[] Dendrochronology Program Library Run 176CA Program COF 15:51 Thu 24 Mar 2011 Page 1

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[] P R O G R A M C O F E C H A Version 6.06P 27843

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QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

Title of run: 176\_CAR\_Corr3-30

File of DATED series: 176\_CAR\_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 30 years lagged successively by 15 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 .4226

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 1905 to 2010 106 years

Continuous time span is 1905 to 2010 106 years

Portion with two or more series is 1908 to 2010 103 years

>> 572-a 1989 absent in 4 of 22 series, but is not usually narrow: master index is .940

>> 572-a 1990 absent in 4 of 22 series, but is not usually narrow: master index is .460

>> 572-a 1999 absent in 1 of 22 series, but is not usually narrow: master index is .657

>> 572-a 2001 absent in 1 of 22 series, but is not usually narrow: master index is .680

>> 572-b 1989 absent in 4 of 22 series, but is not usually narrow: master index is .940

>> 573-a 1987 absent in 2 of 22 series, but is not usually narrow: master index is .254

>> 573-a 1988 absent in 2 of 22 series, but is not usually narrow: master index is 1.454

>> 573-a 1989 absent in 4 of 22 series, but is not usually narrow: master index is .940

>> 573-a 1997 absent in 1 of 22 series, but is not usually narrow: master index is -.043

>> 574-a 1960 absent in 1 of 22 series, but is not usually narrow: master index is .397

>> 574-b 1983 absent in 1 of 22 series, but is not usually narrow: master index is .604

>> 574-b 1984 absent in 1 of 22 series, but is not usually narrow: master index is -.260

>> 574-b 1987 absent in 2 of 22 series, but is not usually narrow: master index is .254

>> 574-b 1988 absent in 2 of 22 series, but is not usually narrow: master index is 1.454

>> 574-b 1989 absent in 4 of 22 series, but is not usually narrow: master index is .940

>> 574-b 1990 absent in 4 of 22 series, but is not usually narrow: master index is .460

>> 574-b 1991 absent in 2 of 22 series, but is not usually narrow: master index is .460

>> 576-a 1990 absent in 4 of 22 series, but is not usually narrow: master index is .460

>> 566-a 1990 absent in 4 of 22 series, but is not usually narrow: master index is .460

>> 566-a 1991 absent in 2 of 22 series, but is not usually narrow: master index is .460

>> 566-a 1993 absent in 1 of 22 series, but is not usually narrow: master index is .811

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

\*C\* Number of dated series 22 \*C\*

\*O\* Master series 1905 2010 106 yrs \*O\*

\*F\* Total rings in all series 1910 \*F\*

\*E\* Total dated rings checked 1907 \*E\*

\*C\* Series intercorrelation .557 \*C\*

\*H\* Average mean sensitivity .339 \*H\*

\*A\* Segments, possible problems 28 \*A\*

\*\*\* Mean length of series 86.8 \*\*\*

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

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

566-b 3 absent rings: 1981 1985 1986

567-a 1 absent rings: 2004

572-a 9 absent rings: 1972 1981 1986 1989 1990 1999 2001 2004 2005

572-b 3 absent rings: 1985 1986 1989

573-a 5 absent rings: 1987 1988 1989 1996 1997

574-a 4 absent rings: 1960 1979 1985 1986

574-b 10 absent rings: 1983 1984 1985 1986 1987 1988 1989 1990 1991 1996

576-a 2 absent rings: 1990 1996

566-a 5 absent rings: 1981 1986 1990 1991 1993

42 absent rings 2.199%

PART 2: TIME PLOT OF TREE-RING SERIES: 176\_CAR\_Corr3-30 15:51 Thu 24 Mar 2011 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

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

. . . . . . . . . . . . . . . . . . <========> . 566-b 1 1921 2010 90

. . . . . . . . . . . . . . . . . . <========> . 567-a 2 1925 2010 86

. . . . . . . . . . . . . . . . . . <========> . 567-b 3 1921 2010 90

. . . . . . . . . . . . . . . . . .<=========> . 568-a 4 1918 2010 93

. . . . . . . . . . . . . . . . . .<=========> . 568-b 5 1919 2010 92

. . . . . . . . . . . . . . . . . . <========> . 569-a 6 1925 2010 86

. . . . . . . . . . . . . . . . . . <========> . 569-b 7 1920 2010 91

. . . . . . . . . . . . . . . . . . <=======> . 570-a 8 1931 2010 80

. . . . . . . . . . . . . . . . . . <========> . 570-b 9 1925 2010 86

. . . . . . . . . . . . . . . . . . <========> . 571-a 10 1924 2010 87

. . . . . . . . . . . . . . . . . . <========> . 571-b 11 1929 2010 82

. . . . . . . . . . . . . . . . . . <========> . 572-a 12 1921 2010 90

. . . . . . . . . . . . . . . . . .<=========> . 572-b 13 1918 2010 93

. . . . . . . . . . . . . . . . . <==========> . 573-a 14 1908 2010 103

. . . . . . . . . . . . . . . . . <==========> . 573-b 15 1905 2010 106

. . . . . . . . . . . . . . . . . . <========> . 574-a 16 1924 2010 87

. . . . . . . . . . . . . . . . . . <=======> . 574-b 17 1934 2010 77

. . . . . . . . . . . . . . . . . . <=======> . 575-a 18 1932 2010 79

. . . . . . . . . . . . . . . . . . <=======> . 575-b 19 1935 2010 76

. . . . . . . . . . . . . . . . . . <=======> . 576-a 20 1937 2010 74

. . . . . . . . . . . . . . . . . . <=======> . 576-b 21 1939 2010 72

. . . . . . . . . . . . . . . . . . <========> . 566-a 22 1921 2010 90

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

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

PART 3: Master Dating Series: 176\_CAR\_Corr3-30 15:51 Thu 24 Mar 2011 Page 3

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Year Value No Ab Year Value No Ab Year Value No Ab Year Value No Ab Year Value No Ab Year Value No Ab

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

1950 -.615 22 2000 -.950 22

1951 -.543 22 2001 .680 22 1<<

1952 .255 22 2002 1.205 22

1953 -2.335 22 2003 -1.480 22

1954 .169 22 2004 -2.808 22 2

1905 .250 1 1955 .921 22 2005 -.896 22 1

1906 1.455 1 1956 -1.513 22 2006 .044 22

1907 1.461 1 1957 -.206 22 2007 .984 22

1908 1.613 2 1958 .393 22 2008 .464 22

1909 -1.743 2 1959 .750 22 2009 -.041 22

1910 -.826 2 1960 .397 22 1<< 2010 1.651 22

1911 -2.359 2 1961 1.226 22

1912 -2.380 2 1962 .739 22

1913 -.857 2 1963 .781 22

1914 .146 2 1964 1.145 22

1915 .832 2 1965 .672 22

1916 2.210 2 1966 -.382 22

1917 1.365 2 1967 -1.031 22

1918 -.795 4 1968 -1.068 22

1919 .286 5 1969 -.383 22

1920 -.679 6 1970 .806 22

1921 -.537 10 1971 1.462 22

1922 .757 10 1972 -.484 22 1

1923 .306 10 1973 -.832 22

1924 .693 12 1974 -.283 22

1925 .441 15 1975 .991 22

1926 -.541 15 1976 -.014 22

1927 -1.285 15 1977 -.141 22

1928 .038 15 1978 -1.121 22

1929 -.188 16 1979 -.680 22 1

1930 .761 16 1980 .227 22

1931 .384 17 1981 -1.978 22 3

1932 .688 18 1982 -.213 22

1933 .324 18 1983 .604 22 1<<

1934 .075 19 1984 -.260 22 1<<

1935 -.095 20 1985 -1.099 22 4

1936 -.010 20 1986 -1.419 22 6

1937 -.359 21 1987 .254 22 2<<

1938 1.329 21 1988 1.454 22 2<<

1939 .471 22 1989 .940 22 4<<

1940 -.439 22 1990 .460 22 4<<

1941 1.549 22 1991 .460 22 2<<

1942 -.486 22 1992 .816 22

1943 -.659 22 1993 .811 22 1<<

1944 -1.288 22 1994 .593 22

1945 -.123 22 1995 1.077 22

1946 -.631 22 1996 -1.883 22 3

1947 .432 22 1997 -.043 22 1<<

1948 -1.417 22 1998 -.414 22

1949 .859 22 1999 .657 22 1<<

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PART 4: Master Bar Plot: 176\_CAR\_Corr3-30 15:51 Thu 24 Mar 2011 Page 4

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Year Rel value Year Rel value Year Rel value Year Rel value Year Rel value Year Rel value Year Rel value Year Rel value

1950--b 2000-d

1951---b 2001-------C

1952-----A 2002---------E

1953i 2003-f

1954-----A 2004k

1905-----A 1955--------D 2005-d

1906----------F 1956f 2006-----@

1907----------F 1957----a 2007---------D

1908----------F 1958------B 2008------B

1909g 1959--------C 2009----@

1910--c 1960------B 2010----------G

1911i 1961---------E

1912j 1962--------C

1913--c 1963--------C

1914-----A 1964---------E

1915--------C 1965-------C

1916----------I 1966---b

1917----------E 1967-d

1918--c 1968-d

1919------A 1969---b

1920--c 1970--------C

1921---b 1971----------F

1922--------C 1972---b

1923------A 1973--c

1924--------C 1974---a

1925------B 1975---------D

1926---b 1976----@

1927-e 1977----a

1928-----@ 1978-d

1929----a 1979--c

1930--------C 1980-----A

1931------B 1981h

1932-------C 1982----a

1933------A 1983-------B

1934-----@ 1984----a

1935----@ 1985-d

1936----@ 1986-f

1937---a 1987-----A

1938----------E 1988----------F

1939------B 1989---------D

1940---b 1990------B

1941----------F 1991------B

1942---b 1992--------C

1943--c 1993--------C

1944-e 1994-------B

1945----@ 1995---------D

1946--c 1996h

1947------B 1997----@

1948-f 1998---b

1949--------C 1999-------C

PART 5: CORRELATION OF SERIES BY SEGMENTS: 176\_CAR\_Corr3-30 15:51 Thu 24 Mar 2011 Page 5

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Correlations of 30-year dated segments, lagged 15 years

Flags: A = correlation under .4226 but highest as dated; B = correlation higher at other than dated position

Seq Series Time\_span 1905 1920 1935 1950 1965 1980 1995

1934 1949 1964 1979 1994 2009 2024

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

1 566-b 1921 2010 .45 .59 .65 .37A .57 .59

2 567-a 1925 2010 .44 .36B .53 .81 .92 .92

3 567-b 1921 2010 .37A .34A .35A .59 .82 .84

4 568-a 1918 2010 .37A .32B .61 .70 .70 .82 .83

5 568-b 1919 2010 .34A .33B .61 .58 .59 .87 .87

6 569-a 1925 2010 .59 .61 .64 .62 .77 .79

7 569-b 1920 2010 .48 .64 .81 .70 .79 .82

8 570-a 1931 2010 .68 .70 .70 .81 .93 .93

9 570-b 1925 2010 .56 .71 .71 .72 .86 .87

10 571-a 1924 2010 .27A .44 .41A .53 .89 .88

11 571-b 1929 2010 .51 .59 .75 .67 .75 .75

12 572-a 1921 2010 .47 .56 .55 .52 .46 .51

13 572-b 1918 2010 .26B .46 .55 .53 .62 .56 .59

14 573-a 1908 2010 .21B .13B .67 .75 .65 .49 .53

15 573-b 1905 2010 .36A .22B .63 .64 .50 .58 .59

16 574-a 1924 2010 .54 .51 .34B .14B .46 .47

17 574-b 1934 2010 .60 .72 .70 .32B .38A .37A

18 575-a 1932 2010 .43 .56 .54 .57 .57 .59

19 575-b 1935 2010 .66 .59 .44 .50 .52

20 576-a 1937 2010 .52 .43 -.07B .36A .29A

21 576-b 1939 2010 .38A .47B .36B .67 .67

22 566-a 1921 2010 .20B .64 .61 .63 .56 .60

Av segment correlation .31 .42 .57 .59 .54 .66 .67

PART 6: POTENTIAL PROBLEMS: 176\_CAR\_Corr3-30 15:51 Thu 24 Mar 2011 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 30-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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566-b 1921 to 2010 90 years Series 1

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

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

1965 1994 0 .20 .03 -.13 -.10 -.06 .29 .31 -.35 -.48 -.32 .37\* .16 -.19 -.19 -.18 .30 .21 -.05 -.05 .01 -.01

[B] Entire series, effect on correlation ( .568) is:

Lower 1927> -.021 1940> -.016 1921< -.012 1996> -.010 1990< -.008 1935> -.008 Higher 1981 .034 1941 .012

1965 to 1994 segment:

Lower 1974> -.027 1978> -.027 1984> -.025 1990< -.016 1991< -.015 1993< -.013 Higher 1981 .166 1975 .019

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

1981 -1.978 22 3

1985 -1.099 22 4

1986 -1.419 22 6

566-b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1921 45 101 124 184 198 154 205 208 216

1930 201 164 187 156 154 185 180 139 153 125

1940 150 178 140 110 93 117 114 143 107 129

1950 109 80 104 82 106 91 72 66 90 127

1960 117 114 105 96 92 91 76 60 53 74

1970 84 73 39 39 70 69 38 33 25 21

1980 21 0 9 8 11 0 0 9 10 6

1990 4 4 9 9 16 22 15 37 47 72

2000 51 69 85 41 25 43 60 82 62 58

2010 79

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

567-a 1925 to 2010 86 years Series 2

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

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

1935 1964 9 .00 .14 -.17 .08 -.17 -.03 .14 -.25 .18 .06 .36|-.24 -.03 .24 -.01 -.17 .08 -.02 -.05 .37\*-.13

[B] Entire series, effect on correlation ( .645) is:

Lower 1956> -.043 1948> -.041 1944< -.031 1957< -.021 1925> -.009 1945< -.007 Higher 1996 .034 2003 .024

1935 to 1964 segment:

Lower 1956> -.083 1948> -.082 1957< -.049 1944< -.031 1945< -.019 1941< -.010 Higher 1953 .085 1938 .042

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

2004 -2.808 22 2

567-a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1925 384 315 250 299 296

1930 265 219 240 215 173 161 193 180 267 155

1940 113 135 109 127 26 44 103 216 240 245

1950 154 152 181 88 139 189 185 90 110 169

1960 126 180 126 131 120 85 75 45 34 34

1970 42 49 30 21 28 44 30 35 27 33

1980 40 22 29 58 42 27 25 49 92 79

1990 70 75 56 64 42 58 17 38 27 38

2000 23 46 54 16 0 18 30 43 43 67

2010 89

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

567-b 1921 to 2010 90 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

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

1921 1950 0 .01 .14 .20 -.13 .13 -.24 -.10 -.06 .16 -.06 .37\*-.48 .05 .07 -.34 .21 .08 .07 .14 .01 -.20

1935 1964 0 .07 .10 -.06 -.22 .17 -.17 .00 .06 -.01 -.13 .34\*-.51 -.05 .16 -.34 .15 .08 .03 .12 .10 -.04

1950 1979 0 .00 .34 -.13 .05 .27 .01 .22 -.02 -.24 -.07 .35\*-.28 -.28 .06 .00 .15 -.07 .10 .05 .34 .15

[B] Entire series, effect on correlation ( .498) is:

Lower 1937< -.123 1957< -.014 1966> -.013 1953> -.008 1921> -.008 1982< -.007 Higher 2003 .022 1996 .021

1921 to 1950 segment:

Lower 1937< -.247 1921> -.022 1950> -.014 1945< -.012 1928< -.009 1926> -.006 Higher 1941 .041 1938 .037

1935 to 1964 segment:

Lower 1937< -.211 1957< -.023 1953> -.023 1956> -.018 1958< -.011 1950> -.010 Higher 1941 .040 1938 .034

1950 to 1979 segment:

Lower 1957< -.066 1966> -.048 1958< -.030 1959< -.027 1962< -.026 1968> -.020 Higher 1961 .041 1955 .037

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

1936 1937 -4.4 SD

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

1937 -7.0 SD

567-b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1921 400 365 382 375 365 311 186 210 234

1930 272 330 325 280 232 210 211 68 213 199

1940 144 232 150 145 117 118 152 273 175 203

1950 169 164 172 128 217 357 190 46 54 79

1960 79 183 114 121 146 132 161 116 115 113

1970 134 119 79 72 65 86 55 48 46 73

1980 100 56 37 85 63 33 30 58 102 114

1990 133 110 83 102 77 94 31 50 42 55

2000 33 69 87 23 4 17 31 54 49 56

2010 123

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

568-a 1918 to 2010 93 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

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

1918 1947 0 -.24 .13 .22 .31 .15 .28 -.16 .03 -.06 -.18 .37\*-.06 -.02 .06 -.04 -.34 .20 -.06 .16 .04 -.07

1920 1949 -5 -.27 .06 .19 .19 .17 .32\*-.10 .08 .03 -.12 .32|-.07 -.02 .02 .05 -.20 .15 -.03 .19 -.02 -.09

[B] Entire series, effect on correlation ( .679) is:

Lower 1921> -.017 1949< -.015 1947< -.014 1930< -.010 1928< -.010 1953> -.009 Higher 1996 .034 1981 .016

1918 to 1947 segment:

Lower 1947< -.079 1921> -.077 1930< -.058 1928< -.055 1935> -.023 1937> -.018 Higher 1938 .088 1941 .073

1920 to 1949 segment:

Lower 1921> -.070 1947< -.067 1949< -.064 1930< -.048 1928< -.046 1935> -.021 Higher 1938 .085 1941 .074

568-a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1918 126 197

1920 147 319 460 265 243 165 90 78 70 93

1930 102 147 188 250 238 247 210 201 267 232

1940 129 172 137 117 90 88 72 59 56 61

1950 51 67 70 61 131 130 69 72 126 111

1960 96 118 114 119 137 145 139 113 85 122

1970 201 221 137 102 108 120 88 80 37 55

1980 62 33 35 65 46 31 23 26 37 36

1990 23 20 23 17 20 38 8 17 14 29

2000 19 44 53 22 7 21 24 48 48 53

2010 114

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568-b 1919 to 2010 92 years Series 5

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

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

1919 1948 0 -.28 .19 .31 .24 -.05 .02 -.22 -.10 .19 .01 .34\* .08 -.13 .12 -.17 -.11 .28 -.09 .21 .13 -.06

1920 1949 -8 -.27 .19 .38\* .27 -.05 .01 -.24 -.17 .18 .02 .33| .07 -.12 .11 -.17 -.12 .27 -.08 .23 .13 -.06

[B] Entire series, effect on correlation ( .640) is:

Lower 1953> -.027 1920< -.021 1972> -.019 1921> -.016 1934< -.013 1942> -.011 Higher 1996 .051 2003 .025

1919 to 1948 segment:

Lower 1921> -.054 1942> -.041 1947< -.034 1920< -.025 1934< -.024 1935> -.020 Higher 1938 .054 1941 .038

1920 to 1949 segment:

Lower 1921> -.055 1942> -.040 1947< -.030 1935> -.022 1934< -.021 1933> -.021 Higher 1938 .052 1941 .039

568-b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1919 299

1920 138 289 371 377 310 228 174 126 126 118

1930 147 204 254 335 169 213 155 162 202 144

1940 89 117 100 66 24 26 22 18 13 28

1950 27 36 54 55 80 85 56 76 121 137

1960 133 141 142 150 156 138 104 102 81 102

1970 164 173 164 127 137 144 97 89 23 30

1980 37 18 19 33 24 10 6 13 19 23

1990 21 23 35 34 20 30 7 19 14 41

2000 27 63 78 37 17 35 31 49 35 48

2010 61

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569-a 1925 to 2010 86 years Series 6

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

Lower 1956> -.018 1940> -.018 1926< -.014 1973> -.010 1944> -.008 1989< -.008 Higher 1996 .016 1953 .014

569-a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1925 180 132 140 196 162

1930 177 190 181 152 153 158 164 164 187 168

1940 175 191 111 134 131 132 94 95 83 115

1950 66 70 80 57 85 96 83 107 99 111

1960 98 93 86 91 83 62 43 45 52 63

1970 80 113 67 76 58 61 39 35 34 28

1980 28 22 35 37 17 17 20 37 62 38

1990 38 41 51 66 67 74 35 52 43 45

2000 37 55 72 38 18 40 50 48 53 50

2010 73

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569-b 1920 to 2010 91 years Series 7

[B] Entire series, effect on correlation ( .679) is:

Lower 1942< -.029 1940> -.018 1921> -.010 1944> -.009 1935< -.009 1933< -.008 Higher 1953 .022 2004 .018

569-b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1920 56 181 225 223 230 141 118 135 210 227

1930 245 165 183 139 176 133 164 164 192 170

1940 208 266 147 172 193 215 221 217 166 229

1950 161 166 163 118 171 174 146 203 196 227

1960 228 255 224 221 211 168 127 96 109 119

1970 152 191 115 111 76 94 59 43 37 36

1980 30 17 32 39 25 23 26 45 65 33

1990 37 53 48 31 31 43 19 34 43 52

2000 24 33 39 26 10 26 30 51 46 46

2010 89

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570-a 1931 to 2010 80 years Series 8

[B] Entire series, effect on correlation ( .808) is:

Lower 1940< -.016 1953> -.015 1952< -.014 1943< -.011 1975< -.009 1937> -.008 Higher 1996 .025 1956 .013

570-a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1931 352 343 322 309 312 307 298 290 258

1940 160 216 142 88 74 82 79 88 52 76

1950 54 48 36 31 35 63 39 56 53 65

1960 78 97 111 136 136 146 111 102 87 101

1970 149 164 109 77 76 69 62 59 53 61

1980 74 39 55 80 65 47 44 78 134 160

1990 156 163 123 106 77 86 31 47 30 55

2000 35 52 73 40 17 39 60 65 69 54

2010 104

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570-b 1925 to 2010 86 years Series 9

[B] Entire series, effect on correlation ( .714) is:

Lower 1928< -.014 1967> -.014 1937> -.009 1978> -.006 1938< -.006 1935> -.006 Higher 2004 .016 1981 .013

570-b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1925 189 151 178 144 164

1930 242 292 291 219 245 257 239 249 206 191

1940 129 197 142 105 108 116 83 100 62 105

1950 96 96 126 87 90 122 74 96 97 95

1960 86 104 99 122 134 120 93 98 76 76

1970 98 107 69 48 71 66 56 41 44 37

1980 42 21 31 37 25 19 18 28 70 71

1990 69 71 59 67 60 80 36 44 41 79

2000 42 66 86 43 17 30 62 63 47 36

2010 62

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

571-a 1924 to 2010 87 years Series 10

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

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

1924 1953 0 -.19 .08 .07 -.13 .19 .01 -.04 .13 .08 -.19 .27\*-.24 .16 .01 -.09 .11 .02 .02 .13 -.04 -.16

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

1950 1979 0 .27 .09 .19 -.05 .04 -.08 -.12 -.06 -.15 -.14 .41\*-.38 -.03 .25 .05 .08 .14 -.09 -.05 -.16 -.14

[B] Entire series, effect on correlation ( .596) is:

Lower 1924< -.037 1972> -.036 1935< -.015 1962< -.013 1953> -.013 1940> -.011 Higher 1996 .055 2003 .035

1924 to 1953 segment:

Lower 1924< -.131 1935< -.045 1947< -.030 1940> -.030 1949< -.025 1943> -.020 Higher 1941 .095 1948 .062

1950 to 1979 segment:

Lower 1972> -.121 1962< -.065 1960< -.032 1970< -.014 1965< -.011 1964< -.011 Higher 1956 .068 1971 .050

571-a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1924 196 239 225 231 248 223

1930 278 316 240 274 248 136 153 154 182 194

1940 193 247 138 164 134 142 113 89 68 76

1950 58 61 82 58 64 89 45 57 46 58

1960 30 34 20 26 24 20 20 19 14 20

1970 16 33 29 17 14 17 10 9 8 12

1980 11 4 11 14 5 4 12 15 20 15

1990 17 15 18 19 25 26 12 25 26 31

2000 20 36 46 21 20 49 52 58 57 57

2010 62

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

571-b 1929 to 2010 82 years Series 11

[B] Entire series, effect on correlation ( .618) is:

Lower 1935< -.058 1977< -.026 1944> -.022 1934> -.013 1936< -.012 1997< -.011 Higher 1981 .026 1953 .026

571-b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1929 378

1930 388 419 342 325 381 228 201 227 260 257

1940 221 269 179 191 231 190 127 122 78 159

1950 112 116 168 86 122 151 92 131 112 114

1960 119 152 106 94 120 85 65 48 40 49

1970 53 66 41 37 37 38 28 16 18 15

1980 21 11 15 21 25 21 22 32 36 36

1990 29 26 36 42 45 39 22 20 23 34

2000 23 40 52 27 32 55 51 58 51 43

2010 56

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

572-a 1921 to 2010 90 years Series 12

[B] Entire series, effect on correlation ( .450) is:

Lower 2003> -.043 2001< -.023 1996> -.021 1956> -.020 1942> -.018 1999< -.018 Higher 1953 .048 1948 .024

[D] 9 Absent rings: Year Master N series Absent

1972 -.484 22 1

1981 -1.978 22 3

1986 -1.419 22 6

1989 .940 22 4 >> WARNING: Ring is not usually narrow

1990 .460 22 4 >> WARNING: Ring is not usually narrow

1999 .657 22 1 >> WARNING: Ring is not usually narrow

2001 .680 22 1 >> WARNING: Ring is not usually narrow

2004 -2.808 22 2

2005 -.896 22 1

572-a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1921 155 261 242 268 184 189 150 198 147

1930 165 134 191 153 152 156 147 147 170 154

1940 142 218 162 185 154 153 114 143 82 125

1950 100 99 118 67 105 121 86 83 78 113

1960 44 76 52 49 51 53 31 24 20 17

1970 15 19 0 11 12 27 23 12 4 13

1980 12 0 23 17 3 8 0 12 17 0

1990 0 19 14 10 13 13 5 16 11 0

2000 5 0 18 18 0 0 6 22 20 20

2010 43

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

572-b 1918 to 2010 93 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

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

1918 1947 -7 -.41 .26 .09 .46\* .40 .02 -.10 -.01 -.20 -.10 .26|-.09 .12 .01 -.14 -.11 .13 -.07 .23 .02 -.03

[B] Entire series, effect on correlation ( .444) is:

Lower 1918< -.051 2003> -.023 1989< -.019 2001< -.017 1927< -.015 1970< -.014 Higher 1948 .022 1981 .018

1918 to 1947 segment:

Lower 1918< -.127 1947< -.039 1945< -.020 1935> -.019 1921> -.016 1934> -.008 Higher 1941 .054 1927 .047

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

1985 -1.099 22 4

1986 -1.419 22 6

1989 .940 22 4 >> WARNING: Ring is not usually narrow

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

1918 -4.6 SD; 1927 -4.8 SD

572-b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1918 25 151

1920 129 159 188 220 238 183 147 65 164 141

1930 215 216 214 236 221 246 208 188 218 176

1940 144 189 108 109 91 68 52 48 21 52

1950 63 64 96 56 84 75 51 73 84 123

1960 52 75 47 45 64 51 33 28 14 14

1970 10 14 3 14 17 23 17 17 3 4

1980 17 4 9 13 12 0 0 9 16 0

1990 22 17 15 20 23 42 10 22 11 5

2000 8 4 23 19 6 4 14 28 19 19

2010 41

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

573-a 1908 to 2010 103 years Series 14

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

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

1908 1937 9 - - - - - - - .06 .04 .21 .21| .00 -.04 -.11 -.16 -.28 .22 .18 .02 .23\* .06

1920 1949 6 .18 -.03 .05 .05 -.04 -.15 -.10 .00 .15 -.26 .13|-.21 .07 -.13 -.01 -.18 .19\* .05 -.14 .18 .08

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

Lower 1918> -.036 1933< -.033 1920> -.019 1988< -.019 2003> -.019 1987< -.014 Higher 1996 .040 1953 .036

1908 to 1937 segment:

Lower 1918> -.104 1933< -.103 1920> -.054 1926> -.021 1923< -.016 1936< -.011 Higher 1909 .083 1916 .072

1920 to 1949 segment:

Lower 1933< -.082 1920> -.073 1940> -.042 1943> -.035 1926> -.030 1923< -.013 Higher 1949 .068 1938 .036

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

1987 .254 22 2 >> WARNING: Ring is not usually narrow

1988 1.454 22 2 >> WARNING: Ring is not usually narrow

1989 .940 22 4 >> WARNING: Ring is not usually narrow

1996 -1.883 22 3

1997 -.043 22 1 >> WARNING: Ring is not usually narrow

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

1918 +3.3 SD

573-a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1908 188 112

1910 130 108 108 158 194 228 331 259 299 218

1920 260 158 219 167 232 191 212 191 170 183

1930 175 210 163 119 120 123 116 112 139 118

1940 145 138 113 158 121 152 104 136 111 197

1950 157 122 162 67 153 133 48 95 89 105

1960 154 161 163 213 152 119 87 43 40 54

1970 77 94 50 52 31 57 55 51 41 27

1980 35 12 33 30 19 8 3 0 0 0

1990 11 11 8 5 12 9 0 0 5 18

2000 9 30 41 36 33 36 57 67 51 35

2010 74

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573-b 1905 to 2010 106 years Series 15

[\*] Early part of series cannot be checked from 1905 to 1907 -- not matched by another series

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

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

1908 1937 0 - - - - - - - .05 .17 .08 .36\* .00 .00 -.09 -.15 -.18 .04 .01 .23 .23 -.14

1920 1949 -2 -.06 .08 .17 -.33 -.21 .08 -.15 .11 .30\*-.40 .22|-.18 .03 -.14 .12 -.04 .23 -.14 .14 .11 -.06

[B] Entire series, effect on correlation ( .530) is:

Lower 1923< -.033 1920> -.018 1978> -.015 1927> -.015 1918> -.014 1984> -.013 Higher 1956 .027 1981 .026

1908 to 1937 segment:

Lower 1923< -.119 1920> -.065 1927> -.053 1918> -.049 1936< -.013 1926> -.012 Higher 1909 .097 1911 .050

1920 to 1949 segment:

Lower 1923< -.124 1920> -.062 1927> -.051 1940> -.032 1936< -.015 1938< -.015 Higher 1942 .084 1949 .049

573-b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1905 122 168 165 179 54

1910 83 51 58 81 107 126 158 145 135 111

1920 147 115 142 81 172 143 141 168 180 123

1930 168 185 185 139 119 85 84 86 104 103

1940 123 124 81 110 92 131 111 112 92 151

1950 129 103 160 72 142 168 46 87 64 65

1960 102 117 105 132 129 80 79 45 46 70

1970 71 99 55 54 35 51 47 32 39 23

1980 19 4 16 17 25 7 2 7 12 10

1990 12 10 21 35 43 42 17 23 37 87

2000 62 88 104 74 72 72 152 168 150 119

2010 157

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574-a 1924 to 2010 87 years Series 16

[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 1979 -6 .06 .08 .16 -.02 .47\* .09 -.32 .31 -.11 -.31 .34|-.24 -.29 .34 -.17 -.13 .15 .17 -.21 -.08 -.16

1965 1994 -10 .30\* .08 .28 -.16 .16 .24 .23 .04 -.28 -.02 .14|-.21 .15 -.23 .07 -.09 -.04 .04 -.09 .04 -.21

[B] Entire series, effect on correlation ( .384) is:

Lower 1924< -.031 1959< -.023 1960< -.019 2009< -.016 1979< -.015 1982< -.013 Higher 1996 .057 1953 .026

1950 to 1979 segment:

Lower 1959< -.069 1960< -.048 1961< -.027 1979< -.027 1967> -.027 1968> -.022 Higher 1953 .117 1970 .035

1965 to 1994 segment:

Lower 1982< -.036 1967> -.036 1989< -.030 1968> -.029 1972> -.021 1973> -.020 Higher 1985 .074 1970 .036

[D] 4 Absent rings: Year Master N series Absent

1960 .397 22 1 >> WARNING: Ring is not usually narrow

1979 -.680 22 1

1985 -1.099 22 4

1986 -1.419 22 6

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

1960 -4.5 SD

574-a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1924 25 91 93 124 169 289

1930 276 344 321 283 271 335 254 258 275 213

1940 191 244 197 161 192 207 192 253 153 177

1950 131 138 163 88 88 103 74 112 124 43

1960 0 14 27 30 40 71 64 69 74 75

1970 96 74 49 51 33 37 29 30 16 0

1980 13 10 4 13 9 0 0 11 14 8

1990 15 22 24 59 38 56 25 42 75 135

2000 92 104 106 93 90 118 133 156 142 111

2010 136

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574-b 1934 to 2010 77 years Series 17

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

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

1965 1994 5 -.18 -.24 -.32 -.08 .27 .23 -.23 -.55 .13 .10 .32|-.06 -.21 -.20 -.06 .32\* .03 .19 .12 .13 .14

1980 2009 0 -.13 -.23 .03 .25 -.04 -.18 -.05 -.16 .15 -.11 .38\* .08 - - - - - - - - -

1981 2010 0 -.18 -.28 .11 .22 -.07 -.23 -.04 -.15 .20 -.11 .37\* - - - - - - - - - -

[B] Entire series, effect on correlation ( .497) is:

Lower 1934< -.058 1981> -.053 1985> -.012 1986> -.010 1974< -.009 2002< -.008 Higher 1953 .054 1941 .017

1965 to 1994 segment:

Lower 1981> -.187 1985> -.038 1986> -.031 1983< -.027 1974< -.027 1971< -.023 Higher 1978 .054 1972 .050

1980 to 2009 segment:

Lower 1981> -.142 2002< -.045 1983< -.044 1985> -.029 1986> -.024 2009> -.019 Higher 1996 .151 2003 .095

1981 to 2010 segment:

Lower 1981> -.142 2002< -.041 1983< -.040 1985> -.031 1986> -.026 2009> -.021 Higher 1996 .151 2003 .095

[D] 10 Absent rings: Year Master N series Absent

1983 .604 22 1 >> WARNING: Ring is not usually narrow

1984 -.260 22 1 >> WARNING: Ring is not usually narrow

1985 -1.099 22 4

1986 -1.419 22 6

1987 .254 22 2 >> WARNING: Ring is not usually narrow

1988 1.454 22 2 >> WARNING: Ring is not usually narrow

1989 .940 22 4 >> WARNING: Ring is not usually narrow

1990 .460 22 4 >> WARNING: Ring is not usually narrow

1991 .460 22 2 >> WARNING: Ring is not usually narrow

1996 -1.883 22 3

574-b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1934 277 359 315 339 352 289

1940 272 368 311 275 262 339 283 308 211 295

1950 159 177 194 100 122 150 117 171 198 188

1960 158 152 145 152 140 129 124 86 54 55

1970 77 55 39 28 17 29 19 17 5 3

1980 7 9 13 0 0 0 0 0 0 0

1990 0 0 8 6 4 23 0 16 9 29

2000 17 49 48 36 51 89 124 226 262 349

2010 345

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575-a 1932 to 2010 79 years Series 18

[B] Entire series, effect on correlation ( .518) is:

Lower 1932< -.043 1978> -.021 1955< -.017 1952< -.017 2002< -.016 1948> -.011 Higher 2003 .041 1956 .034

575-a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1932 10 99 93 109 104 68 130 110

1940 65 107 84 55 53 56 69 74 61 58

1950 56 50 35 28 50 37 21 34 53 48

1960 56 57 84 70 76 73 62 45 61 58

1970 88 85 55 51 62 95 85 114 146 143

1980 174 107 173 181 137 152 138 160 166 140

1990 117 141 178 196 148 149 117 127 105 109

2000 109 144 96 33 59 78 79 92 110 95

2010 144

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575-b 1935 to 2010 76 years Series 19

[B] Entire series, effect on correlation ( .544) is:

Lower 1983< -.024 1985> -.016 2002< -.015 2004> -.014 1978> -.012 1972< -.011 Higher 1956 .024 2003 .021

575-b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1935 101 115 101 142 119

1940 69 93 77 48 53 62 69 118 78 75

1950 39 37 30 24 55 53 30 38 52 52

1960 68 66 87 71 82 70 57 42 62 54

1970 66 85 48 48 104 135 138 146 147 128

1980 128 96 181 126 98 152 143 189 192 233

1990 209 200 214 156 99 96 51 88 70 72

2000 49 56 43 17 35 61 62 79 101 166

2010 165

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576-a 1937 to 2010 74 years Series 20

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

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

1965 1994 7 .10 -.28 -.24 -.07 .22 -.16 -.01 -.10 -.22 -.29 -.07|-.08 .07 .12 -.26 -.08 .21 .37\* .06 .09 -.19

1980 2009 0 -.16 -.11 .18 .24 .09 -.06 .05 -.14 -.16 -.36 .36\* .20 - - - - - - - - -

1981 2010 0 -.13 -.15 .15 .28 .14 -.07 .04 -.17 -.16 -.35 .29\* - - - - - - - - - -

[B] Entire series, effect on correlation ( .452) is:

Lower 1981> -.051 1948> -.037 1990< -.025 1970< -.022 2010< -.017 1968> -.016 Higher 1996 .108 1953 .051

1965 to 1994 segment:

Lower 1981> -.106 1970< -.059 1968> -.036 1986> -.033 1967> -.030 1990< -.018 Higher 1972 .102 1975 .056

1980 to 2009 segment:

Lower 1981> -.113 1990< -.059 1986> -.030 1985> -.017 2002< -.014 1987< -.011 Higher 1996 .242 2003 .061

1981 to 2010 segment:

Lower 1981> -.109 1990< -.052 2010< -.035 1986> -.031 1985> -.017 2002< -.012 Higher 1996 .253 2003 .064

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

1990 .460 22 4 >> WARNING: Ring is not usually narrow

1996 -1.883 22 3

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

1981 +3.2 SD

576-a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1937 248 262 190

1940 135 147 99 105 117 133 120 172 191 223

1950 139 136 107 52 70 86 64 85 86 63

1960 60 78 47 34 40 36 21 32 41 27

1970 16 18 9 10 16 24 19 28 18 13

1980 15 20 23 20 17 15 19 12 16 11

1990 0 6 9 10 25 33 0 62 59 57

2000 39 69 67 33 41 82 151 206 164 181

2010 160

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576-b 1939 to 2010 72 years Series 21

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

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

1939 1968 0 .18 .01 -.17 .02 -.06 -.07 -.26 .09 -.25 -.18 .38\*-.35 .21 .26 .12 -.37 .17 -.05 .07 -.09 .15

1950 1979 3 .31 -.06 -.24 -.12 .14 .00 -.26 .01 -.24 -.24 .47|-.06 -.09 .60\*-.15 -.18 .09 .15 .00 -.02 -.14

1965 1994 3 .27 .18 -.37 -.33 .17 .16 -.05 -.43 -.23 -.07 .36| .10 .10 .41\*-.19 -.05 .29 .08 -.01 -.22 -.06

[B] Entire series, effect on correlation ( .503) is:

Lower 1948> -.039 1940< -.021 1963< -.021 1968> -.019 1985> -.014 1964< -.012 Higher 1953 .046 2003 .035

1939 to 1968 segment:

Lower 1948> -.080 1963< -.042 1968> -.035 1964< -.026 1940< -.012 1950> -.012 Higher 1953 .132 1961 .022

1950 to 1979 segment:

Lower 1968> -.055 1963< -.050 1964< -.030 1950> -.021 1951> -.018 1956> -.016 Higher 1953 .152 1961 .025

1965 to 1994 segment:

Lower 1968> -.069 1985> -.053 1990< -.022 1983< -.021 1984> -.013 1971< -.013 Higher 1988 .072 1978 .062

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

1966 -4.7 SD

576-b Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1939 140

1940 109 131 121 127 106 126 120 147 158 146

1950 129 148 150 79 112 142 96 123 121 88

1960 103 111 85 45 42 39 21 35 58 39

1970 40 31 24 19 23 26 18 24 9 15

1980 25 16 20 18 28 44 32 57 102 96

1990 34 28 41 42 33 39 16 76 116 107

2000 37 83 130 37 41 86 138 166 157 132

2010 165

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566-a 1921 to 2010 90 years Series 22

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

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

1921 1950 -4 .12 -.10 .24 -.25 -.06 -.04 .26\*-.05 .07 -.21 .20|-.29 .00 .05 -.06 .24 .02 -.30 .14 .09 -.25

[B] Entire series, effect on correlation ( .387) is:

Lower 1931< -.130 1927> -.021 1990< -.019 1996> -.015 1955< -.014 1922< -.013 Higher 1981 .022 1956 .020

1921 to 1950 segment:

Lower 1931< -.296 1927> -.057 1922< -.034 1932< -.011 1937> -.008 1926> -.008 Higher 1941 .071 1938 .055

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

1930 1931 -4.8 SD

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

1981 -1.978 22 3

1986 -1.419 22 6

1990 .460 22 4 >> WARNING: Ring is not usually narrow

1991 .460 22 2 >> WARNING: Ring is not usually narrow

1993 .811 22 1 >> WARNING: Ring is not usually narrow

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

1931 -7.4 SD

566-a Ring measurements

Annual values

Date 0 1 2 3 4 5 6 7 8 9

1921 136 143 174 196 201 188 225 208 185

1930 213 102 141 193 191 170 208 193 232 168

1940 148 213 155 99 92 135 132 143 103 164

1950 119 100 97 88 105 86 71 82 109 121

1960 124 123 144 119 108 105 82 53 69 71

1970 121 85 50 42 60 54 31 26 24 13

1980 26 0 13 15 15 4 0 6 5 10

1990 0 0 5 0 5 6 6 12 13 23

2000 17 51 60 24 13 28 34 51 70 95

2010 201

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PART 7: DESCRIPTIVE STATISTICS: 176\_CAR\_Corr3-30 15:51 Thu 24 Mar 2011 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 ()

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

1 566-b 1921 2010 90 6 1 .568 .85 2.15 .589 .929 .323 2.50 .419 .036 1

2 567-a 1925 2010 86 6 1 .645 1.06 3.84 .861 .894 .371 2.71 .500 .055 1

3 567-b 1921 2010 90 6 3 .498 1.39 4.00 .974 .847 .339 2.53 .344 -.037 2

4 568-a 1918 2010 93 7 2 .679 1.03 4.60 .804 .845 .310 2.51 .351 -.065 2

5 568-b 1919 2010 92 7 2 .640 .99 3.77 .865 .882 .333 2.65 .497 -.047 1

6 569-a 1925 2010 86 6 0 .668 .85 1.95 .504 .913 .215 2.61 .467 .016 1

7 569-b 1920 2010 91 6 0 .679 1.21 2.66 .767 .891 .265 2.58 .436 -.063 1

8 570-a 1931 2010 80 6 0 .808 1.07 3.52 .828 .945 .260 2.79 .602 -.049 1

9 570-b 1925 2010 86 6 0 .714 .99 2.92 .658 .912 .254 2.52 .484 -.060 1

10 571-a 1924 2010 87 6 2 .596 .77 3.16 .830 .952 .272 2.74 .536 .009 1

11 571-b 1929 2010 82 6 0 .618 1.05 4.19 1.018 .944 .241 2.59 .519 .027 1

12 572-a 1921 2010 90 6 0 .450 .74 2.68 .735 .926 .582 2.74 .502 -.050 1

13 572-b 1918 2010 93 7 1 .444 .71 2.46 .739 .917 .506 2.68 .477 -.039 1

14 573-a 1908 2010 103 7 2 .458 1.03 3.31 .765 .883 .378 2.67 .551 -.018 1

15 573-b 1905 2010 106 7 2 .530 .91 1.85 .511 .778 .328 2.61 .493 -.022 1

16 574-a 1924 2010 87 6 2 .384 1.08 3.44 .909 .927 .410 2.72 .567 .031 1

17 574-b 1934 2010 77 6 3 .497 1.25 3.68 1.212 .945 .369 2.61 .501 .009 2

18 575-a 1932 2010 79 6 0 .518 .93 1.96 .433 .789 .250 2.46 .397 .072 1

19 575-b 1935 2010 76 5 0 .544 .93 2.33 .506 .842 .264 2.73 .480 .018 1

20 576-a 1937 2010 74 5 3 .452 .71 2.62 .655 .914 .376 2.57 .438 -.025 1

21 576-b 1939 2010 72 5 3 .503 .77 1.66 .492 .825 .335 2.66 .510 -.079 1

22 566-a 1921 2010 90 6 1 .387 .90 2.32 .694 .908 .432 2.70 .359 .037 1

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Total or mean: 1910 134 28 .557 .97 4.60 .744 .890 .339 2.79 .474 -.012

- = [ COFECHA 176CACOF ] = -