1.032 28

1895 -1.094 5 1945 -1.443 28 1995 1.443 28

1896 .014 5 1946 -.557 28 1996 -.486 28

1897 -.973 7 1947 .868 28 1997 -.130 28

1898 -1.013 7 1948 -.928 28 1998 -.529 28

1899 .678 7 1949 1.147 28 1999 1.389 28

PART 5: CORRELATION OF SERIES BY SEGMENTS: MMRB2200A\_ACSA\_Corr3 14:09 Mon 27 Jun 2016 Page 5

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Correlations of 50-year dated segments, lagged 25 years

Flags: A = correlation under .3281 but highest as dated; B = correlation higher at other than dated position

Seq Series Time\_span 1875 1900 1925 1950 1975

1924 1949 1974 1999 2024

--- -------- --------- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ----

1 1180A 1920 2015 .50 .47 .56 .84

2 1180B 1902 2015 .53 .34 .48 .79

3 1165A 1912 2015 .27B .23B .57 .67

4 1165B 1912 2015 .35 .25B .38 .55

5 1164A 1916 2015 .59 .67 .55 .65

6 1164B 1916 2015 .30A .39 .59 .73

7 1163A 1931 2015 .84 .62 .66

8 1163B 1923 2015 .56 .58 .62 .73

9 1162A 1914 2015 .36 .29A .41 .57

10 1162B 1922 2015 .63 .64 .54 .58

11 1161A 1921 2015 .68 .70 .73 .74

12 1161B 1933 2015 .69 .73 .58

13 1160A 1889 2015 .43 .64 .71 .65 .75

14 1160B 1937 2015 .53 .63 .69

15 1159A 1910 2015 .75 .81 .68 .74

16 1159B 1908 2015 .73 .74 .47 .56

17 1157A 1909 2015 .48 .58 .71 .82

18 1157B 1929 2015 .60 .80 .86

19 1500A 1879 2015 .47 .58 .63 .76 .81

20 1500B 1879 2015 .36 .66 .78 .72 .68

21 1062A 1863 2015 .39 .59 .59 .71 .78

22 1062B 1879 2015 .50 .70 .83 .80 .76

23 1065A 1897 2015 .57 .58 .63 .53 .56

24 1065B 1897 2015 .45 .44 .37 .51 .63

25 1066A 1929 2015 .55 .68 .70

26 1066B 1919 2015 .88 .88 .74 .68

27 1067A 1914 2015 .41 .43 .39 .57

28 1067B 1914 2015 .28B .29B .53 .41

Av segment correlation .45 .54 .57 .61 .68

PART 6: POTENTIAL PROBLEMS: MMRB2200A\_ACSA\_Corr3 14:09 Mon 27 Jun 2016 Page 5

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For each series with potential problems the following diagnostics may appear:

[A] Correlations with master dating series of flagged 50-year segments of series filtered with 32-year spline,

at every point from ten years earlier (-10) to ten years later (+10) than dated

[B] Effect of those data values which most lower or raise correlation with master series

Symbol following year indicates value in series is greater (>) or lesser (<) than master series value

[C] Year-to-year changes very different from the mean change in other series

[D] Absent rings (zero values)

[E] Values which are statistical outliers from mean for the year

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1180A 1920 to 2015 96 years Series 1

[B] Entire series, effect on correlation ( .665) is:

Lower 1961< -.066 1949< -.034 1956> -.014 1952< -.012 1940> -.011 1962< -.010 Higher 1936 .067 1980 .039

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1961 -5.1 SD

1180A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1920 111 143 98 82 86 67 72 81 102 107

1930 84 86 85 75 108 93 15 76 121 176

1940 179 148 148 117 91 19 79 131 86 51

1950 108 108 94 170 156 224 225 219 212 160

1960 224 114 151 277 321 307 364 358 324 352

1970 364 322 266 322 248 266 320 280 356 198

1980 101 252 183 264 266 254 145 264 92 80

1990 157 190 134 117 152 175 72 78 34 126

2000 34 4 42 56 60 104 40 44 91 50

2010 41 36 63 60 64 18

====================================================================================================================================

1180B 1902 to 2015 114 years Series 2

[B] Entire series, effect on correlation ( .535) is:

Lower 1961< -.106 1917> -.012 1947< -.009 1940> -.009 1941> -.008 1965> -.008 Higher 1980 .040 1936 .035

[C] Year-to-year changes diverging by over 4.0 std deviations:

1960 1961 -4.9 SD

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1961 -7.7 SD

1180B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1902 26 129 79 42 106 117 143 134

1910 115 101 106 99 103 86 135 130 84 73

1920 181 206 115 93 80 74 85 72 90 109

1930 85 127 102 93 130 128 48 101 163 221

1940 225 226 208 212 196 103 134 128 120 208

1950 177 106 125 196 168 214 181 137 191 189

1960 223 98 215 321 323 291 325 324 269 237

1970 312 279 286 340 291 232 285 286 333 238

1980 123 239 203 212 241 221 143 276 86 95

1990 150 190 156 137 205 263 118 171 104 209

2000 74 58 154 159 153 185 49 69 126 113

2010 74 43 72 79 109 42

====================================================================================================================================

1165A 1912 to 2015 104 years Series 3

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

--------- ---- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- ---

1912 1961 -9 -.08 .46\*-.18 -.11 .10 .17 .03 .18 -.13 .03 .27|-.06 -.26 -.01 -.19 .04 .00 -.21 .04 -.01 -.06

1925 1974 -9 -.05 .50\*-.12 -.23 .06 .19 -.02 .17 -.21 .00 .23|-.08 -.23 .06 -.12 .01 -.06 -.11 -.04 -.06 .00

[B] Entire series, effect on correlation ( .458) is:

Lower 1936> -.060 1994< -.021 1939< -.013 1931< -.012 1956> -.011 1970< -.011 Higher 1980 .063 2015 .016

1912 to 1961 segment:

Lower 1936> -.092 1939< -.025 1931< -.024 1956> -.017 1959> -.013 1958> -.011 Higher 1945 .058 1917 .037

1925 to 1974 segment:

Lower 1936> -.084 1931< -.022 1939< -.022 1970< -.019 1956> -.018 1958> -.013 Higher 1945 .095 1955 .037

[E] Outliers 2 3.0 SD above or -4.5 SD below mean for year

1936 +3.5 SD; 1945 -4.6 SD

1165A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1912 59 41 36 46 63 12 15 16

1920 29 62 36 38 35 52 40 78 73 82

1930 81 53 61 84 100 86 76 80 85 67

1940 80 77 92 101 101 64 74 99 103 129

1950 109 119 131 132 130 157 141 127 140 129

1960 128 123 111 133 116 104 115 132 103 90

1970 88 124 101 85 94 101 93 81 101 74

1980 50 91 77 111 111 125 100 129 71 79

1990 121 134 130 102 82 142 109 135 124 225

2000 166 98 137 160 184 230 158 178 253 215

2010 142 167 183 131 110 54

====================================================================================================================================

1165B 1912 to 2015 104 years Series 4

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

--------- ---- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- ---

1925 1974 -6 .09 .04 .00 -.33 .29\* .03 -.05 -.08 -.19 -.05 .25|-.27 -.01 -.01 -.05 .03 .15 -.13 -.11 .11 .01

[B] Entire series, effect on correlation ( .422) is:

Lower 1987< -.017 1948> -.017 1931< -.016 1916> -.013 1981> -.011 1946< -.011 Higher 1980 .057 2006 .017

1925 to 1974 segment:

Lower 1948> -.034 1931< -.033 1970< -.021 1973< -.020 1974< -.018 1946< -.016 Higher 1936 .095 1956 .036

[E] Outliers 2 3.0 SD above or -4.5 SD below mean for year

1916 +3.2 SD; 1961 +3.2 SD

1165B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1912 65 50 42 53 85 26 30 55

1920 46 50 59 45 57 56 80 87 129 102

1930 58 48 65 99 96 122 70 83 96 77

1940 84 86 85 134 124 103 84 114 156 168

1950 152 167 188 212 175 188 137 172 178 162

1960 163 204 148 181 159 143 144 127 114 97

1970 91 106 92 79 72 83 114 96 126 100

1980 49 127 110 172 139 148 95 71 76 82

1990 93 79 95 80 88 145 108 150 110 228

2000 158 98 199 177 166 206 94 87 133 130

2010 65 87 123 129 85 58

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1164A 1916 to 2015 100 years Series 5

[B] Entire series, effect on correlation ( .612) is:

Lower 1951< -.027 1945> -.024 1916< -.022 1981> -.014 1923> -.013 1934< -.011 Higher 1936 .090 1988 .011

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1981 +3.5 SD

1164A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1916 24 56 76 108

1920 108 122 135 179 188 144 195 170 191 181

1930 170 220 141 136 150 171 103 222 241 219

1940 233 199 212 213 222 234 210 213 165 216

1950 183 150 235 233 202 263 182 225 192 195

1960 209 223 222 262 208 181 253 234 203 239

1970 263 268 247 260 284 319 221 247 334 242

1980 176 305 271 272 217 221 189 221 123 123

1990 152 132 116 128 152 187 140 132 158 192

2000 98 85 122 100 125 131 83 76 101 94

2010 36 69 70 51 63 22

====================================================================================================================================

1164B 1916 to 2015 100 years Series 6

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

--------- ---- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- ---

1916 1965 0 -.04 -.02 -.03 -.23 .16 .04 -.21 .09 -.23 -.13 .30\*-.03 .04 .00 -.04 -.12 -.02 .04 .06 .18 .02

[B] Entire series, effect on correlation ( .481) is:

Lower 1916< -.062 1951< -.023 1934< -.022 1945> -.022 1964< -.013 2014< -.008 Higher 1980 .031 1988 .017

1916 to 1965 segment:

Lower 1916< -.082 1945> -.037 1934< -.036 1951< -.030 1964< -.012 1949< -.008 Higher 1936 .057 1921 .023

[C] Year-to-year changes diverging by over 4.0 std deviations:

1916 1917 4.5 SD

[D] 3 Absent rings: Year Master N series Absent

2010 -1.077 28 3

2014 .908 28 1 >> WARNING: Ring is not usually narrow

2015 -1.369 28 2

>> WARNING: Last ring in series is ABSENT

[E] Outliers 2 3.0 SD above or -4.5 SD below mean for year

1916 -6.2 SD; 1951 -5.1 SD

1164B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1916 34 68 72 98

1920 99 127 122 113 142 131 146 153 146 153

1930 166 188 121 113 108 163 128 263 325 291

1940 245 212 230 274 274 282 236 222 184 202

1950 174 138 249 242 195 264 248 282 249 208

1960 226 276 248 298 211 207 265 275 262 291

1970 283 284 279 284 328 311 228 208 260 183

1980 130 229 233 249 229 182 158 255 110 78

1990 128 117 112 129 134 132 93 72 72 112

2000 56 35 67 58 58 60 13 25 35 45

2010 0 50 51 32 0 0

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1163A 1931 to 2015 85 years Series 7

[B] Entire series, effect on correlation ( .732) is:

Lower 1988> -.029 1963< -.024 2006> -.022 1958< -.013 1986> -.010 1989> -.007 Higher 1936 .083 1980 .054

1163A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1931 135 93 118 120 130 74 126 153 146

1940 149 138 132 162 160 135 148 183 156 207

1950 155 167 189 146 136 188 152 150 99 91

1960 146 142 154 112 123 120 166 174 176 170

1970 196 155 173 158 182 184 168 187 225 190

1980 75 120 206 161 238 287 299 344 296 240

1990 230 205 164 209 206 197 170 148 133 186

2000 154 131 176 134 205 211 168 106 197 174

2010 94 187 232 165 125 64

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1163B 1923 to 2015 93 years Series 8

[B] Entire series, effect on correlation ( .647) is:

Lower 1963< -.045 1931< -.022 1934< -.014 1925> -.012 1923< -.011 1990< -.009 Higher 1936 .087 1980 .037

1163B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1923 38 104 106 99 123 101 128

1930 110 93 122 129 109 129 97 137 127 140

1940 139 132 122 161 176 146 140 162 119 171

1950 146 144 181 165 142 185 140 142 106 81

1960 122 116 113 70 89 111 112 114 119 113

1970 150 192 207 195 228 221 187 197 250 179

1980 72 80 141 136 158 170 156 155 124 89

1990 115 163 153 125 174 204 147 179 153 265

2000 133 117 211 102 127 132 96 101 170 134

2010 104 114 184 131 136 62

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1162A 1914 to 2015 102 years Series 9

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

--------- ---- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- ---

1925 1974 0 .11 .06 .25 -.02 .07 .01 -.01 .12 .01 .00 .29\*-.07 -.22 .07 .17 -.19 -.10 -.20 -.10 -.19 -.16

[B] Entire series, effect on correlation ( .454) is:

Lower 1984< -.029 1936> -.027 1966< -.022 1960< -.014 1919< -.014 1959> -.014 Higher 1980 .049 2006 .017

1925 to 1974 segment:

Lower 1966< -.047 1959> -.025 1960< -.017 1962< -.016 1965> -.014 1936> -.011 Higher 1925 .023 1934 .020

[D] 2 Absent rings: Year Master N series Absent

1960 -.958 28 1

2010 -1.077 28 3

[E] Outliers 3 3.0 SD above or -4.5 SD below mean for year

1919 -4.6 SD; 1936 +3.3 SD; 2010 -4.6 SD

1162A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1914 74 93 122 67 94 58

1920 203 177 227 181 192 141 194 227 239 303

1930 285 407 256 295 537 349 206 233 215 202

1940 137 113 69 145 84 102 81 116 83 133

1950 188 256 275 183 131 132 106 77 103 100

1960 0 30 27 85 52 98 31 81 31 106

1970 130 200 151 135 138 161 177 153 193 202

1980 74 127 156 129 52 174 100 127 88 98

1990 105 108 131 122 158 201 142 145 88 120

2000 77 101 118 93 127 124 47 40 98 78

2010 0 95 121 69 79 43

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1162B 1922 to 2015 94 years Series 10

[B] Entire series, effect on correlation ( .601) is:

Lower 1966< -.023 1938< -.021 1989> -.020 1965> -.016 1984< -.013 1957< -.011 Higher 1936 .093 1980 .028

[D] 5 Absent rings: Year Master N series Absent

1966 .437 28 1 >> WARNING: Ring is not usually narrow

1968 -.353 28 1 >> WARNING: Ring is not usually narrow

1988 -1.108 28 1

2006 -1.512 28 1

2007 -.689 28 1

1162B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1922 172 89 170 141 244 281 303 257

1930 247 257 235 302 368 192 104 202 152 208

1940 184 174 175 228 182 167 165 204 120 148

1950 148 153 151 96 63 90 70 19 23 22

1960 24 97 146 134 123 179 0 108 0 141

1970 127 165 150 86 88 78 105 68 128 122

1980 21 89 126 112 29 194 63 210 0 221

1990 233 214 147 102 135 183 101 148 74 258

2000 127 122 198 90 182 98 0 0 54 67

2010 49 71 134 36 77 23

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1161A 1921 to 2015 95 years Series 11

[B] Entire series, effect on correlation ( .713) is:

Lower 1928< -.021 2012< -.018 1925> -.013 1996> -.009 1968> -.009 1939< -.008 Higher 1936 .078 1980 .026

1161A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1921 176 206 173 232 202 171 154 103 100

1930 109 157 88 114 147 203 77 194 244 154

1940 148 135 173 208 219 175 199 225 189 278

1950 266 240 243 169 159 236 145 146 151 145

1960 134 169 261 346 220 212 289 253 274 275

1970 242 171 227 243 185 184 201 179 205 138

1980 76 70 79 88 95 86 87 120 79 62

1990 84 100 99 91 106 116 95 84 73 101

2000 54 28 41 38 34 61 29 29 55 39

2010 34 47 30 47 61 33

====================================================================================================================================

1161B 1933 to 2015 83 years Series 12

[B] Entire series, effect on correlation ( .621) is:

Lower 1943< -.030 2015> -.029 2004< -.020 2003< -.013 2010> -.011 1964< -.011 Higher 1936 .068 1980 .029

1161B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1933 166 218 231 116 247 200 162

1940 172 131 171 143 179 172 184 219 191 217

1950 214 210 217 189 167 286 169 195 182 155

1960 139 176 167 196 140 126 176 183 177 226

1970 191 156 194 215 150 179 175 177 242 122

1980 82 84 96 125 134 121 97 142 83 71

1990 96 114 105 116 133 148 103 99 83 143

2000 77 57 51 21 15 32 14 19 35 23

2010 34 47 39 32 45 39

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1160A 1889 to 2015 127 years Series 13

[B] Entire series, effect on correlation ( .580) is:

Lower 1896< -.033 1908< -.019 1893> -.014 1895> -.013 1890> -.012 1911< -.011 Higher 1936 .071 1980 .034

[C] Year-to-year changes diverging by over 4.0 std deviations:

1895 1896 -4.1 SD

1160A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1889 43

1890 49 22 21 27 14 35 8 23 21 31

1900 22 52 49 64 21 22 41 35 36 66

1910 97 49 117 95 132 193 119 69 83 97

1920 260 308 208 202 242 159 158 173 198 166

1930 161 237 249 270 354 352 130 268 241 244

1940 211 236 232 248 224 119 147 217 182 199

1950 106 107 116 95 144 154 103 137 104 62

1960 72 107 100 77 60 44 62 77 55 76

1970 98 92 99 82 97 75 148 87 141 105

1980 57 116 116 130 114 135 101 146 75 54

1990 95 82 123 115 109 148 98 65 57 139

2000 67 33 63 113 124 186 59 133 173 127

2010 92 186 213 98 131 36

====================================================================================================================================

1160B 1937 to 2015 79 years Series 14

[B] Entire series, effect on correlation ( .592) is:

Lower 1968< -.042 1937< -.031 1952< -.030 1945> -.015 2002< -.014 2014< -.014 Higher 1980 .077 2006 .024

1160B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1937 305 797 519

1940 463 363 356 409 304 294 214 247 185 261

1950 165 166 128 146 171 179 134 133 131 67

1960 103 208 181 151 151 146 143 180 75 140

1970 152 153 160 194 185 123 248 181 178 131

1980 55 99 101 101 117 116 125 149 75 67

1990 114 92 123 111 136 139 96 80 98 129

2000 60 55 49 64 67 74 31 44 80 62

2010 40 56 65 58 29 29

====================================================================================================================================

1159A 1910 to 2015 106 years Series 15

[B] Entire series, effect on correlation ( .730) is:

Lower 1988> -.022 1999< -.021 1917> -.015 1918> -.011 1978< -.009 1910< -.008 Higher 1980 .047 1936 .030

1159A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1910 41 55 78 58 70 67 86 104 124 115

1920 187 222 140 145 124 94 111 123 135 146

1930 129 162 118 107 179 162 92 153 128 131

1940 116 101 132 174 179 102 142 183 116 171

1950 173 212 234 169 153 184 142 142 143 104

1960 121 172 139 180 167 160 157 190 138 145

1970 133 155 168 156 166 126 149 125 101 88

1980 32 32 80 81 95 134 118 162 166 137

1990 181 196 140 136 183 211 119 95 76 61

2000 59 66 94 119 152 230 72 96 121 112

2010 28 59 82 89 71 24

====================================================================================================================================

1159B 1908 to 2015 108 years Series 16

[B] Entire series, effect on correlation ( .631) is:

Lower 1945< -.029 1988> -.013 1924< -.012 1978< -.011 1989> -.009 1999< -.008 Higher 1936 .073 2006 .012

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1945 -6.2 SD

1159B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1908 51 44

1910 27 95 98 50 59 43 92 64 88 98

1920 195 267 211 209 122 109 171 170 194 191

1930 184 240 215 216 276 240 154 225 250 238

1940 208 196 197 205 221 127 209 297 232 320

1950 323 242 283 225 195 250 176 193 233 181

1960 181 196 251 233 190 189 214 276 252 231

1970 173 139 148 116 90 62 70 50 46 43

1980 11 39 63 77 156 156 129 178 180 195

1990 255 229 191 311 301 227 150 147 133 123

2000 98 75 86 63 84 91 44 79 122 115

2010 50 90 111 129 111 48

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1157A 1909 to 2015 107 years Series 17

[B] Entire series, effect on correlation ( .641) is:

Lower 1959> -.022 1921< -.015 1923< -.012 1911< -.011 1913> -.010 1918> -.010 Higher 1980 .058 2006 .015

1157A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1909 53

1910 37 25 62 65 72 70 47 45 71 71

1920 60 57 62 34 73 74 139 158 162 189

1930 172 168 152 187 177 151 127 233 199 219

1940 186 207 193 224 241 199 179 215 165 267

1950 212 218 190 135 115 136 81 117 137 182

1960 159 260 250 255 159 127 153 133 109 116

1970 143 144 188 182 161 223 204 183 132 109

1980 49 99 142 149 143 141 98 130 78 60

1990 112 112 94 98 128 142 98 130 102 173

2000 121 106 174 178 158 189 48 116 146 77

2010 46 83 120 92 150 64

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1157B 1929 to 2015 87 years Series 18

[B] Entire series, effect on correlation ( .748) is:

Lower 1936> -.046 1948> -.024 1999< -.011 1996> -.008 1943< -.007 1930< -.006 Higher 1980 .061 2006 .011

1157B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1929 278

1930 162 220 166 199 266 279 201 347 302 316

1940 254 254 249 253 258 225 266 305 328 417

1950 266 330 285 250 236 315 195 270 219 202

1960 206 288 301 273 225 233 255 275 233 217

1970 210 205 214 180 207 265 240 187 228 180

1980 54 92 94 87 96 116 99 116 50 49

1990 79 87 74 68 88 78 71 51 62 61

2000 41 40 85 69 85 164 51 93 109 74

2010 38 90 142 109 135 49

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1500A 1879 to 2015 137 years Series 19

[B] Entire series, effect on correlation ( .678) is:

Lower 1883> -.016 1896> -.013 1944< -.011 1987< -.010 1930< -.008 1891> -.007 Higher 1980 .051 2006 .008

[E] Outliers 2 3.0 SD above or -4.5 SD below mean for year

1883 +3.7 SD; 1896 +3.0 SD

1500A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1879 48

1880 41 52 30 72 39 44 39 53 31 32

1890 32 39 31 22 24 35 84 49 53 69

1900 50 65 82 86 65 64 77 77 164 183

1910 172 169 139 94 114 78 104 91 107 110

1920 118 126 93 118 120 74 79 73 84 94

1930 55 145 132 168 155 205 71 175 193 148

1940 93 85 108 186 75 51 125 191 127 225

1950 173 177 227 141 128 195 153 115 109 42

1960 60 137 172 167 142 96 155 156 141 105

1970 98 81 76 96 100 107 117 109 130 97

1980 34 43 56 63 62 76 59 59 56 68

1990 96 100 71 82 118 102 62 61 78 104

2000 58 58 103 79 72 109 49 44 115 71

2010 52 49 54 47 73 32

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1500B 1879 to 2015 137 years Series 20

[B] Entire series, effect on correlation ( .628) is:

Lower 2012< -.031 1944< -.014 1917> -.014 1912< -.011 1894> -.011 2015> -.011 Higher 1936 .079 1980 .022

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1936 -4.7 SD

1500B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1879 42

1880 31 61 40 69 41 59 56 53 36 33

1890 21 20 17 12 29 11 46 26 20 48

1900 48 79 88 78 68 106 108 142 193 132

1910 142 126 90 107 126 98 87 141 136 187

1920 179 186 160 153 188 96 129 124 145 140

1930 97 184 153 119 172 127 32 141 141 167

1940 128 125 113 163 72 67 150 172 154 206

1950 191 155 182 127 107 135 110 128 152 62

1960 84 140 164 149 132 89 134 143 163 146

1970 183 148 174 177 195 179 224 191 185 146

1980 72 104 115 119 107 162 101 122 94 96

1990 147 133 102 145 165 170 111 129 151 204

2000 95 69 123 92 85 153 51 61 122 84

2010 60 42 18 29 28 23

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1062A 1863 to 2015 153 years Series 21

[\*] Early part of series cannot be checked from 1863 to 1878 -- not matched by another series

[B] Entire series, effect on correlation ( .614) is:

Lower 1883< -.029 1963< -.017 1915< -.016 1959> -.012 1948> -.012 1917> -.009 Higher 1980 .062 1936 .033

[D] 1 Absent rings: Year Master N series Absent

2010 -1.077 28 3

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1981 -4.7 SD

1062A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1863 16 8 7 33 23 8 27

1870 33 31 24 49 62 63 73 95 101 65

1880 54 44 37 20 65 57 56 90 48 46

1890 43 31 45 38 43 61 82 82 92 125

1900 111 132 111 138 145 122 156 151 177 149

1910 132 231 187 101 134 79 187 149 97 133

1920 129 150 131 119 145 115 119 104 121 91

1930 109 138 112 58 98 102 28 194 175 150

1940 95 122 145 180 117 26 159 190 173 168

1950 116 101 179 140 124 172 84 122 161 142

1960 118 111 138 92 122 110 163 132 165 163

1970 194 170 139 144 119 166 113 103 103 71

1980 9 13 73 81 79 101 53 111 67 80

1990 118 122 97 95 113 121 74 81 64 96

2000 79 64 66 80 81 92 37 70 74 74

2010 0 39 53 57 63 21

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1062B 1879 to 2015 137 years Series 22

[B] Entire series, effect on correlation ( .726) is:

Lower 1999< -.014 1912< -.012 1911< -.012 1917> -.011 1916> -.007 1883< -.006 Higher 1936 .059 1980 .031

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1936 -5.0 SD

1062B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1879 94

1880 86 67 48 46 56 67 60 80 52 53

1890 48 37 38 48 33 54 79 70 80 175

1900 108 131 133 157 180 157 209 194 254 219

1910 211 87 57 55 73 133 243 196 114 156

1920 213 247 234 207 239 128 188 138 180 186

1930 193 290 243 191 302 217 95 238 234 294

1940 329 300 299 461 387 298 290 376 255 350

1950 296 280 426 333 271 414 200 248 238 161

1960 191 246 248 218 168 104 164 145 123 127

1970 162 133 163 225 157 181 155 140 153 121

1980 28 47 89 97 133 178 115 214 118 99

1990 180 157 94 121 128 139 83 114 79 77

2000 68 74 151 204 137 178 93 107 161 112

2010 47 47 59 65 47 30

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1065A 1897 to 2015 119 years Series 23

[B] Entire series, effect on correlation ( .554) is:

Lower 1918< -.050 2006> -.031 2010> -.017 1956> -.017 1988> -.012 1945> -.011 Higher 1936 .062 1959 .019

[D] 1 Absent rings: Year Master N series Absent

1959 -1.922 28 1

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1918 -7.5 SD

1065A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1897 43 47 100

1900 101 107 45 109 105 83 113 85 93 84

1910 85 109 93 75 78 91 51 48 18 49

1920 81 105 94 64 89 85 112 101 118 108

1930 112 131 107 139 141 156 62 158 122 116

1940 130 88 63 104 80 102 98 124 61 112

1950 72 130 97 85 158 138 150 113 73 0

1960 80 59 116 133 110 85 83 118 74 100

1970 199 193 190 216 235 261 205 212 230 215

1980 88 103 119 169 122 170 159 293 243 193

1990 352 286 231 235 209 263 173 220 214 302

2000 184 128 295 236 262 343 331 239 317 202

2010 313 301 266 158 161 94

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1065B 1897 to 2015 119 years Series 24

[B] Entire series, effect on correlation ( .501) is:

Lower 1966< -.028 1945> -.024 2006> -.020 1903< -.015 1948< -.013 1956> -.012 Higher 1980 .025 2015 .016

1065B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1897 20 30 50

1900 91 105 124 58 120 103 106 106 100 109

1910 84 98 93 65 69 54 65 32 33 28

1920 33 54 53 45 55 55 88 72 89 68

1930 75 121 88 114 124 105 70 140 143 109

1940 96 100 81 152 103 135 123 129 31 68

1950 82 61 83 93 82 123 115 148 95 57

1960 79 35 61 63 87 84 34 80 62 89

1970 125 191 179 111 157 171 161 164 165 154

1980 61 66 105 94 117 198 141 193 115 87

1990 146 132 175 169 263 321 175 239 324 367

2000 166 114 324 282 263 380 296 190 297 182

2010 175 144 224 167 193 97

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1066A 1929 to 2015 87 years Series 25

[B] Entire series, effect on correlation ( .637) is:

Lower 1936> -.038 1933< -.018 1945> -.012 1988> -.011 2006< -.011 1986> -.009 Higher 1980 .016 1959 .012

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

2006 -4.6 SD

1066A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1929 234

1930 228 249 164 62 140 146 107 208 255 233

1940 116 138 132 155 157 174 151 181 147 218

1950 178 200 308 264 238 259 178 185 227 155

1960 199 256 343 321 260 195 269 239 189 187

1970 288 151 217 235 169 161 135 84 104 60

1980 19 29 32 35 49 65 79 91 56 42

1990 63 62 39 43 59 39 22 33 32 37

2000 23 12 51 33 33 67 4 32 48 45

2010 37 49 83 47 68 20

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1066B 1919 to 2015 97 years Series 26

[B] Entire series, effect on correlation ( .788) is:

Lower 2010> -.017 2004< -.013 1985< -.013 1980> -.009 1968> -.007 1934< -.005 Higher 1936 .060 2006 .011

[D] 1 Absent rings: Year Master N series Absent

2015 -1.369 28 2

>> WARNING: Last ring in series is ABSENT

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1936 -4.8 SD

1066B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1919 167

1920 262 345 264 221 184 147 183 210 226 252

1930 222 232 148 157 161 170 52 208 278 180

1940 193 176 172 205 196 130 151 194 116 202

1950 182 186 266 258 180 289 207 213 168 117

1960 169 181 238 361 221 199 320 319 305 253

1970 341 180 275 254 216 239 192 151 150 119

1980 48 62 66 52 46 44 67 92 34 27

1990 48 55 45 44 52 40 31 28 30 53

2000 29 24 34 32 16 38 5 19 28 28

2010 40 29 57 32 57 0

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1067A 1914 to 2015 102 years Series 27

[B] Entire series, effect on correlation ( .490) is:

Lower 1959> -.026 1977< -.024 1936> -.020 1926< -.012 1976< -.011 1940< -.010 Higher 1980 .035 2015 .013

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1977 -4.6 SD

1067A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1914 78 106 82 46 73 101

1920 65 95 63 46 32 29 14 59 103 103

1930 146 164 107 110 144 150 90 179 150 139

1940 57 54 109 165 159 108 136 196 105 174

1950 117 138 140 106 98 145 138 147 108 199

1960 232 220 281 280 270 220 326 223 210 182

1970 222 158 152 172 181 169 104 47 86 94

1980 43 85 82 102 168 168 82 81 84 79

1990 119 137 116 146 158 135 33 47 41 83

2000 51 29 50 56 73 63 43 35 60 62

2010 29 68 94 77 135 69

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1067B 1914 to 2015 102 years Series 28

[A] Segment High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +10

--------- ---- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- --- ---

1914 1963 -4 .14 -.07 .19 .04 -.05 -.15 .42\*-.16 -.11 -.22 .28| .03 .00 -.03 -.11 .11 .01 -.16 .13 -.11 .09

1925 1974 -4 .08 -.09 .16 -.05 -.11 -.22 .44\*-.12 -.09 -.23 .29| .02 .00 -.01 -.02 .12 -.02 -.14 .20 .03 .06

[B] Entire series, effect on correlation ( .326) is:

Lower 1940< -.059 2015> -.030 1936> -.024 2006> -.022 2005< -.014 1995< -.011 Higher 1980 .034 2001 .012

1914 to 1963 segment:

Lower 1940< -.096 1936> -.067 1918> -.019 1920< -.017 1930> -.013 1915> -.010 Higher 1937 .024 1956 .022

1925 to 1974 segment:

Lower 1940< -.092 1936> -.074 1930> -.015 1971< -.011 1972< -.009 1965> -.009 Higher 1956 .026 1948 .023

[C] Year-to-year changes diverging by over 4.0 std deviations:

1939 1940 -4.2 SD

[E] Outliers 3 3.0 SD above or -4.5 SD below mean for year

1936 +3.6 SD; 1940 -7.2 SD; 2015 +3.3 SD

1067B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1914 78 114 72 38 82 105

1920 50 96 70 46 38 31 16 60 112 127

1930 234 179 126 113 138 169 123 199 182 147

1940 27 93 107 117 130 120 107 148 103 138

1950 114 148 138 116 123 155 104 127 84 117

1960 128 179 180 187 209 200 265 229 191 181

1970 208 122 112 136 156 141 157 124 156 107

1980 56 75 46 78 137 197 134 179 94 75

1990 125 128 96 130 119 70 38 58 39 53

2000 36 23 66 62 76 43 48 37 36 26

2010 28 20 36 26 28 31

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PART 7: DESCRIPTIVE STATISTICS: MMRB2200A\_ACSA\_Corr3 14:09 Mon 27 Jun 2016 Page 6

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Corr //-------- Unfiltered --------\\ //---- Filtered -----\\

No. No. No. with Mean Max Std Auto Mean Max Std Auto AR

Seq Series Interval Years Segmt Flags Master msmt msmt dev corr sens value dev corr ()

--- -------- --------- ----- ----- ----- ------ ----- ----- ----- ----- ----- ----- ----- ----- --

1 1180A 1920 2015 96 4 0 .665 1.49 3.64 .968 .829 .379 2.62 .485 .052 1

2 1180B 1902 2015 114 4 0 .535 1.59 3.40 .779 .712 .313 2.46 .346 -.032 2

3 1165A 1912 2015 104 4 2 .458 1.03 2.53 .455 .795 .226 2.53 .372 .055 2

4 1165B 1912 2015 104 4 1 .422 1.10 2.28 .456 .703 .247 2.59 .415 .005 1

5 1164A 1916 2015 100 4 0 .612 1.77 3.34 .678 .792 .208 2.50 .436 .009 1

6 1164B 1916 2015 100 4 1 .481 1.68 3.28 .890 .885 .261 2.57 .428 .059 2

7 1163A 1931 2015 85 3 0 .732 1.66 3.44 .493 .639 .214 2.44 .364 .009 1

8 1163B 1923 2015 93 4 0 .647 1.39 2.65 .405 .476 .220 2.66 .443 .002 1

9 1162A 1914 2015 102 4 1 .454 1.38 5.37 .833 .726 .412 2.75 .474 -.094 1

10 1162B 1922 2015 94 4 0 .601 1.34 3.68 .776 .515 .544 2.60 .455 -.004 1

11 1161A 1921 2015 95 4 0 .713 1.44 3.46 .756 .835 .240 2.48 .402 -.005 1

12 1161B 1933 2015 83 3 0 .621 1.37 2.86 .651 .798 .244 2.96 .572 .051 1

13 1160A 1889 2015 127 5 0 .580 1.19 3.54 .737 .762 .351 2.61 .457 -.011 1

14 1160B 1937 2015 79 3 0 .592 1.56 7.97 1.210 .790 .263 2.65 .503 .003 1

15 1159A 1910 2015 106 4 0 .730 1.27 2.34 .458 .633 .246 2.64 .492 -.003 1

16 1159B 1908 2015 108 4 0 .631 1.59 3.23 .776 .836 .262 2.47 .367 -.041 1

17 1157A 1909 2015 107 4 0 .641 1.36 2.67 .576 .747 .261 2.57 .448 -.001 1

18 1157B 1929 2015 87 3 0 .748 1.80 4.17 .935 .849 .247 2.69 .422 .001 1

19 1500A 1879 2015 137 5 0 .678 .95 2.27 .471 .679 .285 2.78 .433 .058 1

20 1500B 1879 2015 137 5 0 .628 1.12 2.24 .524 .730 .299 2.48 .351 -.007 1

21 1062A 1863 2015 153 5 0 .614 .98 2.31 .490 .696 .339 2.58 .410 .032 1

22 1062B 1879 2015 137 5 0 .726 1.61 4.61 .925 .796 .281 2.53 .342 .031 1

23 1065A 1897 2015 119 5 0 .554 1.43 3.52 .776 .772 .313 2.47 .370 .025 1

24 1065B 1897 2015 119 5 0 .501 1.23 3.80 .742 .745 .303 2.46 .379 -.020 1

25 1066A 1929 2015 87 3 0 .637 1.31 3.43 .893 .863 .343 2.49 .365 -.038 1

26 1066B 1919 2015 97 4 0 .788 1.46 3.61 .959 .841 .324 2.53 .351 -.016 1

27 1067A 1914 2015 102 4 0 .490 1.17 3.26 .631 .782 .325 2.72 .547 .001 1

28 1067B 1914 2015 102 4 2 .326 1.08 2.65 .567 .776 .321 2.46 .336 -.021 1

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Total or mean: 2974 114 7 .599 1.35 7.97 .697 .748 .297 2.96 .417 .004

- = [ COFECHA RSAS3COF ] = -