[] Dendrochronology Program Library Run FAGR Program COF 13:51 Wed 27 Sep 2017 Page 1

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[] P R O G R A M C O F E C H A Version 6.06P 30222

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QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

Title of run: FAGR\_GOSH2\_CORR1-50

File of DATED series: FAGR\_GOSH2\_CORR1

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 1880 to 2016 137 years

Continuous time span is 1880 to 2016 137 years

Portion with two or more series is 1884 to 2016 133 years

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

\*C\* Number of dated series 33 \*C\*

\*O\* Master series 1880 2016 137 yrs \*O\*

\*F\* Total rings in all series 3259 \*F\*

\*E\* Total dated rings checked 3255 \*E\*

\*C\* Series intercorrelation .610 \*C\*

\*H\* Average mean sensitivity .234 \*H\*

\*A\* Segments, possible problems 10 \*A\*

\*\*\* Mean length of series 98.8 \*\*\*

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

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

No ring measurements of zero value

1900 .357 6 1950 -.716 32 2000 -.851 33

1901 -.575 6 1951 -.123 33 2001 .626 33

1902 -.932 6 1952 .675 33 2002 -1.390 33

1903 -.206 6 1953 -.354 33 2003 -2.687 33

1904 -1.040 6 1954 .323 33 2004 .721 33

1905 -1.332 6 1955 1.904 33 2005 .340 33

1906 -.822 6 1956 .226 33 2006 -1.213 33

1907 -1.461 6 1957 -.261 33 2007 .765 33

1908 -1.392 6 1958 .250 33 2008 .484 33

1909 -1.052 6 1959 -.545 33 2009 1.564 33

1910 -2.165 6 1960 -.223 33 2010 .535 33

1911 -1.528 6 1961 .816 33 2011 .313 33

1912 -.765 6 1962 -.084 33 2012 .485 33

1913 -.690 7 1963 .294 33 2013 .136 33

1914 .935 8 1964 .297 33 2014 .726 33

1915 1.855 8 1965 -.984 33 2015 1.005 33

1916 1.816 11 1966 -.356 33 2016 -1.609 33

1917 .614 12 1967 -.483 33

1918 -.321 12 1968 -.668 33

1919 .320 14 1969 -1.131 33

1920 .275 15 1970 -1.238 33

1921 -.396 17 1971 -1.158 33

1922 -.103 21 1972 .121 33

1923 -.019 21 1973 .389 33

1924 -.293 24 1974 .323 33

1925 .317 24 1975 .881 33

1926 .468 25 1976 -.056 33

1927 .349 25 1977 .596 33

1928 .189 25 1978 1.221 33

1929 .208 25 1979 1.510 33

1880 -.485 1 1930 -1.601 25 1980 .928 33

1881 2.273 1 1931 .750 25 1981 .495 33

1882 -.610 1 1932 1.158 25 1982 .963 33

1883 -.987 1 1933 .540 27 1983 -1.880 33

1884 -1.449 2 1934 1.041 29 1984 -.159 33

1885 .727 2 1935 1.632 29 1985 -.163 33

1886 .765 3 1936 -5.249 30 1986 .548 33

1887 1.092 4 1937 -.473 30 1987 .423 33

1888 1.918 5 1938 -.331 30 1988 -.758 33

1889 1.202 5 1939 .206 30 1989 .215 33

1890 .310 5 1940 .424 30 1990 .531 33

1891 .318 5 1941 -.811 30 1991 .858 33

1892 -.646 5 1942 .057 31 1992 .739 33

1893 .958 6 1943 -.246 32 1993 .868 33

1894 .466 6 1944 .383 32 1994 -.372 33

1895 -1.493 6 1945 .410 32 1995 -.017 33

1896 1.454 6 1946 -.099 32 1996 -1.016 33

1897 1.066 6 1947 .394 32 1997 -.324 33

1898 .128 6 1948 -.223 32 1998 -.070 33

1899 -.005 6 1949 -.213 32 1999 -.561 33

PART 5: CORRELATION OF SERIES BY SEGMENTS: FAGR\_GOSH2\_CORR2-50 13:51 Wed 27 Sep 2017 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 1635A 1933 2016 .73 .43 .49

2 1635B 1913 2016 .78 .80 .44 .57

3 1636A 1922 2016 .56 .61 .05B .44

4 1636B 1919 2016 .70 .72 .27A .41

5 1637A 1943 2016 .34 .33 .49

6 1637B 1934 2016 .35 .58 .64

7 1638A 1951 2016 .33A .43

8 1638B 1942 2016 .32B .39 .34

9 1639A 1916 2016 .65 .73 .46 .53

10 1639B 1921 2016 .74 .74 .47 .46

11 1641A 1922 2016 .34 .35 .38 .39

12 1641B 1934 2016 .40 .54 .38

13 1642A 1884 2016 .42 .87 .81 .17B .26A

14 1642B 1886 2016 .44 .72 .76 .45 .43

15 1688A 1926 2016 .87 .71 .75

16 1688B 1922 2016 .72 .73 .62 .58

17 1689A 1920 2016 .76 .80 .61 .75

18 1689B 1919 2016 .90 .90 .58 .53

19 1693A 1916 2016 .80 .82 .77 .77

20 1693B 1924 2016 .60 .60 .37 .62

21 1694A 1917 2016 .73 .79 .66 .63

22 1694B 1916 2016 .47 .49 .57 .63

23 1695A 1893 2016 .79 .77 .71 .34 .56

24 1695B 1888 2016 .82 .82 .74 .31A .52

25 1697A 1887 2016 .86 .80 .73 .35 .45

26 1697B 1880 2016 .64 .86 .82 .38 .53

27 1698A 1922 2016 .65 .64 .36 .58

28 1698B 1936 2016 .51 .70 .74

29 1699A 1924 2016 .75 .76 .41 .63

30 1699B 1921 2016 .73 .77 .59 .77

31 1906A 1933 2016 .66 .40 .48

32 1907A 1924 2016 .58 .58 .29B .67

33 1907B 1914 2016 .49B .45B .41 .51

Av segment correlation .66 .70 .66 .45 .54

PART 6: POTENTIAL PROBLEMS: FAGR\_GOSH2\_CORR2-50 13:51 Wed 27 Sep 2017 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

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

1635A 1933 to 2016 84 years Series 1

[B] Entire series, effect on correlation ( .639) is:

Lower 2000< -.044 2003> -.015 1992< -.013 1970> -.010 1990< -.010 1974< -.009 Higher 1936 .150 2002 .011

1635A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1933 89 85 140 29 108 164 159

1940 133 131 106 89 133 154 94 143 94 106

1950 70 72 86 115 142 179 130 94 111 75

1960 70 113 119 126 136 79 70 80 106 82

1970 126 136 102 98 77 112 86 147 166 206

1980 198 179 180 111 97 121 145 141 110 118

1990 85 113 75 100 63 111 64 96 98 88

2000 35 79 47 71 103 97 53 113 112 147

2010 126 119 161 70 136 108 52

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

1635B 1913 to 2016 104 years Series 2

[B] Entire series, effect on correlation ( .686) is:

Lower 1996> -.013 2016> -.011 2013< -.011 1918> -.010 1952< -.009 2002> -.009 Higher 1936 .182 2003 .012

1635B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1913 249 262 318 316 278 309 249

1920 275 228 188 203 170 235 206 236 293 321

1930 258 358 321 278 282 273 89 201 188 196

1940 196 167 165 129 155 156 156 184 181 193

1950 165 178 140 157 157 201 138 176 136 136

1960 105 153 120 136 135 106 90 99 112 90

1970 97 104 119 109 127 127 138 183 170 181

1980 189 217 188 162 181 191 167 185 156 184

1990 160 213 164 158 136 145 156 118 105 119

2000 84 133 101 48 109 83 81 117 102 149

2010 105 80 90 59 98 100 84

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

1636A 1922 to 2016 95 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

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

1950 1999 9 .01 .16 -.07 -.06 .13 -.02 .12 .10 .13 .05 .05|-.17 .18 .04 -.24 .08 -.02 -.37 .15 .34\*-.27

[B] Entire series, effect on correlation ( .509) is:

Lower 1954< -.050 1923< -.020 1988> -.016 1965> -.015 1955< -.014 2009< -.014 Higher 1936 .204 2016 .017

1950 to 1999 segment:

Lower 1954< -.073 1988> -.041 1965> -.039 1996> -.032 1955< -.021 1979< -.021 Higher 1994 .051 1970 .028

1636A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1922 200 137 303 262 307 263 285 224

1930 242 336 398 349 390 413 164 252 305 278

1940 245 178 225 225 270 269 242 275 170 184

1950 166 69 128 117 11 37 39 26 26 10

1960 17 18 17 21 38 40 38 18 21 14

1970 12 30 41 45 61 67 97 154 159 110

1980 124 175 198 160 208 154 184 155 200 192

1990 177 186 197 210 153 179 204 157 189 193

2000 212 246 165 152 206 167 173 245 231 195

2010 229 258 342 269 325 265 145

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1636B 1919 to 2016 98 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

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

1950 1999 0 .10 -.04 -.20 -.08 .01 .04 .12 -.02 .15 .01 .27\* .00 .03 -.14 -.28 .15 -.01 -.03 .18 .13 -.12

[B] Entire series, effect on correlation ( .597) is:

Lower 2009< -.027 2003> -.026 1998< -.013 1965> -.012 1927< -.011 1975< -.009 Higher 1936 .257 2016 .019

1950 to 1999 segment:

Lower 1965> -.044 1975< -.023 1950> -.023 1987< -.018 1998< -.018 1974< -.018 Higher 1970 .036 1983 .033

1636B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1919 149

1920 183 159 149 120 190 158 131 90 100 160

1930 90 232 252 197 181 183 39 172 136 184

1940 213 199 226 211 168 183 180 206 155 195

1950 170 103 117 108 80 80 54 38 41 18

1960 22 31 29 27 45 49 54 42 47 34

1970 21 34 64 60 45 50 70 76 82 99

1980 112 120 134 106 147 111 151 117 120 144

1990 179 217 232 204 171 141 158 142 115 156

2000 155 192 178 188 196 219 177 234 194 161

2010 195 186 191 179 224 224 129

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1637A 1943 to 2016 74 years Series 5

[B] Entire series, effect on correlation ( .442) is:

Lower 1994> -.025 1948> -.021 1977< -.021 2006> -.017 1990< -.017 1952< -.016 Higher 2003 .108 2002 .038

1637A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1943 154 140 133 104 133 286 165

1950 94 292 169 110 172 261 225 167 155 103

1960 143 172 152 200 184 166 223 196 212 219

1970 222 204 226 272 242 228 183 183 228 250

1980 228 240 241 179 181 210 236 231 183 189

1990 171 219 182 192 205 160 153 154 136 143

2000 133 147 88 46 96 123 114 94 102 137

2010 88 124 100 47 56 56 49

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1637B 1934 to 2016 83 years Series 6

[B] Entire series, effect on correlation ( .432) is:

Lower 1936> -.054 1947< -.050 1934< -.019 2007< -.012 1948> -.010 1978< -.008 Higher 1983 .026 2002 .021

1637B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1934 54 109 60 104 141 189

1940 156 122 149 124 108 88 109 61 182 140

1950 148 183 143 108 134 208 143 103 146 107

1960 114 143 148 173 174 136 132 145 129 123

1970 148 132 177 151 173 150 121 128 126 176

1980 199 153 186 104 114 172 118 127 90 122

1990 113 148 131 122 99 98 56 101 77 86

2000 84 111 42 40 95 80 25 42 71 103

2010 82 96 97 68 68 52 45

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

1638A 1951 to 2016 66 years Series 7

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

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

1951 2000 0 -.22 -.34 -.06 .22 -.10 .28 -.08 .23 -.09 -.18 .33\* .03 -.10 .17 .22 -.29 .14 .24 -.16 -.02 -.07

[B] Entire series, effect on correlation ( .433) is:

Lower 1994> -.026 2001< -.026 1969> -.024 1963< -.022 1973< -.019 2002> -.019 Higher 2016 .056 2003 .053

1951 to 2000 segment:

Lower 1994> -.040 1969> -.036 1963< -.029 1973< -.026 1970> -.025 1990< -.024 Higher 1955 .052 1988 .043

1638A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1951 226 202 144 198 270 137 160 179 160

1960 182 182 186 129 140 129 137 144 175 226

1970 220 227 206 161 201 229 210 229 284 285

1980 320 188 266 179 208 213 198 154 116 184

1990 128 127 154 152 182 118 106 123 162 83

2000 111 82 98 71 105 83 86 115 177 141

2010 124 123 147 135 139 153 101

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

1638B 1942 to 2016 75 years Series 8

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

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

1942 1991 -7 -.06 -.37 -.17 .56\*-.06 .29 -.05 .07 .00 -.15 .32|-.10 .06 .03 -.03 -.11 .20 .15 -.06 -.02 -.04

[B] Entire series, effect on correlation ( .300) is:

Lower 1943< -.058 2002> -.034 2000> -.020 1969> -.017 2007< -.011 1950> -.011 Higher 1955 .041 2016 .038

1942 to 1991 segment:

Lower 1943< -.082 1969> -.033 1950> -.022 1971> -.021 1970> -.015 1959> -.013 Higher 1955 .067 1988 .048

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

1943 -4.8 SD

1638B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1942 145 115 145 183 161 159 165 179

1950 187 194 176 141 158 249 163 182 192 191

1960 206 222 196 142 141 134 146 139 172 232

1970 216 247 210 200 158 190 198 222 365 380

1980 373 184 224 150 184 182 185 136 83 165

1990 154 141 151 144 167 124 111 181 226 107

2000 199 163 172 115 146 87 86 103 191 158

2010 108 146 165 165 174 170 101

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1639A 1916 to 2016 101 years Series 9

[B] Entire series, effect on correlation ( .603) is:

Lower 1994> -.027 1917< -.023 1951< -.019 1918> -.012 2002> -.009 1938< -.009 Higher 1936 .167 1983 .017

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

1994 +3.3 SD

1639A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1916 316 243 322 320

1920 247 270 338 338 300 239 209 158 167 180

1930 80 149 196 179 175 213 34 90 59 85

1940 80 82 85 84 95 107 99 71 61 45

1950 45 43 124 143 130 171 131 139 161 148

1960 217 256 233 241 201 195 223 230 218 210

1970 173 194 252 216 259 300 181 156 207 216

1980 183 175 180 134 171 179 163 189 108 129

1990 178 133 120 136 211 138 95 108 102 85

2000 93 92 106 78 165 147 94 142 135 163

2010 111 80 83 138 168 199 110

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1639B 1921 to 2016 96 years Series 10

[B] Entire series, effect on correlation ( .619) is:

Lower 1994> -.022 1981< -.021 1986< -.014 1950< -.010 2006> -.008 2002> -.008 Higher 1936 .149 1983 .023

1639B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1921 358 359 336 298 233 279 273 200 153

1930 52 131 172 222 241 318 78 102 86 98

1940 92 85 111 110 151 118 87 131 100 118

1950 61 61 102 94 104 156 135 162 184 189

1960 250 344 326 313 277 274 344 290 265 232

1970 237 277 324 263 289 335 214 285 313 297

1980 219 139 219 118 149 170 135 178 134 139

1990 187 190 200 205 267 201 198 200 193 144

2000 180 235 210 183 320 337 259 248 186 213

2010 144 109 109 193 170 166 110

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1641A 1922 to 2016 95 years Series 11

[B] Entire series, effect on correlation ( .368) is:

Lower 1936> -.029 1971< -.025 1978< -.020 2002> -.015 2016> -.012 1953> -.010 Higher 2003 .040 1955 .015

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

1936 +3.4 SD; 1971 -7.3 SD

1641A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1922 133 177 141 119 120 181 205 265

1930 219 282 308 195 257 231 84 77 88 124

1940 97 96 100 92 115 117 92 176 179 157

1950 170 294 402 533 565 615 329 292 270 297

1960 338 357 316 300 307 273 295 280 309 276

1970 215 184 226 246 238 246 237 220 182 201

1980 206 240 207 159 185 183 145 156 95 122

1990 123 152 99 60 66 69 40 45 91 43

2000 40 41 50 21 47 48 37 44 46 70

2010 42 23 24 38 49 39 35

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1641B 1934 to 2016 83 years Series 12

[B] Entire series, effect on correlation ( .358) is:

Lower 2010< -.055 1936> -.053 2016> -.009 1997< -.009 1964< -.008 2001< -.008 Higher 1955 .023 2003 .015

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

1936 +3.6 SD

1641B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1934 172 119 33 69 84 71

1940 78 93 65 67 83 145 105 166 130 188

1950 164 301 344 306 370 486 296 256 237 299

1960 263 277 261 323 225 175 200 232 260 237

1970 208 185 269 255 219 234 207 225 227 269

1980 194 182 187 164 142 123 157 167 119 136

1990 151 157 121 113 55 79 57 36 65 45

2000 47 36 34 24 36 54 34 52 29 37

2010 8 34 34 19 29 32 23

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1642A 1884 to 2016 133 years Series 13

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

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

1950 1999 -3 .08 .13 -.02 -.10 -.16 -.17 -.05 .34\* .00 -.07 .17| .06 .17 .04 .09 .16 .08 -.02 -.12 .04 -.18

1967 2016 0 .11 .05 -.13 -.11 -.11 -.27 .08 .15 -.11 -.06 .26\* - - - - - - - - - -

[B] Entire series, effect on correlation ( .603) is:

Lower 1895> -.027 1894< -.014 1971> -.013 1988> -.012 1970> -.012 1900< -.012 Higher 1936 .234 2016 .007

1950 to 1999 segment:

Lower 1988> -.051 1971> -.050 1970> -.050 1979< -.025 1951< -.023 1993< -.019 Higher 1983 .103 1965 .030

1967 to 2016 segment:

Lower 1971> -.040 1988> -.038 1970> -.038 2012< -.025 1979< -.022 2002> -.022 Higher 1983 .070 2016 .067

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

1971 +3.5 SD

1642A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1884 66 93 79 85 103 74

1890 62 63 47 62 47 55 56 61 64 64

1900 50 51 53 57 52 64 78 76 81 97

1910 67 80 123 104 150 181 214 205 157 169

1920 205 168 191 183 215 208 255 215 195 186

1930 140 186 219 166 166 193 51 154 142 147

1940 132 81 105 89 123 130 104 108 72 53

1950 66 40 61 74 108 114 106 91 148 123

1960 119 139 126 149 122 114 133 160 126 135

1970 189 222 187 200 175 191 178 178 173 165

1980 223 211 201 146 155 163 147 143 184 213

1990 183 141 113 95 121 131 100 77 63 55

2000 47 62 87 72 117 111 99 117 131 126

2010 101 124 95 140 124 151 110

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1642B 1886 to 2016 131 years Series 14

[B] Entire series, effect on correlation ( .585) is:

Lower 1894< -.024 2007< -.011 2014< -.011 1909> -.008 1949< -.007 1910> -.007 Higher 1936 .153 2003 .013

1642B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1886 107 98 113 90

1890 78 88 80 89 58 59 111 109 85 107

1900 101 81 90 78 63 62 104 94 114 153

1910 139 132 159 169 187 218 187 181 129 187

1920 235 174 219 148 141 168 243 138 187 152

1930 102 126 164 179 201 174 32 130 108 116

1940 96 53 82 101 115 97 85 57 45 33

1950 56 42 78 84 89 106 65 55 100 105

1960 143 175 131 185 139 119 121 121 106 118

1970 128 163 195 186 156 200 185 176 203 193

1980 202 189 193 170 228 195 184 194 153 194

1990 204 170 163 162 162 192 170 157 190 166

2000 160 177 157 123 185 140 134 129 126 142

2010 178 178 193 170 128 204 157

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1688A 1926 to 2016 91 years Series 15

[B] Entire series, effect on correlation ( .832) is:

Lower 1930> -.015 1941> -.011 2012< -.010 2016> -.007 1935< -.007 1978< -.005 Higher 1936 .185 2002 .003

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

1936 -5.3 SD

1688A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1926 250 264 158 154

1930 185 226 228 175 167 151 21 128 134 118

1940 148 149 129 106 130 122 116 122 107 128

1950 135 158 170 134 172 177 154 116 137 115

1960 136 155 120 124 116 114 116 132 124 112

1970 122 128 144 158 207 228 197 246 205 250

1980 223 241 245 173 212 206 255 226 164 195

1990 218 210 183 204 135 195 139 198 167 176

2000 141 195 116 95 164 157 132 191 195 244

2010 163 134 92 101 157 177 114

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1688B 1922 to 2016 95 years Series 16

[B] Entire series, effect on correlation ( .676) is:

Lower 2011< -.019 2006> -.018 1932< -.014 1931< -.014 1945> -.013 2012< -.010 Higher 1936 .176 1983 .017

1688B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1922 186 221 209 244 226 213 135 72

1930 31 35 30 46 77 68 7 49 46 44

1940 45 39 52 43 57 92 68 54 56 73

1950 64 62 52 49 59 92 83 78 83 60

1960 45 58 76 88 83 75 61 65 51 97

1970 133 153 181 179 185 254 214 243 236 265

1980 217 213 222 144 160 161 214 169 159 161

1990 162 169 149 172 122 143 97 121 130 126

2000 108 182 109 94 156 122 164 182 173 231

2010 291 118 73 92 143 205 121

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1689A 1920 to 2016 97 years Series 17

[B] Entire series, effect on correlation ( .754) is:

Lower 2006> -.025 1952< -.024 1920< -.018 1950> -.013 1923> -.010 1989< -.006 Higher 1936 .156 1983 .012

1689A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1920 148 171 182 250 204 230 192 215 194 188

1930 133 179 245 234 275 235 37 218 229 173

1940 209 155 129 119 124 189 160 203 146 142

1950 190 180 84 91 153 150 92 79 95 96

1960 83 161 126 132 121 89 124 84 85 68

1970 48 56 107 116 175 211 154 177 188 191

1980 143 170 203 86 134 154 123 108 105 90

1990 97 101 103 133 81 86 58 86 65 60

2000 62 131 70 56 118 114 146 179 114 166

2010 155 113 141 135 128 170 89

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1689B 1919 to 2016 98 years Series 18

[B] Entire series, effect on correlation ( .777) is:

Lower 2002> -.015 1952< -.010 1922< -.009 2006> -.009 2015< -.008 1983> -.007 Higher 1936 .230 1955 .006

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

1936 -4.8 SD

1689B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1919 301

1920 280 245 211 245 226 243 252 270 259 252

1930 201 241 275 285 272 278 76 199 225 221

1940 238 196 212 231 254 220 209 208 180 191

1950 160 224 163 151 179 265 134 178 193 180

1960 141 198 160 125 149 118 93 100 75 52

1970 48 32 107 148 162 137 122 138 132 131

1980 102 132 142 107 158 148 120 117 117 108

1990 112 134 138 128 92 115 62 98 82 52

2000 64 138 116 78 113 114 107 122 149 123

2010 115 114 174 86 97 74 55

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1693A 1916 to 2016 101 years Series 19

[B] Entire series, effect on correlation ( .787) is:

Lower 1948< -.009 1999> -.008 2006> -.008 1917< -.007 1960< -.007 2004< -.006 Higher 1936 .082 1983 .007

1693A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1916 362 273 240 297

1920 318 264 393 327 384 376 328 336 435 452

1930 299 438 456 396 371 376 82 161 195 274

1940 284 214 214 174 256 186 164 198 122 176

1950 155 234 281 195 263 322 251 212 196 205

1960 165 240 235 229 216 162 188 193 183 185

1970 204 184 180 218 198 237 206 234 256 265

1980 216 233 191 79 133 124 141 171 105 157

1990 169 169 193 197 125 129 79 106 110 137

2000 91 143 61 53 91 90 106 171 112 212

2010 150 113 148 192 234 198 110

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1693B 1924 to 2016 93 years Series 20

[B] Entire series, effect on correlation ( .616) is:

Lower 1928< -.017 1963< -.016 1970> -.013 1978< -.011 1968> -.011 1960< -.009 Higher 1936 .058 2003 .017

1693B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1924 241 180 236 226 116 200

1930 152 274 291 267 315 416 103 168 220 207

1940 209 219 240 229 235 215 203 209 207 224

1950 197 263 328 233 253 268 160 196 196 200

1960 159 205 207 157 245 197 224 247 274 194

1970 252 193 249 265 194 212 144 183 166 203

1980 229 191 171 125 165 162 248 235 157 173

1990 135 134 165 201 96 127 104 146 118 128

2000 83 120 42 54 108 104 85 113 98 150

2010 96 85 90 76 96 94 64

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1694A 1917 to 2016 100 years Series 21

[B] Entire series, effect on correlation ( .668) is:

Lower 2002> -.037 2006< -.016 1930> -.009 1920< -.008 1921< -.006 1956> -.006 Higher 1936 .095 1983 .018

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

2002 +3.5 SD

1694A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1917 227 211 234

1920 200 171 229 194 178 279 319 267 236 265

1930 242 310 361 262 207 270 60 121 168 257

1940 263 151 220 195 293 181 132 82 83 62

1950 48 75 201 173 180 230 247 217 181 183

1960 249 281 187 255 214 178 193 171 155 168

1970 159 187 226 255 322 299 278 332 304 344

1980 320 272 349 176 239 257 277 227 118 125

1990 143 148 159 133 137 103 84 86 101 122

2000 108 147 161 76 138 103 40 74 85 102

2010 90 80 85 112 99 121 90

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1694B 1916 to 2016 101 years Series 22

[B] Entire series, effect on correlation ( .524) is:

Lower 1947< -.122 1924< -.012 1930> -.010 1988> -.008 1999> -.006 1996> -.006 Higher 1936 .096 1983 .028

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

1946 1947 -4.3 SD

1694B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1916 295 282 251 229

1920 230 179 177 200 140 197 173 210 185 193

1930 191 275 235 225 211 236 86 94 134 177

1940 180 103 148 134 155 149 190 52 129 117

1950 86 127 234 210 200 214 178 214 247 191

1960 245 249 157 238 183 138 163 136 187 136

1970 112 161 208 258 208 201 232 261 264 258

1980 217 173 167 78 100 116 172 170 178 172

1990 179 160 198 151 99 126 131 120 117 131

2000 121 119 62 34 67 69 51 73 75 113

2010 174 158 183 154 140 156 124

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1695A 1893 to 2016 124 years Series 23

[B] Entire series, effect on correlation ( .648) is:

Lower 1986< -.020 2015< -.010 2006> -.009 1965> -.008 1954< -.008 1901< -.007 Higher 1936 .141 1983 .014

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

1930 -4.8 SD

1695A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1893 71 105 46 90 67 60 31

1900 57 15 16 46 31 34 24 18 17 10

1910 11 51 74 129 166 251 198 126 106 150

1920 178 193 178 156 148 134 115 94 80 81

1930 30 100 130 103 109 112 25 77 47 77

1940 95 99 125 159 248 166 189 150 191 179

1950 93 98 120 117 91 126 117 132 148 167

1960 194 227 181 140 146 160 164 153 104 85

1970 107 129 125 108 112 104 122 170 201 212

1980 185 146 192 108 122 142 90 179 179 148

1990 225 198 198 191 180 125 126 144 131 98

2000 83 136 93 68 98 130 121 139 139 120

2010 86 89 99 92 113 77 39

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

1695B 1888 to 2016 129 years Series 24

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

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1950 1999 0 .06 -.05 -.09 .03 -.01 -.08 -.14 .10 -.17 -.09 .31\*-.17 .06 -.17 -.13 -.22 -.22 .11 -.22 -.23 -.19

[B] Entire series, effect on correlation ( .668) is:

Lower 2006< -.019 1972< -.016 1981< -.011 1892> -.010 1994> -.007 1988> -.006 Higher 1936 .138 1983 .013

1950 to 1999 segment:

Lower 1972< -.058 1981< -.037 1994> -.031 1988> -.026 1986< -.023 1971> -.023 Higher 1983 .191 1955 .024

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

2006 -4.7 SD

1695B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1888 90 73

1890 58 67 74 80 92 41 81 54 40 28

1900 41 47 31 46 38 37 35 29 38 26

1910 17 64 76 176 314 300 264 204 157 201

1920 180 185 204 221 184 193 252 185 158 138

1930 37 82 103 126 117 136 19 61 42 58

1940 69 84 114 103 152 107 102 87 93 123

1950 100 87 103 104 136 198 141 197 248 286

1960 296 377 344 355 335 317 324 356 336 270

1970 256 282 200 222 213 234 181 205 208 187

1980 174 118 147 73 108 127 106 158 178 165

1990 276 253 217 240 249 185 151 194 202 179

2000 161 171 117 66 130 126 48 77 87 94

2010 85 91 86 113 91 94 65

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1697A 1887 to 2016 130 years Series 25

[B] Entire series, effect on correlation ( .664) is:

Lower 1972< -.025 1945< -.024 1969> -.012 1979< -.011 1988> -.010 1898< -.008 Higher 1936 .191 1955 .009

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

1972 -5.5 SD

1697A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1887 104 120 129

1890 105 71 59 95 89 25 59 50 12 11

1900 20 11 13 35 40 30 29 25 21 27

1910 13 28 22 28 187 278 353 368 313 329

1920 348 358 395 424 470 379 403 371 351 306

1930 236 280 334 259 270 317 58 124 136 127

1940 102 112 138 143 164 68 102 88 94 105

1950 108 72 97 76 112 174 133 117 78 102

1960 102 111 68 125 107 60 97 110 110 145

1970 102 86 64 146 154 144 121 160 205 154

1980 167 214 188 152 158 157 200 200 203 191

1990 191 151 179 122 79 84 60 61 77 58

2000 33 35 34 18 38 32 30 63 37 56

2010 27 31 34 31 27 24 8

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1697B 1880 to 2016 137 years Series 26

[\*] Early part of series cannot be checked from 1880 to 1883 -- not matched by another series

[B] Entire series, effect on correlation ( .704) is:

Lower 1961< -.020 2009< -.012 1956> -.011 1993< -.011 1901> -.010 1980< -.010 Higher 1936 .172 1895 .010

1697B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1880 58 99 51 45 37 49 49 69 54 67

1890 59 37 23 31 34 9 26 21 21 21

1900 30 32 21 26 33 20 17 15 11 16

1910 12 17 18 31 210 273 314 274 202 204

1920 174 158 206 169 154 206 219 193 213 203

1930 139 205 188 143 166 195 36 116 121 96

1940 135 101 132 178 228 118 103 116 68 89

1950 107 96 141 120 149 180 193 117 90 80

1960 100 64 75 105 105 85 84 100 94 106

1970 87 88 135 144 109 143 129 166 196 197

1980 133 161 160 138 139 153 187 182 146 127

1990 156 145 131 104 120 133 102 103 94 69

2000 67 99 64 43 86 87 65 88 54 45

2010 60 58 37 53 45 38 24

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1698A 1922 to 2016 95 years Series 27

[B] Entire series, effect on correlation ( .627) is:

Lower 1944< -.075 1930> -.029 1963< -.012 1988> -.010 1922< -.010 1983> -.009 Higher 1936 .229 2006 .009

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

1943 1944 -4.1 SD

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

1944 -5.5 SD

1698A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1922 164 205 167 221 235 268 214 254

1930 329 390 326 283 306 288 17 189 156 146

1940 186 90 134 164 32 97 114 166 112 111

1950 114 103 156 100 138 162 125 99 134 115

1960 141 126 119 57 102 82 95 74 33 30

1970 43 58 55 45 68 91 105 114 144 190

1980 180 183 217 170 233 160 237 190 225 200

1990 193 208 244 234 167 144 184 146 150 173

2000 158 182 123 131 214 170 117 244 172 277

2010 168 170 162 153 133 142 115

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1698B 1936 to 2016 81 years Series 28

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

Lower 1936> -.111 1944< -.013 2002< -.012 1949< -.009 1965> -.009 1943> -.008 Higher 1983 .022 2016 .020

1698B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1936 69 155 188 206

1940 251 89 157 218 104 142 114 157 94 63

1950 92 124 111 97 142 165 105 78 82 51

1960 78 75 83 95 102 105 107 70 63 51

1970 47 66 108 122 140 218 184 229 263 249

1980 190 203 180 122 242 175 260 209 177 197

1990 196 183 216 197 160 149 138 158 174 168

2000 152 192 74 120 198 190 128 264 140 244

2010 212 163 144 128 141 146 85

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1699A 1924 to 2016 93 years Series 29

[B] Entire series, effect on correlation ( .710) is:

Lower 1962< -.022 1983> -.020 1930> -.016 1941< -.008 2006> -.008 1924< -.007 Higher 1936 .175 2016 .013

1699A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1924 140 185 187 247 220 150

1930 175 258 210 213 165 179 17 96 119 122

1940 154 52 75 101 122 137 150 221 196 133

1950 146 231 224 117 135 227 180 142 130 117

1960 153 134 58 83 109 105 125 110 101 124

1970 125 99 157 202 269 287 299 282 307 312

1980 256 257 335 306 346 333 351 289 288 295

1990 282 267 234 280 217 182 184 165 192 204

2000 164 158 105 104 199 163 168 253 199 244

2010 199 189 218 211 187 220 124

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1699B 1921 to 2016 96 years Series 30

[B] Entire series, effect on correlation ( .737) is:

Lower 1921> -.021 1930> -.017 1942< -.007 1958< -.006 1987< -.006 2014< -.006 Higher 1936 .132 2003 .012

1699B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1921 301 207 248 170 183 154 146 205 195

1930 179 197 140 138 157 176 12 69 80 91

1940 106 27 42 86 179 241 185 248 140 108

1950 102 245 353 195 258 221 200 129 122 132

1960 176 177 155 139 177 143 169 137 151 124

1970 113 115 199 209 269 331 308 295 429 365

1980 321 325 304 205 331 198 228 186 193 219

1990 306 227 228 283 176 160 159 142 203 188

2000 172 186 114 93 213 163 127 272 165 284

2010 237 193 201 174 151 255 111

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1906A 1933 to 2016 84 years Series 31

[B] Entire series, effect on correlation ( .607) is:

Lower 1962< -.030 1990< -.016 1996> -.016 2007< -.015 2000> -.014 1977< -.013 Higher 1936 .116 2016 .018

1906A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1933 156 248 196 43 106 88 95

1940 115 82 128 110 109 144 113 190 154 129

1950 118 129 160 137 148 178 175 151 171 137

1960 135 138 104 175 144 115 136 127 161 131

1970 131 159 169 190 225 212 173 134 160 167

1980 153 135 132 107 123 114 147 150 117 95

1990 86 94 130 138 101 121 143 169 130 123

2000 154 109 87 88 119 125 83 90 119 178

2010 169 153 139 127 183 193 99

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1907A 1924 to 2016 93 years Series 32

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

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

1950 1999 2 -.07 -.06 -.55 -.09 .00 -.21 .21 .04 -.12 .13 .29|-.02 .30\* .18 .07 .09 .05 -.01 -.07 -.03 -.24

[B] Entire series, effect on correlation ( .613) is:

Lower 1963< -.059 1933< -.026 1954< -.010 1988> -.010 1926< -.009 1982< -.007 Higher 1936 .186 2002 .011

1950 to 1999 segment:

Lower 1963< -.119 1988> -.030 1954< -.024 1970> -.021 1982< -.021 1956> -.014 Higher 1983 .040 1978 .029

1907A Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1924 221 242 221 237 235 232

1930 216 224 230 178 238 292 164 240 225 295

1940 305 263 271 247 231 199 173 222 210 202

1950 202 205 222 163 153 173 190 174 224 194

1960 154 158 161 118 165 152 165 173 160 153

1970 188 159 209 232 205 219 226 248 286 261

1980 228 175 161 140 153 145 190 169 192 203

1990 207 234 171 158 115 141 112 118 96 90

2000 83 104 63 61 89 103 53 76 96 107

2010 101 94 100 83 98 86 74

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1907B 1914 to 2016 103 years Series 33

[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 6 -.08 -.01 .09 -.01 -.03 -.12 -.09 -.03 .03 -.24 .49|-.27 -.23 .17 -.07 -.06 .52\*-.15 -.04 .04 -.09

1925 1974 6 -.10 -.03 .09 .02 .03 -.09 -.07 -.04 .01 -.32 .45|-.22 -.21 .20 .00 .03 .59\*-.08 .01 -.04 -.07

[B] Entire series, effect on correlation ( .487) is:

Lower 1936> -.022 1998< -.021 1988> -.018 1984< -.012 1947> -.008 1964< -.008 Higher 1983 .020 2006 .013

1914 to 1963 segment:

Lower 1936> -.072 1947> -.019 1937> -.009 1949> -.009 1932< -.009 1944< -.009 Higher 1955 .018 1930 .016

1925 to 1974 segment:

Lower 1964< -.016 1936> -.014 1947> -.012 1944< -.011 1932< -.011 1954< -.011 Higher 1955 .020 1930 .017

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

1937 +3.6 SD; 1947 +3.2 SD

1907B Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1914 179 192 253 205 124 124

1920 146 117 140 151 152 145 169 183 207 220

1930 144 209 188 180 233 274 179 365 272 293

1940 225 215 224 195 182 199 240 381 247 277

1950 209 214 254 181 166 232 211 189 193 145

1960 141 162 154 179 151 150 150 177 179 193

1970 189 216 256 237 245 238 250 219 244 246

1980 212 200 210 171 159 178 202 178 221 221

1990 190 207 186 175 141 166 127 160 94 83

2000 99 137 118 86 147 156 87 97 118 144

2010 129 146 124 93 107 104 88

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PART 7: DESCRIPTIVE STATISTICS: FAGR\_GOSH2\_CORR2-50 13:51 Wed 27 Sep 2017 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 1635A 1933 2016 84 3 0 .639 1.09 2.06 .359 .444 .307 2.51 .438 -.099 1

2 1635B 1913 2016 104 4 0 .686 1.68 3.58 .664 .834 .182 2.48 .340 -.028 2

3 1636A 1922 2016 95 4 1 .509 1.73 4.13 1.010 .861 .261 2.44 .434 -.046 1

4 1636B 1919 2016 98 4 1 .597 1.34 2.52 .635 .816 .230 2.44 .344 -.047 1

5 1637A 1943 2016 74 3 0 .442 1.68 2.92 .590 .648 .219 2.56 .399 .125 2

6 1637B 1934 2016 83 3 0 .432 1.18 2.08 .408 .594 .267 2.66 .546 -.018 1

7 1638A 1951 2016 66 2 1 .433 1.65 3.20 .540 .677 .201 2.81 .686 -.079 1

8 1638B 1942 2016 75 3 1 .300 1.74 3.80 .551 .608 .201 2.63 .402 -.004 1

9 1639A 1916 2016 101 4 0 .603 1.62 3.38 .709 .798 .225 2.61 .404 -.057 2

10 1639B 1921 2016 96 4 0 .619 1.98 3.59 .815 .777 .223 2.57 .422 -.056 1

11 1641A 1922 2016 95 4 0 .368 1.75 6.15 1.203 .910 .217 2.63 .447 .061 2

12 1641B 1934 2016 83 3 0 .358 1.50 4.86 1.016 .902 .276 2.69 .461 -.065 1

13 1642A 1884 2016 133 5 2 .603 1.24 2.55 .521 .841 .189 2.38 .277 -.072 1

14 1642B 1886 2016 131 5 0 .585 1.38 2.43 .486 .752 .206 2.56 .366 -.005 1

15 1688A 1926 2016 91 3 0 .832 1.62 2.64 .463 .625 .201 2.28 .272 -.038 1

16 1688B 1922 2016 95 4 0 .676 1.23 2.91 .677 .846 .247 2.63 .368 -.031 1

17 1689A 1920 2016 97 4 0 .754 1.39 2.75 .529 .593 .259 2.38 .338 -.035 1

18 1689B 1919 2016 98 4 0 .777 1.58 3.01 .657 .795 .211 2.36 .271 -.022 1

19 1693A 1916 2016 101 4 0 .787 2.13 4.56 .919 .779 .233 2.48 .376 -.026 1

20 1693B 1924 2016 93 4 0 .616 1.83 4.16 .672 .626 .233 2.65 .437 -.011 1

21 1694A 1917 2016 100 4 0 .668 1.87 3.61 .795 .762 .238 2.47 .441 -.019 1

22 1694B 1916 2016 101 4 0 .524 1.67 2.95 .576 .712 .222 2.42 .361 -.053 1

23 1695A 1893 2016 124 5 0 .648 1.19 2.51 .541 .785 .277 2.51 .359 -.027 1

24 1695B 1888 2016 129 5 1 .668 1.47 3.77 .884 .901 .253 2.41 .344 -.044 2

25 1697A 1887 2016 130 5 0 .664 1.31 4.70 1.078 .922 .282 2.49 .291 -.034 1

26 1697B 1880 2016 137 5 0 .704 1.06 3.14 .650 .849 .259 2.40 .281 -.042 1

27 1698A 1922 2016 95 4 0 .627 1.58 3.90 .711 .691 .280 2.53 .354 -.022 2

28 1698B 1936 2016 81 3 0 .554 1.47 2.64 .576 .585 .267 2.55 .406 -.018 1

29 1699A 1924 2016 93 4 0 .710 1.88 3.51 .732 .796 .226 2.44 .355 -.008 1

30 1699B 1921 2016 96 4 0 .737 1.90 4.29 .761 .629 .284 2.52 .368 .028 2

31 1906A 1933 2016 84 3 0 .607 1.37 2.48 .351 .465 .204 2.72 .492 -.010 1

32 1907A 1924 2016 93 4 1 .613 1.76 3.05 .603 .860 .148 2.53 .398 -.088 1

33 1907B 1914 2016 103 4 2 .487 1.83 3.81 .555 .694 .165 2.85 .525 -.020 1

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Total or mean: 3259 128 10 .610 1.55 6.15 .680 .750 .234 2.85 .385 -.029

- = [ COFECHA FAGR COF ] = -