[] Dendrochronology Program Library Run 118 Program COF 11:06 Fri 06 May 2011 Page 1

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[] P R O G R A M C O F E C H A Version 6.06P 27886

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QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS

File of DATED series: 118\_KIL

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 N

8 Parts printed 1234567

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

Time span of Master dating series is 1742 to 2010 269 years

Continuous time span is 1742 to 2010 269 years

Portion with two or more series is 1747 to 2010 264 years

>> 262a 1768 absent in 2 of 2 series, but is not usually narrow: master index is -.033

>> 262a 2008 absent in 2 of 22 series, but is not usually narrow: master index is .461

>> 262a 2009 absent in 3 of 22 series, but is not usually narrow: master index is 1.488

>> 262a 2010 absent in 4 of 22 series, but is not usually narrow: master index is .807

>> 262b 1768 absent in 2 of 2 series, but is not usually narrow: master index is -.033

>> 262b 1989 absent in 2 of 22 series, but is not usually narrow: master index is .329

>> 262b 1990 absent in 2 of 22 series, but is not usually narrow: master index is .867

>> 262b 2010 absent in 4 of 22 series, but is not usually narrow: master index is .807

>> 263A 1825 absent in 1 of 11 series, but is not usually narrow: master index is -.034

>> 263A 1858 absent in 2 of 11 series, but is not usually narrow: master index is -.131

>> 268A 1858 absent in 2 of 11 series, but is not usually narrow: master index is -.131

>> 529A 2009 absent in 3 of 22 series, but is not usually narrow: master index is 1.488

>> 529A 2010 absent in 4 of 22 series, but is not usually narrow: master index is .807

>> 529B 1978 absent in 1 of 22 series, but is not usually narrow: master index is -.175

>> 529B 1979 absent in 1 of 22 series, but is not usually narrow: master index is .166

>> 529B 1980 absent in 1 of 22 series, but is not usually narrow: master index is 1.028

>> 529B 1987 absent in 1 of 22 series, but is not usually narrow: master index is .527

>> 529B 1988 absent in 1 of 22 series, but is not usually narrow: master index is .585

>> 529B 1989 absent in 2 of 22 series, but is not usually narrow: master index is .329

>> 529B 1990 absent in 2 of 22 series, but is not usually narrow: master index is .867

>> 529B 1991 absent in 1 of 22 series, but is not usually narrow: master index is 1.008

>> 529B 1992 absent in 1 of 22 series, but is not usually narrow: master index is 1.661

>> 529B 1993 absent in 1 of 22 series, but is not usually narrow: master index is 2.389

>> 529B 1994 absent in 1 of 22 series, but is not usually narrow: master index is 1.440

>> 529B 1995 absent in 1 of 22 series, but is not usually narrow: master index is .726

>> 529B 1999 absent in 1 of 22 series, but is not usually narrow: master index is -.264

>> 529B 2001 absent in 1 of 22 series, but is not usually narrow: master index is .033

>> 529B 2002 absent in 1 of 22 series, but is not usually narrow: master index is .360

>> 529B 2007 absent in 1 of 22 series, but is not usually narrow: master index is .582

>> 529B 2008 absent in 2 of 22 series, but is not usually narrow: master index is .461

>> 529B 2009 absent in 3 of 22 series, but is not usually narrow: master index is 1.488

>> 529B 2010 absent in 4 of 22 series, but is not usually narrow: master index is .807

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

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

\*O\* Master series 1742 2010 269 yrs \*O\*

\*F\* Total rings in all series 3551 \*F\*

\*E\* Total dated rings checked 3546 \*E\*

\*C\* Series intercorrelation .502 \*C\*

\*H\* Average mean sensitivity .285 \*H\*

\*A\* Segments, possible problems 69 \*A\*

\*\*\* Mean length of series 161.4 \*\*\*

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

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

262a 6 absent rings: 1767 1768 1890 2008 2009 2010

262b 4 absent rings: 1768 1989 1990 2010

263A 5 absent rings: 1824 1825 1844 1847 1858

268A 5 absent rings: 1844 1858 1888 1911 1912

269B 7 absent rings: 1882 1884 1887 1888 1889 1890 1996

271A 3 absent rings: 1984 1985 1986

529A 2 absent rings: 2009 2010

529B 34 absent rings: 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992

1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008

2009 2010

66 absent rings 1.859%

PART 2: TIME PLOT OF TREE-RING SERIES: 11:06 Fri 06 May 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

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

. . . . . . . . . . . . . . <==========================> . 262a 1 1747 2010 264

. . . . . . . . . . . . . . <==========================> . 262b 2 1742 2010 269

. . . . . . . . . . . . . . . <=====================> . 263A 3 1799 2010 212

. . . . . . . . . . . . . . . <====================> . 263B 4 1801 2010 210

. . . . . . . . . . . . . . . . . <=============> . 264A 5 1874 2010 137

. . . . . . . . . . . . . . . . . <===========> . 264B 6 1893 2010 118

. . . . . . . . . . . . . . . . . <===========> . 265A 7 1894 2010 117

. . . . . . . . . . . . . . . . . <==========> . 265B 8 1902 2010 109

. . . . . . . . . . . . . . . . . <===========> . 266A 9 1898 2010 113

. . . . . . . . . . . . . . . . . <==========> . 266B 10 1905 2010 106

. . . . . . . . . . . . . . . . . .<=========> . 267A 11 1917 2010 94

. . . . . . . . . . . . . . . . . .<=========> . 267B 12 1917 2010 94

. . . . . . . . . . . . . . . <====================> . 268A 13 1808 2010 203

. . . . . . . . . . . . . . . . <==================> . 268B 14 1822 2010 189

. . . . . . . . . . . . . . . . . .<=========> . 269A 15 1911 2010 100

. . . . . . . . . . . . . . . .<===================> . 269B 16 1810 2010 201

. . . . . . . . . . . . . . . . . <==========> . 270A 17 1905 2010 106

. . . . . . . . . . . . . . . . . .<=========> . 270B 18 1918 2010 93

. . . . . . . . . . . . . . . .<===================> . 271A 19 1815 2010 196

. . . . . . . . . . . . . . . <=====================> . 271B 20 1793 2010 218

. . . . . . . . . . . . . . . . <==================> . 529A 21 1822 2010 189

. . . . . . . . . . . . . . . <=====================> . 529B 22 1798 2010 213

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

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: 11:06 Fri 06 May 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

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1750 -1.203 2 1800 .195 5 1850 -.316 11 1900 1.202 15 1950 -.298 22

1751 .207 2 1801 1.046 6 1851 .615 11 1901 -.254 15 1951 -.210 22

1752 .523 2 1802 .623 6 1852 -.941 11 1902 -.380 16 1952 .389 22

1753 1.835 2 1803 .791 6 1853 .116 11 1903 .579 16 1953 -.671 22

1754 -.354 2 1804 -.803 6 1854 -.100 11 1904 .820 16 1954 .777 22

1755 .445 2 1805 .279 6 1855 .842 11 1905 .454 18 1955 1.341 22

1756 .036 2 1806 .426 6 1856 .223 11 1906 .519 18 1956 -.527 22

1757 .218 2 1807 2.202 6 1857 .141 11 1907 -.475 18 1957 1.182 22

1758 1.659 2 1808 .192 7 1858 -.131 11 2<< 1908 .039 18 1958 1.820 22

1759 -.050 2 1809 -.967 7 1859 .416 11 1909 -1.361 18 1959 .649 22

1760 .880 2 1810 .287 8 1860 .839 11 1910 -.656 18 1960 .504 22

1761 -1.025 2 1811 1.169 8 1861 1.983 11 1911 -2.633 19 1 1961 1.742 22

1762 -2.482 2 1812 -.920 8 1862 .238 11 1912 -1.805 19 1 1962 .392 22

1763 -.948 2 1813 .581 8 1863 -.007 11 1913 -.470 19 1963 -.204 22

1764 -1.252 2 1814 -.456 8 1864 -.418 11 1914 -.301 19 1964 -.969 22

1765 -1.608 2 1815 .756 9 1865 -.378 11 1915 .140 19 1965 -1.565 22

1766 -2.252 2 1816 -.545 9 1866 .146 11 1916 .876 19 1966 -2.137 22

1767 -2.357 2 1 1817 1.330 9 1867 .912 11 1917 -.406 21 1967 -1.388 22

1768 -.033 2 2<< 1818 -.910 9 1868 .722 11 1918 .094 22 1968 -1.428 22

1769 .165 2 1819 -.428 9 1869 -.165 11 1919 .683 22 1969 -.773 22

1770 .368 2 1820 -1.724 9 1870 .713 11 1920 .646 22 1970 .424 22

1771 1.471 2 1821 -1.166 9 1871 -.026 11 1921 .316 22 1971 .367 22

1772 .734 2 1822 1.811 11 1872 1.122 11 1922 .174 22 1972 .626 22

1773 .704 2 1823 -.673 11 1873 .144 11 1923 -.411 22 1973 -.040 22

1774 .656 2 1824 -.872 11 1 1874 -.314 12 1924 1.357 22 1974 -.070 22

1775 .603 2 1825 -.034 11 1<< 1875 .075 12 1925 -.175 22 1975 .897 22

1776 1.782 2 1826 -.186 11 1876 .273 12 1926 .361 22 1976 .418 22

1777 1.664 2 1827 .243 11 1877 -.116 12 1927 .662 22 1977 -.586 22 1

1778 1.698 2 1828 .079 11 1878 1.206 12 1928 .504 22 1978 -.175 22 1<<

1779 .560 2 1829 -1.806 11 1879 .975 12 1929 -.761 22 1979 .166 22 1<<

1780 .797 2 1830 1.058 11 1880 1.397 12 1930 .071 22 1980 1.028 22 1<<

1781 -1.294 2 1831 .825 11 1881 -.627 12 1931 .082 22 1981 -.524 22 1

1782 -1.905 2 1832 .204 11 1882 -1.099 12 1 1932 .857 22 1982 -.517 22 1

1783 -2.022 2 1833 .283 11 1883 -.272 12 1933 -.089 22 1983 -.559 22 1

1784 -1.761 2 1834 .652 11 1884 -.417 12 1 1934 1.420 22 1984 -.985 22 2

1785 -1.235 2 1835 -.290 11 1885 -.499 12 1935 -1.585 22 1985 -.441 22 2

1786 1.222 2 1836 1.013 11 1886 .145 12 1936 -.950 22 1986 -1.449 22 2

1787 1.093 2 1837 .476 11 1887 -1.846 12 1 1937 -.991 22 1987 .527 22 1<<

1788 .638 2 1838 -.300 11 1888 -1.043 12 2 1938 -.643 22 1988 .585 22 1<<

1789 .718 2 1839 -.612 11 1889 -1.026 12 1 1939 -.174 22 1989 .329 22 2<<

1790 -.247 2 1840 .827 11 1890 -1.204 12 2 1940 -1.144 22 1990 .867 22 2<<

1791 1.572 2 1841 .177 11 1891 -.410 12 1941 .786 22 1991 1.008 22 1<<

1742 -3.576 1 1792 -.215 2 1842 -.182 11 1892 -.188 12 1942 -.186 22 1992 1.661 22 1<<

1743 -.279 1 1793 .350 3 1843 -.626 11 1893 .396 13 1943 -.981 22 1993 2.389 22 1<<

1744 1.424 1 1794 -3.035 3 1844 -2.813 11 2 1894 .355 14 1944 .564 22 1994 1.440 22 1<<

1745 .885 1 1795 -.446 3 1845 .216 11 1895 .269 14 1945 .261 22 1995 .726 22 1<<

1746 1.411 1 1796 -.290 3 1846 -.110 11 1896 1.027 14 1946 -.302 22 1996 -1.104 22 2

1747 2.231 2 1797 .558 3 1847 -.688 11 1 1897 .476 14 1947 .326 22 1997 -.958 22 1

1748 .533 2 1798 .340 4 1848 .017 11 1898 .887 15 1948 -1.234 22 1998 -.715 22 1

1749 -.856 2 1799 -2.282 5 1849 -.499 11 1899 .812 15 1949 .418 22 1999 -.264 22 1<<

PART 3: Master Dating Series: 11:06 Fri 06 May 2011 Page 4

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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

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2000 -.547 22 1

2001 .033 22 1<<

2002 .360 22 1<<

2003 -1.396 22 1

2004 -1.691 22 1

2005 -1.707 22 1

2006 -.973 22 1

2007 .582 22 1<<

2008 .461 22 2<<

2009 1.488 22 3<<

2010 .807 22 4<<

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PART 4: Master Bar Plot: 11:06 Fri 06 May 2011 Page 5

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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

1750-e 1800-----A 1850---a 1900---------E 1950---a 2000--b

1751-----A 1801---------D 1851-------B 1901----a 1951----a 2001-----@

1752-------B 1802--------B 1852-d 1902---b 1952------B 2002------A

1753----------G 1803--------C 1853-----@ 1903-------B 1953--c 2003-f

1754---a 1804--c 1854----@ 1904--------C 1954--------C 2004g

1755-------B 1805------A 1855--------C 1905-------B 1955----------E 2005g

1756-----@ 1806-------B 1856-----A 1906-------B 1956--b 2006-d

1757-----A 1807----------I 1857-----A 1907---b 1957---------E 2007-------B

1758----------G 1808-----A 1858----a 1908-----@ 1958----------G 2008-------B

1759----@ 1809-d 1859------B 1909-e 1959--------C 2009----------F

1760---------D 1810------A 1860--------C 1910--c 1960-------B 2010--------C

1761-d 1811---------E 1861----------H 1911k 1961----------G

1762j 1812-d 1862------A 1912g 1962------B

1763-d 1813-------B 1863-----@ 1913---b 1963----a

1764-e 1814---b 1864---b 1914---a 1964-d

1765f 1815--------C 1865---b 1915-----A 1965f

1766i 1816--b 1866-----A 1916---------D 1966i

1767i 1817---------E 1867---------D 1917---b 1967-f

1768----@ 1818-d 1868--------C 1918-----@ 1968f

1769-----A 1819---b 1869----a 1919--------C 1969--c

1770------A 1820g 1870--------C 1920--------C 1970-------B

1771----------F 1821-e 1871----@ 1921------A 1971------A

1772--------C 1822----------G 1872---------D 1922-----A 1972--------C

1773--------C 1823--c 1873-----A 1923---b 1973----@

1774--------C 1824-c 1874---a 1924----------E 1974----@

1775-------B 1825----@ 1875-----@ 1925----a 1975---------D

1776----------G 1826----a 1876------A 1926------A 1976------B

1777----------G 1827------A 1877----@ 1927--------C 1977--b

1778----------G 1828-----@ 1878---------E 1928-------B 1978----a

1779-------B 1829g 1879---------D 1929--c 1979-----A

1780--------C 1830---------D 1880----------F 1930-----@ 1980---------D

1781-e 1831--------C 1881--c 1931-----@ 1981--b

1782h 1832-----A 1882-d 1932--------C 1982--b

1783h 1833------A 1883----a 1933----@ 1983--b

1784g 1834--------C 1884---b 1934----------F 1984-d

1785-e 1835---a 1885---b 1935f 1985---b

1786---------E 1836---------D 1886-----A 1936-d 1986f

1787---------D 1837-------B 1887g 1937-d 1987-------B

1788--------C 1838---a 1888-d 1938--c 1988-------B

1789--------C 1839--b 1889-d 1939----a 1989------A

1790----a 1840--------C 1890-e 1940-e 1990---------C

1791----------F 1841-----A 1891---b 1941--------C 1991---------D

1742n 1792----a 1842----a 1892----a 1942----a 1992----------G

1743---a 1793------A 1843--c 1893------B 1943-d 1993----------J

1744----------F 1794l 1844k 1894------A 1944-------B 1994----------F

1745---------D 1795---b 1845-----A 1895------A 1945------A 1995--------C

1746----------F 1796---a 1846----@ 1896---------D 1946---a 1996-d

1747----------I 1797-------B 1847--c 1897-------B 1947------A 1997-d

1748-------B 1798------A 1848-----@ 1898---------D 1948-e 1998--c

1749-c 1799i 1849---b 1899--------C 1949------B 1999----a

PART 5: CORRELATION OF SERIES BY SEGMENTS: 11:06 Fri 06 May 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 1740 1755 1770 1785 1800 1815 1830 1845 1860 1875 1890 1905 1920 1935 1950 1965 1980 1995

1769 1784 1799 1814 1829 1844 1859 1874 1889 1904 1919 1934 1949 1964 1979 1994 2009 2024

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

1 262a 1747 2010 .64 .69 .67 .69 .80 .89 .76 .49 .72 .46 .30B .58 .56 .60 .71 .47 .29A .32A

2 262b 1742 2010 .66 .71 .64 .71 .82 .83 .61 .44 .75 .69 .41B .43B .56 .62 .59 .51 .40A .38A

3 263A 1799 2010 .47 .37A .51 .22B .38B .56 .51 .50 .56 .68 .74 .66 .56 .68 .71

4 263B 1801 2010 .46 .49 .56 .52 .54 .75 .61 .54 .61 .76 .69 .66 .71 .70

5 264A 1874 2010 .31A .46 .78 .71 .64 .67 .70 .71 .80 .76

6 264B 1893 2010 .50 .55 .36A .53 .74 .74 .79 .76

7 265A 1894 2010 .31B .37B .26B .43 .53 .58B .47 .44

8 265B 1902 2010 .61 .61 .63 .71 .53 .43 .55 .52

9 266A 1898 2010 .31B .38A .65 .65 .21B .47 .74 .75

10 266B 1905 2010 .28B .36B .68 .80 .65 .55 .02B

11 267A 1917 2010 .52 .55 .68 .59 .56 .64 .63

12 267B 1917 2010 .52 .54 .71 .52 .51 .82 .82

13 268A 1808 2010 .37A .33A .03B .32B .45 .56 .33B .45 .57 .59 .61 .73 .74 .71

14 268B 1822 2010 .28B .25B .06B .26B .37A .37B .56 .71 .70 .62 .75 .84 .82

15 269A 1911 2010 .74 .78 .81 .62 .46 .64 .63

16 269B 1810 2010 .42B .42B .44 .47 .37A .26B .67 .63 .65 .75 .67 .47 .44 .42A

17 270A 1905 2010 .12B .61 .72 .51 .49B .68 .67

18 270B 1918 2010 .42 .43B .49B .50B .55 .67 .66

19 271A 1815 2010 .63 .43 .29B .51 .46B .22B .46 .53 .59 .70 .64 .81 .81

20 271B 1793 2010 .52 .57 .65 .46 .31B .37B .39B .29B .59 .75 .67 .57 .55 .70 .68

21 529A 1822 2010 .26B .06B .01B .22B .40B .48B .33B-.06B-.15B-.11B .22A .24A .29A

22 529B 1798 2010 .82 .80 .83 .60 .41A .54 .26B .23B .55 .54 .66 .65 .29B .00A .00A

Av segment correlation .65 .70 .65 .64 .58 .56 .40 .34 .47 .46 .43 .50 .54 .62 .57 .55 .60 .57

PART 6: POTENTIAL PROBLEMS: 11:06 Fri 06 May 2011 Page 6

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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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262a 1747 to 2010 264 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

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1890 1919 -10 .34\*-.06 .13 -.08 -.09 -.19 -.13 -.24 -.09 -.23 .30|-.19 .32 .29 .32 -.09 -.15 -.31 -.07 -.04 .10

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

1980 2009 0 .28 .17 .04 -.05 -.22 .04 -.09 -.17 .12 .00 .29\*-.16 - - - - - - - - -

1981 2010 0 .30 .18 .05 -.05 -.22 .06 -.09 -.19 .13 .01 .32\* - - - - - - - - - -

[B] Entire series, effect on correlation ( .594) is:

Lower 1898< -.012 1984> -.009 2003> -.009 1776> -.008 1935> -.007 1796< -.007 Higher 1844 .008 1822 .007

1890 to 1919 segment:

Lower 1898< -.131 1901> -.054 1897< -.038 1899< -.038 1912> -.030 1895> -.007 Higher 1909 .071 1911 .048

1980 to 2009 segment:

Lower 1984> -.076 2003> -.068 2004> -.051 2009< -.035 1992< -.032 1980< -.026 Higher 1996 .130 1981 .090

1981 to 2010 segment:

Lower 1984> -.076 2003> -.071 2004> -.052 2009< -.038 1992< -.035 2007< -.027 Higher 1996 .128 1981 .087

[D] 6 Absent rings: Year Master N series Absent

1767 -2.357 2 1

Present in series 2 262b time span 1742 to 2010

1768 -.033 2 2 >> WARNING: Ring is not usually narrow

Absent in series 2 262b time span 1742 to 2010

1890 -1.204 12 2

2008 .461 22 2 >> WARNING: Ring is not usually narrow

2009 1.488 22 3 >> WARNING: Ring is not usually narrow

2010 .807 22 4 >> WARNING: Ring is not usually narrow

>> WARNING: Last ring in series is ABSENT

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

1984 +3.3 SD; 2004 +3.2 SD

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262b 1742 to 2010 269 years Series 2

[\*] Early part of series cannot be checked from 1742 to 1746 -- 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

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1890 1919 -6 .07 -.01 .22 .23 .47\*-.03 -.05 -.02 -.19 -.12 .41|-.13 .14 -.05 .06 .00 -.02 -.18 .12 -.24 -.13

1905 1934 -6 .28 .03 .22 .20 .55\*-.22 .06 -.05 -.21 -.26 .43|-.33 .10 -.11 .07 -.19 .05 -.17 .07 -.25 -.09

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

1980 2009 0 .30 .27 -.02 -.12 -.10 .01 .02 -.02 .28 .17 .40\*-.13 - - - - - - - - -

1981 2010 0 .27 .26 -.04 -.11 -.10 -.04 .03 .00 .28 .16 .38\* - - - - - - - - - -

[B] Entire series, effect on correlation ( .534) is:

Lower 1989< -.039 1918< -.016 1776< -.014 1917< -.011 2003> -.009 1990< -.009 Higher 1799 .012 1844 .009

1890 to 1919 segment:

Lower 1918< -.124 1912> -.031 1892> -.013 1900< -.007 1910> -.007 1901> -.007 Higher 1909 .027 1911 .025

1905 to 1934 segment:

Lower 1918< -.109 1912> -.032 1917< -.014 1925> -.011 1921< -.009 1910> -.008 Higher 1929 .019 1909 .017

1980 to 2009 segment:

Lower 1989< -.136 2003> -.054 1990< -.046 2009< -.019 2004> -.017 1984> -.016 Higher 1993 .059 1996 .050

1981 to 2010 segment:

Lower 1989< -.113 2003> -.055 1990< -.045 2004> -.018 1984> -.016 2009< -.015 Higher 1993 .068 1996 .050

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

1918 1919 4.7 SD

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

1768 -.033 2 2 >> WARNING: Ring is not usually narrow

Absent in series 1 262a time span 1747 to 2010

1989 .329 22 2 >> WARNING: Ring is not usually narrow

1990 .867 22 2 >> WARNING: Ring is not usually narrow

2010 .807 22 4 >> WARNING: Ring is not usually narrow

>> WARNING: Last ring in series is ABSENT

[E] Outliers 4 3.0 SD above or -4.5 SD below mean for year

1794 +3.6 SD; 1918 -8.2 SD; 1989 -5.7 SD; 1990 -5.8 SD

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263A 1799 to 2010 212 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

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

1800 1829 0 .11 -.14 -.25 .13 .00 .26 -.24 -.05 -.19 .20 .37\*-.21 -.20 .17 .19 .10 -.12 -.20 .17 .18 .05

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

1830 1859 9 .12 .11 -.01 -.40 .42 -.04 .00 .04 -.06 -.20 .22|-.22 -.26 .04 -.14 -.03 .01 -.09 .08 .51\* .11

1845 1874 -6 .14 -.12 -.17 -.24 .39\*-.03 -.04 -.25 -.08 -.20 .38|-.28 .09 .02 -.05 .11 -.11 -.10 -.12 .07 .14

[B] Entire series, effect on correlation ( .525) is:

Lower 1858< -.020 1812> -.013 1947< -.012 1976< -.012 1852> -.011 1814> -.009 Higher 1935 .036 1844 .010

1800 to 1829 segment:

Lower 1812> -.056 1814> -.050 1804> -.024 1825< -.023 1819< -.017 1818> -.014 Higher 1822 .069 1817 .027

1830 to 1859 segment:

Lower 1852> -.092 1858< -.079 1853< -.027 1842> -.017 1834< -.016 1850> -.008 Higher 1844 .105 1840 .039

1845 to 1874 segment:

Lower 1852> -.119 1858< -.037 1863> -.027 1853< -.024 1850> -.011 1873> -.010 Higher 1861 .049 1862 .041

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

1824 -.872 11 1

1825 -.034 11 1 >> WARNING: Ring is not usually narrow

1844 -2.813 11 2

1847 -.688 11 1

1858 -.131 11 2 >> WARNING: Ring is not usually narrow

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

1858 -6.2 SD

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263B 1801 to 2010 210 years Series 4

[B] Entire series, effect on correlation ( .570) is:

Lower 1824> -.015 1823> -.013 1806> -.011 1862< -.009 1843> -.008 1922< -.006 Higher 1829 .010 1818 .010

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

1824 +3.7 SD

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264A 1874 to 2010 137 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

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1874 1903 0 -.08 -.12 -.09 .10 -.09 .05 .22 .11 .18 .09 .31\* .25 .20 .09 .12 .07 .15 -.22 -.30 -.16 .12

[B] Entire series, effect on correlation ( .632) is:

Lower 1874> -.027 1881> -.019 1943> -.013 1976< -.011 1952< -.008 1973> -.006 Higher 1911 .023 1993 .010

1874 to 1903 segment:

Lower 1874> -.155 1881> -.038 1880< -.027 1886< -.026 1892< -.017 1878< -.014 Higher 1901 .078 1887 .065

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

1874 +3.2 SD

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264B 1893 to 2010 118 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

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1920 1949 0 .07 -.06 -.10 .33 .11 -.14 .25 -.14 .10 -.39 .36\*-.04 -.26 -.10 -.12 -.19 .30 -.21 .29 -.10 -.04

[B] Entire series, effect on correlation ( .588) is:

Lower 1935> -.021 1942< -.021 1920< -.018 1939< -.011 1933> -.010 1895< -.008 Higher 1911 .029 1956 .013

1920 to 1949 segment:

Lower 1920< -.050 1942< -.046 1939< -.031 1935> -.029 1933> -.027 1927< -.014 Higher 1934 .044 1929 .041

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265A 1894 to 2010 117 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

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1894 1923 2 .10 -.04 -.12 -.07 .22 -.23 .09 -.24 -.01 .12 .31|-.26 .34\*-.22 -.10 -.13 .05 -.22 .17 -.20 .15

1905 1934 2 .10 -.06 .04 -.18 .25 -.27 .09 -.10 .02 -.06 .37|-.30 .44\*-.14 -.02 -.18 .12 -.18 .09 -.36 .18

1920 1949 2 .00 -.11 .03 -.07 .31 .03 -.18 -.05 -.10 -.06 .26|-.35 .43\*-.18 -.02 -.09 .12 -.13 .10 -.40 .16

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1965 1994 -1 -.07 -.08 -.39 -.23 -.16 .10 -.01 .26 .44 .61\* .58| .15 -.17 -.23 -.14 -.22 -.28 -.21 .02 -.36 -.36

[B] Entire series, effect on correlation ( .394) is:

Lower 1923< -.047 1958< -.016 1894< -.015 1941< -.013 1956> -.011 1929> -.009 Higher 1911 .025 1993 .021

1894 to 1923 segment:

Lower 1923< -.066 1894< -.039 1922> -.029 1912> -.016 1900< -.012 1917> -.011 Higher 1911 .081 1909 .048

1905 to 1934 segment:

Lower 1923< -.159 1929> -.037 1934< -.030 1922> -.027 1918< -.013 1912> -.012 Higher 1911 .082 1909 .046

1920 to 1949 segment:

Lower 1923< -.109 1941< -.033 1929> -.026 1922> -.019 1934< -.013 1937> -.012 Higher 1948 .044 1924 .034

1965 to 1994 segment:

Lower 1981> -.060 1994> -.052 1991< -.029 1988< -.013 1982< -.013 1990< -.011 Higher 1993 .086 1965 .024

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

1923 -4.8 SD; 1939 +3.4 SD

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265B 1902 to 2010 109 years Series 8

[B] Entire series, effect on correlation ( .575) is:

Lower 1909> -.016 1981> -.015 1973< -.015 1922> -.012 1990< -.010 1918< -.007 Higher 1911 .030 1935 .022

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266A 1898 to 2010 113 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

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1898 1927 -2 -.11 -.23 .21 -.09 -.04 -.01 .06 -.08 .42\* .08 .31| .28 .29 .06 .04 .10 -.06 -.32 .04 -.21 .12

1905 1934 0 .08 -.40 .28 -.08 -.16 -.14 .12 -.11 .33 .03 .38\*-.11 .37 .12 .01 .13 -.17 -.03 -.12 -.09 .27

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1950 1979 3 .04 .15 .11 -.06 .05 -.03 -.48 .03 -.06 -.21 .21| .06 -.02 .23\* .17 .05 -.16 -.05 .16 -.01 -.05

[B] Entire series, effect on correlation ( .521) is:

Lower 1923> -.027 1955< -.021 1973< -.017 1950> -.012 1968> -.012 1902> -.010 Higher 1935 .079 1948 .016

1898 to 1927 segment:

Lower 1923> -.109 1902> -.036 1900< -.026 1913< -.026 1906< -.025 1914> -.022 Higher 1911 .139 1909 .109

1905 to 1934 segment:

Lower 1923> -.113 1929> -.030 1914> -.024 1913< -.023 1906< -.021 1917> -.014 Higher 1911 .096 1909 .083

1950 to 1979 segment:

Lower 1955< -.076 1950> -.041 1968> -.041 1973< -.033 1963> -.024 1975< -.021 Higher 1957 .062 1961 .045

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

1923 +3.5 SD; 1939 +3.3 SD

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266B 1905 to 2010 106 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

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1905 1934 -2 -.09 -.16 .02 -.18 .02 -.11 -.28 .23 .43\* .32 .28| .03 -.09 -.07 .19 .20 -.29 .05 -.27 .07 -.04

1920 1949 5 -.25 -.19 .32 -.04 .14 .06 -.05 -.19 .30 -.08 .36|-.28 -.10 .06 .07 .37\*-.13 .12 -.06 -.04 -.05

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1981 2010 -7 .08 -.06 -.17 .32\* .02 .11 -.03 -.19 .07 -.11 .02| - - - - - - - - - -

[B] Entire series, effect on correlation ( .231) is:

Lower 2010< -.312 1929> -.009 2004> -.009 1944< -.006 2003> -.006 1931< -.006 Higher 1935 .021 2009 .021

1905 to 1934 segment:

Lower 1931< -.065 1929> -.052 1924< -.051 1913< -.050 1923> -.027 1930< -.014 Higher 1911 .096 1909 .052

1920 to 1949 segment:

Lower 1931< -.058 1944< -.044 1929> -.042 1924< -.039 1923> -.022 1938> -.018 Higher 1935 .147 1934 .036

1981 to 2010 segment:

Lower 2010< -.568 2004> -.022 2003> -.014 1984> -.001 1995< -.001 2005> -.001 Higher 2009 .066 1993 .064

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

2009 2010 -8.3 SD

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

2010-12.8 SD

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267A 1917 to 2010 94 years Series 11

[B] Entire series, effect on correlation ( .594) is:

Lower 1922< -.036 1940> -.020 1986> -.017 1925> -.012 2004> -.012 1991< -.010 Higher 1935 .056 2003 .023

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267B 1917 to 2010 94 years Series 12

[B] Entire series, effect on correlation ( .576) is:

Lower 1917< -.032 1968> -.020 1944< -.018 1925> -.017 1948> -.015 1972< -.014 Higher 1935 .067 2003 .018

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

1968 +3.5 SD

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268A 1808 to 2010 203 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

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1808 1837 0 .19 .19 -.03 -.23 .19 -.06 .28 -.43 .25 -.30 .37\*-.19 .02 -.08 .01 .23 .14 -.25 .07 .01 .00

1815 1844 0 .05 .18 .05 -.20 .26 -.07 .23 -.45 .33 -.26 .33\*-.18 -.09 -.04 -.12 .09 .13 -.25 .17 .11 -.08

1830 1859 -5 .18 -.02 .30 -.20 .10 .36\* .13 -.33 .15 -.23 .03| .05 -.17 -.20 .07 -.16 .10 -.11 .01 .08 .02

1845 1874 -5 -.21 -.01 -.09 -.05 .12 .33\*-.32 -.19 -.18 .24 .32|-.12 -.05 -.04 -.20 .06 .04 -.01 .10 -.36 .28

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1890 1919 -3 -.29 -.09 -.13 -.13 .25 .26 .31 .52\* .33 .02 .33| .17 .28 .02 -.12 -.24 -.15 -.12 .05 -.10 -.12

[B] Entire series, effect on correlation ( .517) is:

Lower 1833< -.023 1862> -.016 1812> -.011 1863< -.011 1858< -.008 1923> -.007 Higher 1844 .024 1911 .019

1808 to 1837 segment:

Lower 1833< -.110 1812> -.054 1831< -.028 1823> -.028 1832> -.019 1809> -.017 Higher 1818 .075 1822 .048

1815 to 1844 segment:

Lower 1833< -.082 1823> -.034 1839> -.025 1831< -.023 1842> -.023 1832> -.015 Higher 1844 .138 1818 .049

1830 to 1859 segment:

Lower 1833< -.088 1839> -.038 1842> -.034 1831< -.026 1832> -.024 1847> -.022 Higher 1844 .322 1830 .022

1845 to 1874 segment:

Lower 1862> -.133 1847> -.027 1863< -.026 1873> -.019 1846> -.015 1854> -.013 Higher 1861 .064 1872 .042

1890 to 1919 segment:

Lower 1897> -.047 1916< -.035 1902> -.027 1901> -.023 1917> -.023 1915< -.018 Higher 1911 .241 1912 .014

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

1844 -2.813 11 2

1858 -.131 11 2 >> WARNING: Ring is not usually narrow

1888 -1.043 12 2

1911 -2.633 19 1

1912 -1.805 19 1

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

1943 -5.2 SD

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268B 1822 to 2010 189 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

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1822 1851 6 -.34 .28 -.07 -.23 -.14 -.06 .08 .25 -.30 -.36 .28|-.10 .17 -.07 -.10 .20 .52\*-.21 .14 -.20 .34

1830 1859 10 -.28 .13 .16 -.27 -.17 -.07 .08 .11 -.13 -.33 .25| .02 .32 -.05 .09 .08 .32 -.12 .21 -.22 .34\*

1845 1874 8 -.26 .10 -.08 -.18 -.09 .23 -.18 .13 -.04 -.07 .06|-.07 .30 -.09 .14 -.29 .23 -.13 .35\*-.32 .17

1860 1889 6 -.05 -.04 .05 .04 -.14 .11 -.04 .02 -.11 -.07 .26| .02 -.02 .02 -.01 -.26 .44\*-.01 .03 -.14 .03

1875 1904 0 -.01 -.14 .28 .13 .03 -.05 .34 .01 .14 -.10 .37\* .08 -.11 .00 .07 -.22 .35 -.14 -.18 -.12 -.18

1890 1919 -2 -.16 -.03 -.02 -.22 .20 .08 .20 .40 .52\* .19 .37| .09 .14 -.05 .12 -.17 -.12 -.27 -.09 -.26 -.19

[B] Entire series, effect on correlation ( .476) is:

Lower 1861< -.017 1822< -.014 1867< -.012 1882> -.012 1873> -.009 1923> -.007 Higher 1935 .040 1830 .010

1822 to 1851 segment:

Lower 1822< -.047 1843> -.035 1828> -.030 1848< -.025 1842< -.024 1836< -.023 Higher 1830 .106 1823 .080

1830 to 1859 segment:

Lower 1836< -.039 1843> -.032 1848< -.031 1857> -.027 1842< -.025 1835> -.019 Higher 1830 .118 1844 .056

1845 to 1874 segment:

Lower 1861< -.089 1867< -.063 1873> -.046 1864> -.031 1848< -.023 1860< -.020 Higher 1872 .065 1874 .051

1860 to 1889 segment:

Lower 1861< -.068 1882> -.052 1867< -.043 1887> -.039 1873> -.037 1864> -.027 Higher 1881 .199 1872 .041

1875 to 1904 segment:

Lower 1882> -.072 1887> -.063 1901> -.044 1878< -.037 1902> -.022 1896< -.009 Higher 1881 .240 1880 .034

1890 to 1919 segment:

Lower 1901> -.056 1917> -.054 1902> -.047 1913< -.030 1893< -.018 1903< -.017 Higher 1911 .083 1900 .044

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269A 1911 to 2010 100 years Series 15

[B] Entire series, effect on correlation ( .666) is:

Lower 1994< -.029 1919< -.029 1925> -.019 2004> -.019 1972< -.014 1917> -.010 Higher 1935 .058 1911 .020

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269B 1810 to 2010 201 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

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1810 1839 -6 -.06 -.02 .33 -.29 .52\*-.34 -.05 .25 -.11 -.23 .42|-.46 .03 .09 -.04 -.27 .11 -.29 .17 .26 -.46

1815 1844 -6 -.03 .10 .23 -.32 .61\*-.13 -.14 .15 -.05 -.10 .42|-.49 -.20 .20 -.25 .01 -.03 -.30 .10 .25 -.27

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1860 1889 0 -.15 -.04 .04 .25 -.02 .09 -.26 -.36 .01 .07 .37\*-.36 -.20 -.19 -.18 -.24 .11 -.39 .17 -.22 .14

1875 1904 -5 .19 -.17 .21 .23 .03 .28\* .11 .05 .10 -.07 .26|-.45 -.29 -.13 -.11 -.31 .22 -.28 .03 -.15 .19

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1981 2010 0 -.08 -.30 -.23 -.26 -.20 -.20 -.03 .26 .29 .15 .42\* - - - - - - - - - -

[B] Entire series, effect on correlation ( .527) is:

Lower 1823> -.014 1881> -.010 1826< -.009 1981> -.009 1862> -.007 1818> -.006 Higher 1935 .027 1829 .010

1810 to 1839 segment:

Lower 1823> -.072 1826< -.035 1818> -.034 1814> -.031 1819> -.022 1827< -.015 Higher 1829 .084 1812 .040

1815 to 1844 segment:

Lower 1823> -.064 1826< -.052 1818> -.024 1827< -.022 1819> -.019 1842> -.018 Higher 1829 .065 1822 .041

1860 to 1889 segment:

Lower 1881> -.092 1862> -.054 1885> -.039 1860< -.037 1878< -.018 1873< -.012 Higher 1887 .061 1861 .054

1875 to 1904 segment:

Lower 1881> -.095 1885> -.044 1878< -.034 1893< -.022 1902> -.010 1904< -.010 Higher 1887 .094 1880 .038

1981 to 2010 segment:

Lower 1981> -.058 2005> -.027 2000< -.020 2004> -.013 1986> -.011 2003> -.009 Higher 1996 .099 1990 .015

[D] 7 Absent rings: Year Master N series Absent

1882 -1.099 12 1

1884 -.417 12 1

1887 -1.846 12 1

1888 -1.043 12 2

1889 -1.026 12 1

1890 -1.204 12 2

1996 -1.104 22 2

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

1829 -5.2 SD; 1996 -4.7 SD

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270A 1905 to 2010 106 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

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1905 1934 4 -.03 -.12 .13 -.25 -.19 -.28 .01 .14 .28 -.22 .12|-.10 .09 -.23 .31\*-.11 .25 .13 -.08 .16 -.02

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1965 1994 -5 -.06 -.20 -.18 -.07 -.18 .49\* .03 .19 .08 .13 .49|-.11 .08 .11 .01 .04 -.20 -.11 .06 -.16 -.01

[B] Entire series, effect on correlation ( .505) is:

Lower 1905< -.050 1961< -.018 1953> -.012 1917> -.010 1923> -.009 1931< -.009 Higher 1935 .053 2003 .021

1905 to 1934 segment:

Lower 1905< -.135 1917> -.025 1923> -.025 1931< -.023 1907> -.023 1922> -.016 Higher 1911 .086 1934 .059

1965 to 1994 segment:

Lower 1985> -.050 1993< -.049 1970< -.046 1981> -.041 1976> -.034 1969< -.015 Higher 1986 .054 1992 .044

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270B 1918 to 2010 93 years Series 18

[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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1920 1949 -8 -.08 -.39 .52\*-.09 -.14 -.18 -.09 -.09 .38 -.24 .43|-.33 -.13 .09 -.08 .28 .12 -.22 .19 -.13 .36

1935 1964 3 .10 -.35 .28 .07 -.22 -.31 .01 -.01 .07 -.15 .49|-.11 -.16 .59\*-.13 .17 .20 -.31 -.11 -.05 -.04

1950 1979 3 -.07 -.10 -.26 .10 -.02 -.23 .25 .14 -.18 .04 .50| .01 -.23 .59\* .11 -.24 .23 -.34 -.21 -.16 -.15

[B] Entire series, effect on correlation ( .534) is:

Lower 1994< -.023 1940> -.018 1935> -.017 1937< -.012 1977> -.009 1930< -.007 Higher 2003 .025 1958 .016

1920 to 1949 segment:

Lower 1940> -.043 1937< -.039 1930< -.023 1935> -.020 1922> -.014 1931< -.014 Higher 1941 .040 1924 .034

1935 to 1964 segment:

Lower 1937< -.048 1940> -.038 1960< -.023 1935> -.021 1951> -.013 1947< -.010 Higher 1958 .050 1941 .031

1950 to 1979 segment:

Lower 1977> -.038 1960< -.032 1951> -.031 1976> -.028 1979> -.021 1966> -.012 Higher 1958 .080 1957 .036

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271A 1815 to 2010 196 years Series 19

[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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1845 1874 -8 .12 -.16 .41\*-.34 -.02 .02 -.17 .07 .21 -.16 .29|-.08 -.12 -.14 -.15 .05 -.12 .10 .00 .05 .27

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1875 1904 10 -.03 -.33 -.09 -.08 .03 -.26 -.14 -.20 -.24 -.11 .46|-.12 -.15 -.19 -.09 .07 .22 .14 .23 .12 .54\*

1890 1919 10 -.02 -.20 -.12 -.09 -.10 -.23 -.12 -.09 -.32 -.19 .22|-.29 -.12 -.05 .00 .16 .24 .13 .39 .19 .49\*

[B] Entire series, effect on correlation ( .495) is:

Lower 1901< -.021 1902< -.016 1911> -.013 1872< -.010 1904< -.009 1937> -.006 Higher 1887 .011 1924 .008

1845 to 1874 segment:

Lower 1872< -.072 1862> -.052 1855< -.042 1850> -.040 1863> -.036 1845< -.031 Higher 1852 .180 1861 .110

1875 to 1904 segment:

Lower 1902< -.051 1904< -.041 1884> -.023 1890> -.019 1882> -.013 1889> -.012 Higher 1887 .068 1881 .027

1890 to 1919 segment:

Lower 1911> -.095 1902< -.038 1904< -.038 1910> -.019 1909> -.016 1890> -.014 Higher 1901 .075 1900 .032

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

1984 -.985 22 2

1985 -.441 22 2

1986 -1.449 22 2

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

1901 -4.6 SD; 1902 -6.9 SD; 1911 +3.3 SD

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271B 1793 to 2010 218 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

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1845 1874 7 -.04 -.27 -.04 -.48 .14 .09 -.09 .05 .06 .02 .31|-.05 -.27 .01 -.22 .15 .03 .45\* .14 -.15 -.16

1860 1889 7 -.02 -.18 -.06 -.31 .25 -.06 -.07 .08 -.19 .10 .37| .06 -.21 -.03 -.08 .15 -.08 .55\* .17 -.10 .07

1875 1904 10 -.19 -.28 -.08 -.17 .05 -.35 -.17 -.21 -.31 -.11 .39| .00 .02 -.10 .36 .15 .28 .20 .42 -.02 .54\*

1890 1919 10 .00 -.11 -.17 -.06 .00 -.38 -.10 -.29 -.17 -.01 .29|-.22 -.09 -.20 .21 .13 .20 .13 .40 -.08 .46\*

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

Lower 1918< -.013 1880< -.013 1796> -.008 1890> -.007 1953> -.007 1868< -.007 Higher 1935 .023 1794 .018

1845 to 1874 segment:

Lower 1868< -.052 1866< -.051 1869> -.041 1845< -.036 1852> -.025 1854> -.019 Higher 1861 .089 1872 .060

1860 to 1889 segment:

Lower 1880< -.088 1868< -.042 1866< -.040 1869> -.037 1889> -.020 1874< -.018 Higher 1861 .077 1881 .064

1875 to 1904 segment:

Lower 1880< -.091 1890> -.067 1889> -.019 1903< -.017 1904< -.014 1892> -.014 Higher 1881 .058 1901 .055

1890 to 1919 segment:

Lower 1918< -.085 1890> -.053 1909> -.045 1903< -.023 1904< -.019 1914> -.013 Higher 1901 .082 1911 .074

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

1940 -6.2 SD

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529A 1822 to 2010 189 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

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1822 1851 6 -.38 .19 -.27 .16 -.19 .23 -.03 .29 -.09 -.22 .26| .10 .03 -.02 .01 -.07 .30\*-.42 .03 .15 -.05

1830 1859 2 -.14 .02 -.15 .07 .14 -.16 .15 -.01 -.03 .06 .06|-.04 .18\*-.14 .09 -.27 .11 -.15 .05 .14 -.15

1845 1874 -4 .23 .31 -.17 .12 -.23 -.06 .40\*-.13 .08 -.18 .01| .06 .21 -.33 .03 -.35 .27 -.02 .34 -.17 .06

1860 1889 2 -.03 .05 .07 -.07 -.09 -.04 .06 -.14 -.04 .25 .22| .07 .37\*-.18 .04 .08 .15 .18 .34 -.26 .09

1875 1904 -1 -.35 -.16 .06 -.27 -.01 -.19 -.19 .03 -.04 .51\* .40| .05 .31 -.07 .05 .44 .15 .19 .05 -.12 -.07

1890 1919 -2 -.09 -.23 -.12 -.41 -.16 -.10 .03 .33 .51\* .36 .48| .05 .13 .08 .00 .12 -.01 -.07 .07 -.04 .08

1905 1934 -2 .20 -.15 .20 -.30 -.10 .01 .03 .07 .51\* .12 .33|-.28 -.01 -.11 .05 .23 -.12 -.22 .09 -.25 .30

1920 1949 -10 .38\* .05 .10 -.22 -.13 -.07 .30 -.02 .11 -.12 -.06|-.14 -.19 .03 .18 .18 -.17 -.02 -.01 -.03 .04

1935 1964 -10 .48\*-.04 -.05 .05 -.16 -.04 .46 -.02 .00 -.12 -.15| .21 -.42 .01 .13 -.31 -.23 .17 .13 .17 .10

1950 1979 7 .18 .05 -.14 .18 -.30 .09 .12 -.06 -.06 .07 -.11| .04 -.32 -.14 .15 -.18 -.08 .30\* .27 .01 .28

1965 1994 0 -.07 .06 -.10 -.08 -.46 .16 -.03 .01 -.17 -.09 .22\*-.01 .12 .03 -.04 .19 .21 .19 .16 -.06 .00

1980 2009 0 -.47 -.15 .02 -.04 -.25 .01 .17 .12 .00 -.09 .24\* .14 - - - - - - - - -

1981 2010 0 -.46 -.14 .03 -.05 -.25 .04 .17 .10 .01 -.08 .29\* - - - - - - - - - -

[B] Entire series, effect on correlation ( .135) is:

Lower 1996> -.025 2009< -.014 1955< -.013 1930< -.011 1939< -.010 1830< -.010 Higher 1823 .027 1911 .021

1822 to 1851 segment:

Lower 1830< -.059 1840< -.049 1838> -.046 1829> -.045 1849> -.026 1824> -.012 Higher 1823 .107 1822 .070

1830 to 1859 segment:

Lower 1830< -.074 1838> -.073 1840< -.066 1852> -.042 1849> -.041 1856< -.019 Higher 1844 .162 1855 .043

1845 to 1874 segment:

Lower 1867< -.069 1849> -.040 1852> -.026 1864> -.024 1869> -.024 1871> -.017 Higher 1862 .043 1872 .043

1860 to 1889 segment:

Lower 1867< -.058 1869> -.025 1864> -.025 1882< -.022 1879< -.021 1874> -.021 Higher 1878 .054 1887 .050

1875 to 1904 segment:

Lower 1882< -.057 1901> -.029 1879< -.024 1904< -.015 1881> -.013 1903< -.011 Higher 1878 .049 1887 .029

1890 to 1919 segment:

Lower 1913< -.038 1917> -.034 1915< -.029 1901> -.028 1904< -.025 1903< -.019 Higher 1911 .135 1909 .038

1905 to 1934 segment:

Lower 1930< -.114 1929> -.096 1931< -.031 1917> -.028 1913< -.025 1933> -.019 Higher 1911 .127 1924 .059

1920 to 1949 segment:

Lower 1930< -.058 1939< -.049 1929> -.045 1942> -.025 1931< -.016 1937> -.015 Higher 1924 .071 1934 .066

1935 to 1964 segment:

Lower 1955< -.061 1939< -.031 1962> -.024 1953> -.023 1942> -.019 1958< -.015 Higher 1956 .106 1954 .040

1950 to 1979 segment:

Lower 1955< -.073 1962> -.049 1966> -.048 1953> -.037 1968> -.034 1975< -.020 Higher 1956 .140 1977 .054

1965 to 1994 segment:

Lower 1966> -.084 1968> -.057 1980< -.041 1975< -.034 1984> -.022 1973> -.021 Higher 1981 .078 1992 .069

1980 to 2009 segment:

Lower 1996> -.196 2009< -.114 1980< -.037 1990< -.016 1984> -.015 1994< -.013 Higher 1981 .078 1992 .072

1981 to 2010 segment:

Lower 1996> -.203 2009< -.122 1990< -.018 1994< -.016 1984> -.015 2005> -.012 Higher 1981 .076 1992 .073

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

1829 1830 -4.1 SD

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

2009 1.488 22 3 >> WARNING: Ring is not usually narrow

2010 .807 22 4 >> WARNING: Ring is not usually narrow

>> WARNING: Last ring in series is ABSENT

[E] Outliers 5 3.0 SD above or -4.5 SD below mean for year

1823 -5.8 SD; 1838 +3.1 SD; 1882 -5.1 SD; 1966 +3.4 SD; 1996 +3.9 SD

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

529B 1798 to 2010 213 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

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

1845 1874 0 .01 .05 .28 -.32 .02 -.12 .00 .11 .23 .04 .41\* .05 -.17 -.16 .02 .04 -.06 .05 .09 .04 .11

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

1875 1904 -6 .25 -.24 .12 .23 .42\* .06 -.07 -.22 -.23 -.25 .26|-.07 -.14 -.19 -.25 -.15 .12 -.15 .02 .01 .05

1890 1919 -6 .24 -.05 .18 .11 .26\* .00 -.27 -.30 -.18 -.27 .23| .01 .02 .05 -.04 -.11 -.07 -.42 .13 .06 -.10

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

1965 1994 -1 -.22 -.27 -.45 -.27 .32 .06 .28 .22 .17 .52\* .29| .16 -.22 -.02 .51 -.32 -.43 -.38 -.20 .17 -.67

1980 2009 0 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00\* .00 - - - - - - - - -

1981 2010 0 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00\* - - - - - - - - - -

[B] Entire series, effect on correlation ( .398) is:

Lower 2010< -.118 2009< -.024 1996> -.009 1890> -.008 2003> -.007 1893< -.006 Higher 1799 .023 1807 .013

1845 to 1874 segment:

Lower 1869> -.063 1866< -.038 1845< -.033 1862> -.030 1854> -.026 1856> -.025 Higher 1861 .122 1852 .116

1875 to 1904 segment:

Lower 1890> -.102 1893< -.075 1896< -.029 1889> -.025 1894< -.021 1899< -.019 Higher 1881 .141 1887 .106

1890 to 1919 segment:

Lower 1890> -.091 1893< -.070 1896< -.029 1912> -.020 1894< -.020 1899< -.019 Higher 1911 .086 1917 .062

1965 to 1994 segment:

Lower 1976> -.045 1986> -.039 1980< -.033 1970< -.025 1972< -.025 1979< -.008 Higher 1975 .028 1965 .025

1980 to 2009 segment:

Lower 2009< -.246 2007< -.038 1996> -.037 1980< -.023 1986> -.010 1997> -.008 Higher 1993 .072 1992 .049

1981 to 2010 segment:

Lower 2009< -.066 1996> -.021 1986> -.010 2007< -.007 2003> -.007 1997> -.005 Higher 1993 .044 1992 .030

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

2009 2010 -7.1 SD

[D] 34 Absent rings: Year Master N series Absent

1977 -.586 22 1

1978 -.175 22 1 >> WARNING: Ring is not usually narrow

1979 .166 22 1 >> WARNING: Ring is not usually narrow

1980 1.028 22 1 >> WARNING: Ring is not usually narrow

1981 -.524 22 1

1982 -.517 22 1

1983 -.559 22 1

1984 -.985 22 2

1985 -.441 22 2

1986 -1.449 22 2

1987 .527 22 1 >> WARNING: Ring is not usually narrow

1988 .585 22 1 >> WARNING: Ring is not usually narrow

1989 .329 22 2 >> WARNING: Ring is not usually narrow

1990 .867 22 2 >> WARNING: Ring is not usually narrow

1991 1.008 22 1 >> WARNING: Ring is not usually narrow

1992 1.661 22 1 >> WARNING: Ring is not usually narrow

1993 2.389 22 1 >> WARNING: Ring is not usually narrow

1994 1.440 22 1 >> WARNING: Ring is not usually narrow

1995 .726 22 1 >> WARNING: Ring is not usually narrow

1996 -1.104 22 2

1997 -.958 22 1

1998 -.715 22 1

1999 -.264 22 1 >> WARNING: Ring is not usually narrow

2000 -.547 22 1

2001 .033 22 1 >> WARNING: Ring is not usually narrow

2002 .360 22 1 >> WARNING: Ring is not usually narrow

2003 -1.396 22 1

2004 -1.691 22 1

2005 -1.707 22 1

2006 -.973 22 1

2007 .582 22 1 >> WARNING: Ring is not usually narrow

2008 .461 22 2 >> WARNING: Ring is not usually narrow

2009 1.488 22 3 >> WARNING: Ring is not usually narrow

2010 .807 22 4 >> WARNING: Ring is not usually narrow

>> WARNING: Last ring in series is ABSENT

[E] Outliers 4 3.0 SD above or -4.5 SD below mean for year

1890 +3.1 SD; 1939 +3.6 SD; 2009 -5.3 SD; 2010-14.8 SD

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PART 7: DESCRIPTIVE STATISTICS: 11:06 Fri 06 May 2011 Page 7

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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 262a 1747 2010 264 18 3 .594 .97 4.63 .856 .890 .301 2.98 .456 -.014 1

2 262b 1742 2010 269 18 4 .534 .87 4.38 .817 .932 .284 2.61 .338 .042 1

3 263A 1799 2010 212 15 3 .525 .89 2.76 .699 .891 .369 2.65 .399 -.046 1

4 263B 1801 2010 210 14 0 .570 .82 3.89 .768 .909 .290 2.81 .442 -.039 1

5 264A 1874 2010 137 10 1 .632 1.10 4.12 .889 .873 .307 2.86 .563 -.014 1

6 264B 1893 2010 118 8 1 .588 1.29 3.54 .679 .816 .252 2.70 .512 .002 1

7 265A 1894 2010 117 8 4 .394 1.57 4.34 .887 .825 .227 2.70 .346 -.093 1

8 265B 1902 2010 109 8 0 .575 1.87 4.61 1.029 .858 .213 2.51 .382 -.016 1

9 266A 1898 2010 113 8 3 .521 1.69 3.73 .919 .771 .267 2.75 .408 -.063 1

10 266B 1905 2010 106 7 3 .231 1.75 3.27 .778 .772 .263 2.38 .237 -.124 2

11 267A 1917 2010 94 7 0 .594 1.75 3.15 .568 .728 .195 2.67 .579 -.023 1

12 267B 1917 2010 94 7 0 .576 1.66 3.60 .562 .709 .209 2.56 .441 -.035 1

13 268A 1808 2010 203 14 5 .517 .61 2.41 .577 .912 .343 2.77 .370 -.033 1

14 268B 1822 2010 189 13 6 .476 .88 2.93 .750 .911 .272 2.77 .346 -.075 1

15 269A 1911 2010 100 7 0 .666 1.98 4.14 1.045 .814 .227 2.61 .427 -.080 1

16 269B 1810 2010 201 14 5 .527 .70 2.63 .671 .916 .382 2.63 .359 -.079 1

17 270A 1905 2010 106 7 2 .505 1.09 5.33 .717 .881 .232 2.64 .425 -.087 1

18 270B 1918 2010 93 7 3 .534 1.20 3.00 .711 .861 .241 2.73 .455 -.009 1

19 271A 1815 2010 196 13 3 .495 .95 3.36 .838 .888 .309 2.69 .352 .049 2

20 271B 1793 2010 218 15 4 .524 1.05 3.24 .640 .787 .298 2.82 .455 -.040 1

21 529A 1822 2010 189 13 13 .135 .51 1.46 .295 .836 .285 2.61 .348 -.015 1

22 529B 1798 2010 213 15 6 .398 .81 3.47 .631 .862 .251 2.48 .221 .091 1

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Total or mean: 3551 246 69 .502 1.06 5.33 .732 .861 .285 2.98 .394 -.025

- = [ COFECHA 118 COF ] = -