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Egeson's (George's) transtridecadal weather cycling and sunspots

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Abstract. In the late 19th century, Charles Egeson, a map compiler at the Sydney Observatory, carried out some of the earliest research on climatic cycles, linking them to about 33-year cycles in solar activity, and predicted that a devastating drought would strike Australia at the turn of the 20th century. Eduard Brückner and William J. S. Lockyer, who, like Egeson, found similar cycles, with notable exceptions, are also, like the map compiler, mostly forgotten. But the transtridecadal cycles are important in human physiology, economics and other affairs and are particularly pertinent to ongoing discusions of climate change. Egeson's publication of daily weather reports preceded those officially recorded. Their publication led to clashes with his superiors and his personal life was marked by run-ins with the law and, possibly, an implied, but not proven, confinement in an insane asylum and premature death. We here track what little is known of Egeson's life and of his bucking of the conventional scientific wisdom of his time with tragic results.

1 Introduction

In the United States in the 18th and 19th centuries, the task of recording weather information fell to the Post Office. Thomas Jefferson and George Washington made regular observations in their diaries. In 1787, in England, John Dalton (of atomic theory fame) began weather observations using instruments he made himself, and published the first edition of his "Meteorological Observations and Essays" in 1793. By 1860, 500 stations in the USA furnished daily telegraphic weather reports to the Washington Evening Star; on 30 September 1895, the first Washington daily weather map was published by the Weather Bureau (Evolution of the National Weather Service, 2010). In 1922, the BBC began broadcasting daily radio weather forecasts. In Europe, daily weather maps were published for the first time from 8 August until 11 October 1851 during the World Fair held in London (Marriott, 1903).

Regularly, weather maps were published by the observatory at Paris under the directorship of Leverrier since September 1863, in the "Bulletin de l'Observatoire Imperial". Some years later, the publication of daily weather maps started in England, carried out by the Meteorological Office since 23 March 1872. In Germany, regular daily weather charts were started by the Deutsche Seewarte, Hamburg, on 16 February 1876 (Körber, 1987). Heinrich Wilhelm Dove had published the first weather chart for Germany for 24 December 1821 (Bernhardt, 2004a; cf. Körber, 1987). Austria followed in this field in 1877 (Körber, 1987). Beginning in September 1876, the daily weather maps of "Deutsche Seewarte" were supplemented by short forecasts, written by Wladimir Köppen (1846–1940), who was responsible for these weather maps for some years (Köppen, 1873; cf. Körber, 1987). The same year, the first daily weather maps were published in Sydney, Australia, according to the society of the Austrian Society for Meteorology (Wild, 1877).

Indeed, the scientific foundation of weather maps had been performed some decades earlier. Heinrich Wilhelm Dove (1803–1879), for example, had published in 1828 and again in 1845 a schematic representation of the synoptic situation over Europe for 24 December 1821, using circular streamlines and wind arrows (Bernhardt, 2004a). In 1826 Heinrich Wilhelm Brandes (1777–1834) gave a graphic table of air pressure in Europe for the same Christmas weather

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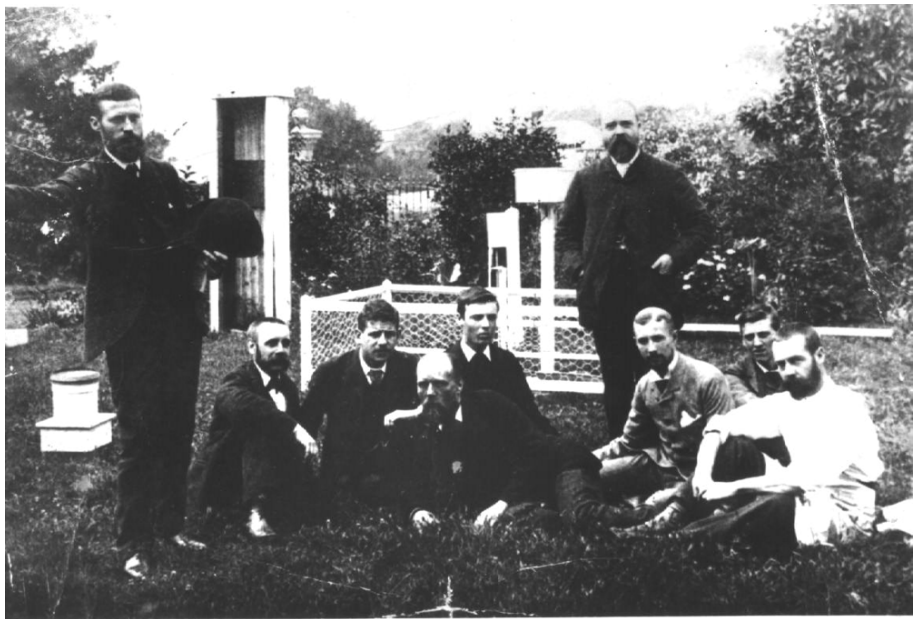

Figure 1a. Officers of the Sydney Observatory, including, on the left, Charles Egeson, first meteorologist to thoroughly document an about-transtridecadal cycle in weather and to relate it to sunspots. Courtesy of Geoff Wyatt, Acting Manager, Sydney Observatory, Sydney, Australia.

situation, which is frequently considered the first "weather map" (Bernhardt, 2004a). Of course, these "weather maps" prepared some years after the actual observation times were not constructions in real time. The development of telegraphy was indispensable for the drawing and publication of modern weather maps.

2 Brückner-Egeson-Lockyer cycle – BEL

In Australia, regular weather reports in newspapers are reported as starting in 1908. But Sydney had a pioneer who published daily reports much earlier, the "map compiler" Charles Egeson, Fig. 1a (possibly an alias for John Joseph George), who can be credited further with the first publication (Egeson, 1889) on a cycle in weather said to be of 33 years length documented by charts, Figs. 1b and 1c, of time series covering a 110-year length. Egeson's proposition was followed within a few months, in 1890, by Eduard Brückner's extensive documentation of transtridecadal changes (Brückner 1890; cf. Rain Affects Emigration, 1912). Brückner gave several different lengths for his cycle, including 33 and 35 years.

William J. S. Lockyer (1901; cf. W. J. S. Lockyer, 1902) associated the transtridecadal with the period (τ) he found to characterize changes of the length of the variable circadecadal Horrebow (Thiele, 1859)-Schwabe (1844) cycle in relative sunspot numbers, as confirmed by Liznar (1902), a topic also of interest in 1903 to William Lockyer's father Sir J. Norman Lockyer, the codiscoverer of helium and founder of the journal Nature (1903; cf. also Lockyer, 1874). We now recognize that this cycle's τ length is highly variable, on the average, longer than (i.e., beyond = trans) 30 years, dubbed transtridecadal. Accordingly, at consensus meetings of physicians and physicists organized in Russia, the BEL cycle (acronym taken from the initials of Brückner, Egeson and Lockyer: Cornélissen et al., 2008; Halberg et al., 2008a, 2009a, b; Sothern et al., 2008) was defined as a cycle with the CI (a 95% confidence interval) of its τ overlapping the range of 30 to 40 years. This was prompted by point estimates of τ, close to, but outside the 30–40-year range of variables closely related to those with τ inside that range.

Elsewhere, after inferential statistical analyses of data taken off Brückner's published graphs, the BEL cycle was discussed in detail (Cornélissen et al., 2008; Halberg et al., 2008a, 2009a, b; Sothern et al., 2008). Today, with notable exceptions (Hoyt and Schatten, 1997; Stehr and von Storch, 2000, 2006), Brückner and certainly Egeson seem to be completely ignored: hence we undertake this historical endeavor to describe Egeson's struggles, as features of a unified transdisciplinary science that knows no fences. Just as it took time to make the weather on Earth a regular systematic topic of general information we now confront the task of presenting the importance of weather in space to the general public, with its implications for individual and societal health (Halberg et al., 2008b), far beyond the conventional issues currently of interest to space agencies, some originally considered by Herschel (1801).

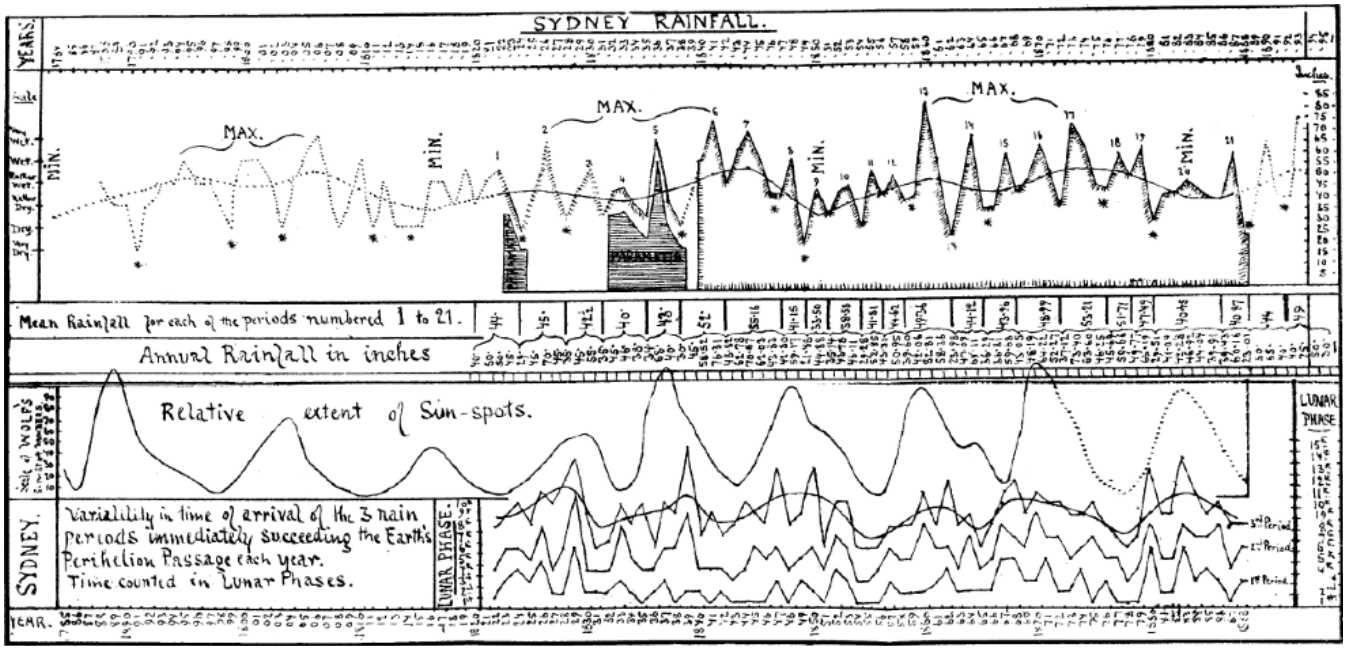

Figure 1b. Rainfall (top) and relative extent of sunspots published by Egeson (1889). His three maxima and the prior publications may have prompted him to refer to a 33-year cycle, a courageous extrapolation at best, but one validated by a subsequent cosinor analysis, Fig. 5; the point estimate of the period happens to be around 33 years in a global analysis of the time series as a whole (rainfall was also a major variable studied by Eduard Brückner).

The US National Aeronautics and Space Administration (NASA) is concerned with understanding societal and economic impacts of severe space weather events. The impact of space weather more generally on health and disease is also within the mandate of NASA and other national and international governmental agencies, including the World Health Organization. Before he introduced his vision of cybercare, C. Everett Koop, a former US Surgeon General, cited Machiavelli: "There is nothing more difficult to take in hand, more perilous to conduct, or more uncertain in its success, than to take the lead in the introduction of a new order of things" (Koop et al., 2008). The difficulty is greater if one tries to introduce 1) a space weather report along with 2) chronobiologic self-help by self-surveillance, both implemented by cybercare enabling inferential statistical analyses – much more and better yet cheaper care. Whoever may pick up these tasks could well be interested in the fate of pioneers of terrestrial weather reporting as a background for current propositions concerning chronobiology and chronomics, concerned with time structures (rhythmic and other dynamics) in and around us, that with genomics are features of personalized health care.

Those who watch the daily weather forecasts on morning TV may not realize that such forecasts were originally opposed by some meteorologists, e.g., in Australia. It is the more to Charles Egeson's credit not only to have introduced them for as long as he could before the turn of the 20th century, but also to have opened a perspective of long-term cycles, not by hearsay but by authoring an original monograph (Egeson, 1889), with extensive data, documenting a 33-year cycle in Australian weather. On the one hand, we here piece together what can be gathered from newspaper articles in Egeson's time, while we also refer to further documentation of this cycle by his contemporaries and still others following up on his work.

3 Antecedents

Charles Egeson in meteorology had no estimates of the uncertainty involved in his point estimate of τ. In space meteorology, endeavors by NASA do not reach the everyday television audience, as do reports of terrestrial weather with some indication of uncertainty; suggestions to introduce reports on space weather as an everyday public endeavor (Dorman et al., 1993) were not yet successful, perhaps because the information thus obtained cannot prompt the equivalent of canceling a trip by air or of using an umbrella as in the case of terrestrial rainy weather and not as yet for moving out of a region, in response to a warning of an earthquake. Part of our endeavor herein is the exploration in particular of Egeson's fate, as far as we can trace him through the Australia and New Zealand press, in the hope that local scholars may thereby be stimulated to get details. We place his contribution into the public domain, and provide the context and quantification by results of our analyses of seemingly

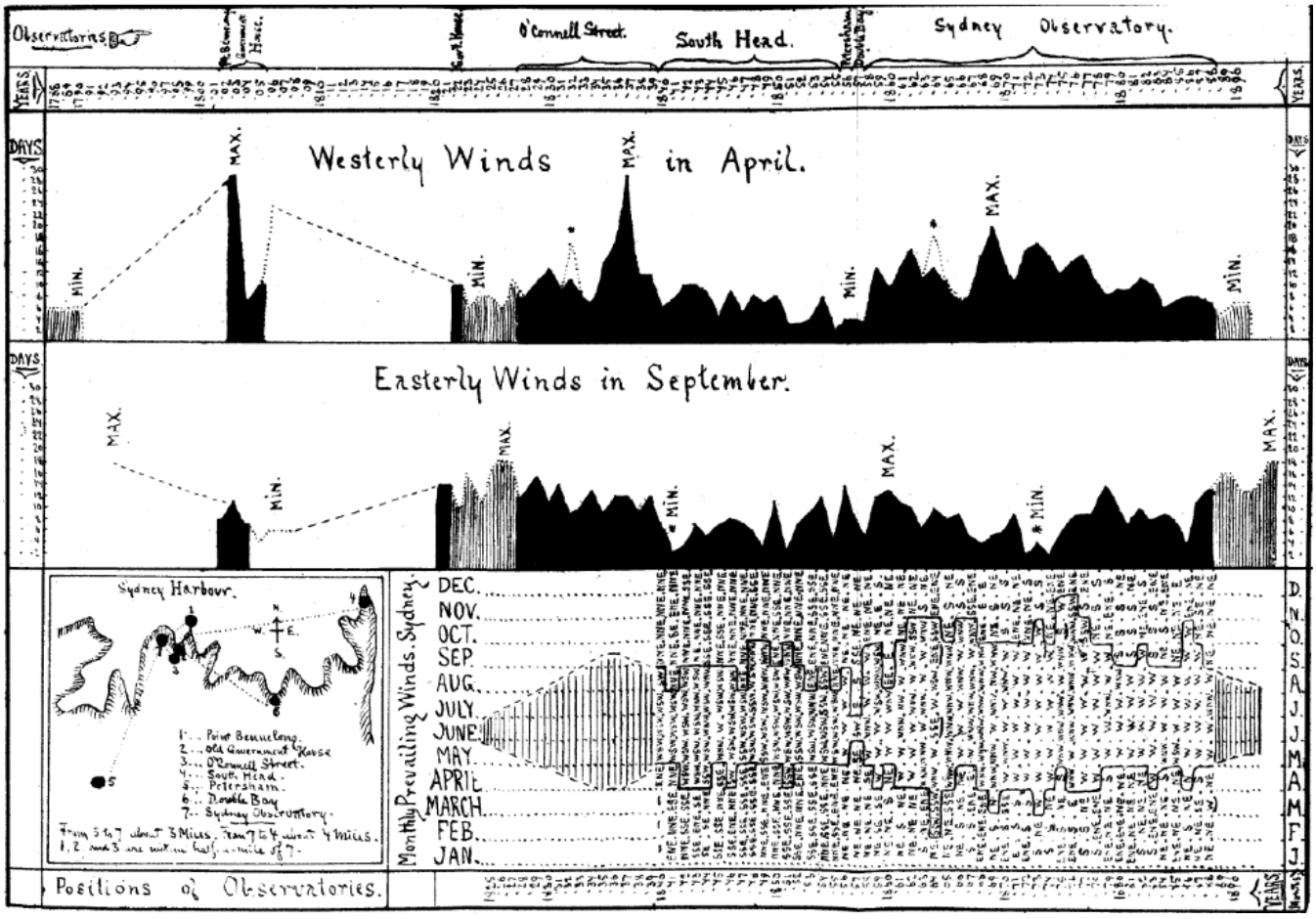

Figure 1c. Winds published by Egeson (1889). In the top two rows, he picks out the maxima of westerly winds in April and those of easterly winds in September, and indicates the minima as well, while at the bottom, apart from a chart of the positions of observatories, he provides observations for all months.

relevant physiological data supporting his inferences. The history of about 35-year cycles includes meteors in the Perseids (Wolf, 1877) following earlier associations of terrestrial weather with solar activity by Giovanni Battista Riccioli and reference to transtridecadals by Lord Francis Bacon; yet Charles Egeson may have been first to collect a wealth of data in their support. In the case of chronobiology, in this information age, a term like "circadian" (Halberg, 1959; Halberg et al., 2003a) may have made it with over 60 000 citations in PubMed, but some infradians in and around us, like the BEL, must also become familiar to most, in view of their high degree of generality and importance that may today relate to debates about climate and may already set the stage for a transdisciplinary science.

Bernhardt (2000, 2004b, 2005), who has dealt with Goethe's ideas in the field of meteorology, quotes Goethe (1947/1970): "... die Geschichte der Wissenschaft ist die Wissenschaft selbst, die Geschichte des Individuums das Individuum; deshalb soll auch hier das Geschichtliche vorwalten" ("The history of science is the science itself, (is) the story of the individual, is the individual. Therefore, here as well, the historical [material; our addition] has precedence": Bernhardt, 2004b). Harman and Dietrich (2008) document this dictum in a recent book on "Rebels, Mavericks and Heretics in [modern] Biology". Those seeking a rebel in meteorology will find one in (the contribution of) Charles Egeson, a weather map compiler at the Sydney Observatory in the late 19th century.

4 Weather prophet without honor

The title of his book is explicit and courageous, but not documented therein (which shortcoming we here try to remedy): "Egeson's Weather System of Sun-Spot Causality: Being Original Researches in Solar and Terrestrial Meteorology" (Egeson, 1889). While Egeson gathered extensive data to support his system, including the documentation of a 33-year cycle, the pertinent passages in his preface label him as both

a rebel and a heretic (as does his life's story as far as we could trace it). Let us document this with part of his preface (Egeson, 1889):

Moreover, I can affirm, without fear of contradiction, if I have arrived at different results from those of others, it is because different methods have been employed, coupled with a more extensive investigation of the subjects treated than any hitherto undertaken.

In searching for data no source has been overlooked to bring all available records under discussion, and the result has been that many valuable old papers, never before discussed, were brought to the light of day, thus giving a much more extended field of view and more research than has been compassed by preceding writers.

It is not a little strange that just as this book was being prepared for the press there appeared in the Sydney "Daily Telegraph," on the 29th December, 1888, an epitome of Australian meteorology, entitled "Droughts; their Causes, Duration, and Effect," in which is expressed the views of the three Government Astronomers, and is a most valuable contribution to the literature of the subject.

My own deductions are in many cases opposed to what was then started, but as we can only arrive at truth by studying every aspect of the question, I would cordially recommend its perusal to such of my readers as feel interested in knowing prevailing opinions. (Egeson, 1889).

After many earlier pages, Egeson's scholarship finds his ancestors, who emerge on p. 60 (Egeson, 1889):

That the period of thirty-three years in our climate must have been well marked in the early years of settlement, there can, I think, be no doubt, and the following goes to corroborate it. Montgomery Martin, writing in 1836, says: "The seasons appear to undergo a variation every nine or ten years, varying, however, in intensity every third series or thirty years." We do not, however, stand alone in this respect.

Going outside Australia, we find that the natives of Ceylon from their very old traditions believe in a period of about thirty years, which is being corroborated by observations now taken there.

Still further away, and to the olden time, we hear Lord [Francis] Bacon [1561–1626] say: "There is a toy which I have heard, and I would not have it given over, but waited upon a little. They say it is observed in the Low Countries that every five-and-thirty years the same kind and suit of years and weathers come about again; as great frosts, great wet, great droughts, warm winters, summers with little heat, and the like, and they call it the Prime." (Egeson, 1889).

Indeed, centuries before Egeson's time, as soon as Galileo and others noted spots on the sun, the possibility that these had to do with weather on earth was noted. In keeping with Sir Norman Lockyer (1903), "according to Professor [Rudolf] Wolf [1877] (as quoted by Professor Köppen [1873]) Riccioli, in 1651, shortly after the first discovery of sun spots, surmised that some coincidence might exist between them and terrestrial weather changes." Giovanni Battista Riccioli's (1598–1671) life overlapped that of Bacon, and Riccioli could have been aware of him and his writings (or vice versa).

5 How we found Egeson (George?)

In early 2008, while preparing a paper on space weather and its effect on human health, we found, courtesy of a book by a Soviet journalist (Sigel, 1979), which when translated into German referred to "Brikner", that in the late 19th century a number of investigators noted climatic cycles of about 33 years. We soon found that "Brikner" was Eduard Brückner (1862–1927) (Brückner, 1890; Rain Affects Emigration, 1912; Stehr and von Storch, 2000, 2006), the investigator from that era who got the most credit (and to some degree does to this day, deservedly), and who after intermediate positions, including a stay in Bern, Switzerland, became a professor at the University of Vienna. The transliteration into "Brikner" in Russian was apparently preferred by Brückner himself (Alissov et al., 1956; Chromov and Mamontova, 1974); but unfortunately this transliteration is also occasionally used in English, and sometimes the umlaut is lost. The younger Lockyer, in a 1901 article in the Proceedings of the Royal Society of London (cf. W. J. S. Lockyer, 1902), extended the scope of Brückner's transtridecadal cycle to the changes in the circadecadal length of the Horrebow-Schwabe cycle in relative sunspot numbers. While citing Brückner, he also gave credit to another investigator:

Another very interesting investigation to which reference must be made is that which we owe to Mr. Charles Egeson, who published his researches . . . in solar and terrestrial meteorology just a few months before the appearance of Professor Brückner's volume. Mr. Egeson not only finds a secular period of about thirty-three to thirty-four years in the occurrence of rainfall, thunderstorms, and westerly winds in the month of April for Sydney, but the epochs of maxima of the two latter harmonise well with the epochs of the thirty-five yearly period deduced in the present paper for sunspots.

From the Internet, we were able to get the name of the book the younger Lockyer refers to, and when we sought an interlibrary loan, the National Library of Australia kindly sent us an electronic copy of the book. The Powerhouse Museum in Sydney had a photograph of Egeson, a tall, bearded man around 30 years of age (an 1893 entry in the New South Wales Police Gazette [Offences not otherwise specified, 16 November 1893], gave his age in that year as 35, which places his year of birth as 1857 or 1858), with some of his colleagues (Fig. 1a): the original has a handwritten note on the back:

Officers of the Sydney Observatory,/ from left to right/ (1) Egeson, C. [. . .] taken in 1887./ Mr Russel [sic] was state meteorologist/ Mr Charles Egeson was the/ acting meteorologist for 12/ months while Mr Russel was/ in Europe. Mr Egeson was/ the originator of daily weather forecasts in 1887.

Mr Russel/ tried to abolish them. The Evening New[s agreed] with Mr Egeson. Fought together in 1890 & won.

Beyond that, however, little was to be found: although Egeson's name registered a fair number of Web hits, no pages were devoted to him or gave any biographical information about him: rather, the mentions were either in digitized copies of articles in meteorological journals or in pages or biographical entries devoted to Henry Chamberlain Russell (1836–1907), the "Russel" referred to on the back of the photograph, described by the Australian Government Bureau of Meteorology (2000) as "Australia's first native-born astronomer and meteorologist, the New South Wales Government Astronomer from 1870 to 1905, and the man credited with preparing Australia's first newspaper weather map." The Australian Dictionary of Biography (2006) gives 1877 as the year in which this weather map was first published.

In the succeeding months, however, the National Libraries of Australia and, even more so, of New Zealand made digitized, electronically searchable copies of historical newspapers available on the Internet. Through their reports, mostly unsigned, spotty in their issuance, brief and lacking in specific detail, often with a variety of dispatches gathered under a single headline pertaining to only one, a story of controversy and conflict between Egeson and his superiors, and ultimately tragedy, both personal on Egeson's part and national in terms of impact on Australia's agrarian economy, has begun to emerge.

Andrew Noble, in the Monthly Weather Review of November 1905, wrote:

From February, 1877, to March, 1888, Mr. Russell published a daily weather map in the Sydney Morning Herald, showing by means of symbols the condition of weather, wind, and sea at 9 a. m. the previous day at a number of stations in South Australia, Victoria, New South Wales, and Queensland. In 1880 a diagram was added to the map showing by means of a curved line the corrected barometrical readings at the chief coastal stations round Australia. But Mr. Russell was apparently opposed to the issue of daily weather forecasts. These were originated in April, 1887, by Mr. Charles Egeson, meteorological assistant in the observatory, during Mr. Russell's absence in Europe. Upon the astronomer's return, an unsuccessful attempt was made to stop these forecasts. (Noble, 1905).

Early in 1889, *Egeson's Weather System of Sun-Spot Causality* (hereafter *System*) was published. The Taranaki (New Zealand) Herald of 24 April 1889, noted that after a lengthy drought Australia was experiencing rainfall "more than could be desired, causing floods and damaging the properties of the farmers." The unsigned report notes the publication of *System*.

... in which [Egeson] hazards the forecast that the turning point has now been reached. He holds the theory that a connection exists between the variations of climate and the occurrence of spots on the sun. The idea is not a new one, but it has never advanced beyond the region of theory, and it may be doubted whether the data exist to admit the capability of proof. Mr Egeson, however, has carefully compared the results of observations in the past records of the Sydney Observatory as far back as 1824, and his studies induce him to believe that such a connection does prevail. At the present time we are at a minimum sun spot epoch, but the spots will increase and reach a maximum in 1893–94, which he foretells as the years of greatest rainfall. He is a believer in Mr Russell's cycle theory, and considers that the position occupied by the years 1824 to 1827 is about to recur. The conclusion to which he comes is that the late drought will be followed by abundant rain in 1889 and 1890, and that then there will be a year or two of drought in Australia preceding the maximum of rainfall to take place in 1893. Then, in 1894–95, there will be another drought, corresponding with the great drought of 1827–29, and so on. (Taranaki Herald, 1889).

Later in 1889, Egeson published a letter in the Sydney Daily Telegraph, subsequently reprinted in the Brisbane Courier of 7 October 1889, predicting that after several years of alternating drought and heavy rainfall, a drought similar in severity to one that struck Australia between 1827 and 1830 was due to occur within the 1890s. He cautiously noted:

The periodicity of our meteorological elements, which I have shown to be thirty-three years in the mean, though it may be a year or so more or less at times, points to the years occupying similar positions in the cycles as alone comparable. Thus with 1889 must be compared 1856 and 1823 or thereabouts, but I find that in general outline and other respects 1889 is identical with 1858 and 1825, and that we are consequently at present two years in advance of our mean cyclical position. An early summer and late autumn has characterized 1889, as it did 1858, and history tells us that in 1825 precisely the same occurred. There, then, are three years with like characteristics, separated by alternately 31 and 33 years. But since 1858 occupied a normal position, we can only compare 1825 with 1889 on this final condition of having appeared two years before its time. ... 1824 and 1888 were years of short but intense droughts following upon wet seasons; in 1824 the rainfall at Parramatta was 19in.; in 1888 it was 20in. – a very close copy indeed .... After every excessively wet year follows a drought as a reaction, and the intensity of the drought varies with the previous excess over the mean cyclical grade .... From six to nine months is not long in which to prepare for a three years' drought, yet much might be done to avoid what might otherwise prove disastrous by making good use of the rain which will yet be plentifully distributed before the trying time comes. (Egeson, Brisbane Courier, 1889)

The Southland Times (New Zealand) reported on 23 October 1889, under the headline "The Predicted Drought", that the government astronomers (meteorology at that time being considered a branch of astronomy) of the states of Victoria and South Australia "both decline to endorse Mr Egeson's predictions, refer to that gentleman's youth and enthusiasm

in climatic matters, but allege that it is impossible to predict a drought any considerable period ahead", and the government astronomer for Queensland "says that Mr Egeson's statements are decidedly premature in the present state of meteorological and solar physical science; hence the prediction is unnecessarily alarming" (Predicted Drought, Southland Times, 1889).

The supplement to the Otago (New Zealand) Witness of 24 October 1889 reports:

As Mr Egeson's recent prophecy of a three years' Australian drought bore a semi-official character, and was calculated to cause alarm, the New South Wales Minister of Public Instruction ... called on the Government astronomer for a report. [Russell] states that Mr Egeson ... made the alarming prophecies without either his knowledge or his approval. He considers Mr Egeson's predictions unreliable, and calculated to do injury to the colony ... he is now preparing a detailed statement with a view of allaying any alarm caused by Mr Egeson's prophecy. The Minister has prohibited the publication of any further weather prognostications of this character until they have been examined and sanctioned by the Government astronomer. (Supplement, Otago Witness, 1889).

The Southland Times of 13 March 1890 ("Cablegrams") tersely reported that "Mr Egeson's prophesies of an extremely wet autumn in New South Wales are being fulfilled to the letter. Towns are being submerged by floods and their inhabitants forced to seek higher levels. Many have been drowned."

The 1 November 1890, Evening Post (New Zealand) reported (under the heading "Australian. – Mr. Dibbs' No-Confidence Motion") that Egeson had been dismissed from the Sydney Observatory "owing to his insubordination in persisting in his prognostications in regard to the state of the weather". Again he wrote to the Sydney Evening News, and his side of the story was reprinted again by the Brisbane Courier under the headline "Rival Astronomers. – Mr. Egeson's Troubles.":

... *during the absence of Mr Russell, who was then* [1887] *in Europe, the proprietors of the Evening News originated the idea of publishing daily forecasts of the weather, for which purpose my services were engaged by permission from the then Minister for Public Instruction. These forecasts, which were the first issued in New South Wales, appeared under the heading of "Our Weather Glass." When Mr. Russell returned at the end of that year I was severely taken to task for lending myself to so progressive an institution, and was obliged to take leave of absence in order to put an end to the forecasting of the weather. The Evening News, however, insisted upon its continuance, and during my absence Mr. Russell had to attend to my former duties of forecasting the daily weather, which he has continued ever since.* [Egeson submitted for Russell's approval algorithms for long-range weather forecasts] *with the result that he would have nothing to do with them, and told me that "the probability was that everything new was wrong." ... When in* [May 1890] *I published my prediction of heavy floods in 1890, to be followed by a three years' drought (the first part of which has been verified, while the latter is now being verified as much as can be shown to be expected by the first three months of a period of three years), matters became still more intensified, and ever since they have been simply intolerable: and the only thing which kept me from resigning was that such an act would, by interested parties, have been construed into "the hoisting of the white flag" ... which, above all things, I wished to avoid.* [Egeson was forbidden to use the observatory library or its telephone; Russell did not speak to him for twelve months, confiding in his juniors instead.] *My position will be better read by the light of the following letter which I received from the Minister of Public Instruction on 11th July last: "As you are now deliberately reopening the prediction of weather prophecies (by publishing a 'supplement' to your weather system), you must now finally understand that any further breach of instructions on your part will be met by your summary removal from the public service on the ground of insubordination and disregard of official regulations."* [Egeson demanded an apology.] *The matter was referred to the Minister, and I was suspended for insubordination. Later on I was removed from the public service on the ground of insubordination and neglect of duty.*[1] (Egeson, Brisbane Courier, 1890).

On 17 January 1891, The Observer (New Zealand) quipped ("Usury Versus Prosperity"): "Weather Prophet Egeson, of Sydney still sticks to his drought prediction. He says so far the rainfall has been but half the usual average". On 14 March 1891, The Star (New Zealand) reported:

Mr W. N. Willis, M.P., has addressed a most ungenerous letter to Mr Egeson ... who, it will be remembered, predicted a drought which did not occur ... it was very unwise of Mr Egeson to prophesy without knowing, but more distinguished men have committed the same blunder, and the loss of his position was punishment enough for the poor man without being compelled to read letters from inane members of Parliament expressing a hope that "the people of the country will appreciate to the full extent the action of the Minister for Public Instruction in removing such a dangerous man from the public service." (Weather Warnings, The Star, 1891).

The 16 August 1893 New South Wales Police Gazette, under the heading "Apprehensions, &c.", reports: "J. J. George alias Charles Edgerson [sic], charged on warrant with obtaining the sum of £3 from Charles Dean by means of false pretences, has been arrested by Constable Burgett, Casino Police. Remanded to Lismore and committed for trial at Grafton Circuit Court. Bail allowed". On page 389 of the November 15 Police Gazette, "John Joseph George alias Charles Egerson [sic]" is listed in a table headed "Return

[1] Noble (1905) quotes from this letter and states that Russell did not contradict it.

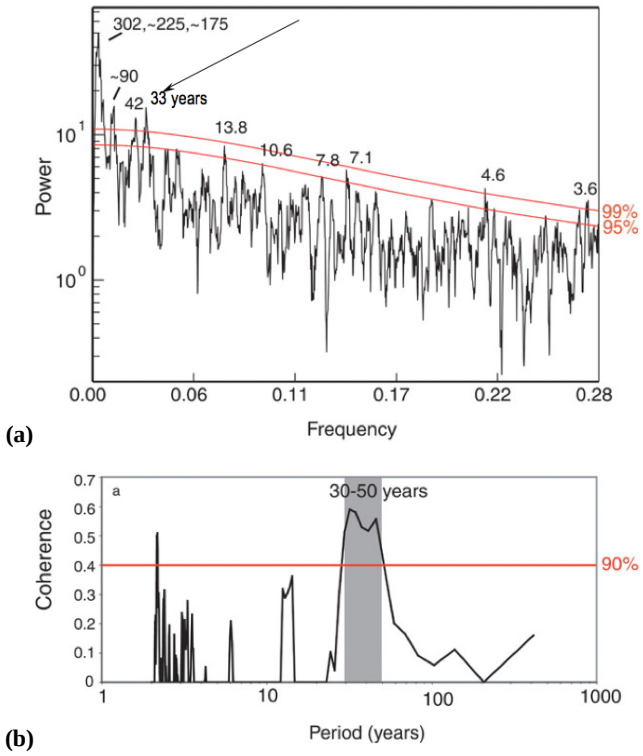

Figure 2. **(a)** Multi-taper method (MTM) spectral analysis of the X-ray fluoroscopy data gauging sediments in the African lake Bosumtwi (Shanahan et al. 2009). Significant power is apparent on interannual (3.6- to 4.6-year), decadal (7.1-, 7.8-, 10.6-, and 13.8-year), multidecadal (33- to 42-year), and century (90-, 175-, 225-. and 302-year) time scales. For clarity, only the portion of the power spectra >3.57 years ($F = 0.28$) is shown. The oblique lines denote the 99 to 95% confidence interval. MTM analyses were performed with the program k-spectra. Parameters $p = 3$, $K = 5$, and a null hypothesis of red noise were used in the analysis. Labeled are periods (in years) for peaks that are significant at 95%. Note the prominent spectral peak protruding above the 1% level of statistical significance with a period of 33 years (arrow) corresponding to a BEL. **(b)** Cross-spectral coherence computed for Lake Bosumtwi (600-year detrended first principal component [PC1] of the full suite of elemental data [aluminum, Al; silicon, Si; potassium, K; titanium, Ti; manganese, Mn; and iron, Fe]) and the Atlantic multidecadal oscillation reconstruction. The horizontal line indicates the 90% confidence interval. The records are in phase and highly coherent at a period of 30 to 50 years (indicated by gray shading). Reproduced from Shanahan et al. (2009) with kind permission.

of prisoners tried at the different circuit courts and courts of quarter sessions" as scheduled for trial at Lismore Quarter Sessions of 6th November 1893; his case is described under "Sentences" as "No appearance. Bench warrant issued by His Honor Judge Coffey." On the following page, the following report appears: "Lismore. – A Bench warrant has been issued by His Honor Judge Coffey for the arrest of John Joseph George alias Charles Egeson for failing to appear upon his recognizances at Lismore Quarter Sessions .... This offender was travelling as a dentist, and is identical with Charles Egeson who was employed at the Sydney Observatory and who predicted that the last three or four years would be a period of unexampled drought in New South Wales. Said to be in Sydney" (Offences not otherwise described, 1893).

Beginning in 1895, Australia experienced a series of droughts interspersed with occasional rainy weather. In the spring of 1901, just months after the previously autonomous colonies of Australia united under a federal government, a severe drought struck the eastern part of the continent. It caused rivers to run dry, killed millions of cattle and sheep, and devastated the wheat crop (Australian Government Bureau of Meteorology, Climate Education: The "Federation Drought", 1895–1902, © 2010). In "Correspondence" in the Advertiser (Adelaide, South Australia) of Friday, 20 June 1902, the following appeared:

"Imax", River Darling, New South Wales, recalls the publication of Mr. Charles Egeson's little book [System] ... *which brought him unenviable notoriety, and finally dismissal from the New South Wales Meteorology Department. Our correspondent remarks: "It is now shown clearly that had we station people* [respected] *his forecasts, the country would not be, as it is, thoroughly conquered by drought, and we should have been better able to cope with it. So accurate are Egeson's forecasts, dating back from* [date illegible], *that we are forced to believe in his system ... Another proof of Egeson's theory is his success in prediction. His forecasts published in 1889, run as follow: – Rainy season, 1889 to 1890; drought, from 1890 to 1892, followed by rains in 1893; drought again from 1894 to 1895, and a continuous drought to 190*[last digit illegible], *when we again shall have excessive rains. Up to date Egeson's predictions have proved only too true. He wrote in 1889: "Shall we let the lessons from our* [illegible]*ings pass away, and the trials of the earliest settlers, and the traditions of the blacks be forgotten, when the* [natives'[2]] *dead bodies strewed this continent like flies, when the rivers were dry, and all fishes and life were dead? What has been is possible to be again, and this past may be ours." We squatters*[3] *were too thickheaded to take his forecast then. Consequently Australia finds herself to-day minus half her flocks and herds, thousands of the best settlers ruined, and the national wealth seriously reduced. How different would things have been if the warning were taken in time ... We egotistical Australians seem to make it our chief aim to buy our knowledge and sense from the dearest school of experience. Other nations' experience is set at nought; ours must be purely and solely our own, paid for by the enormous cost of our country's success and achievement.* (Correspondence, The Advertiser, 1902).

[2]Original uses an epithet now deemed offensive.

[3]Cattle and sheep ranchers; so called because the earliest white settlers claimed grazing lands without government sanction, but the term was later extended to those who acquired land legally.

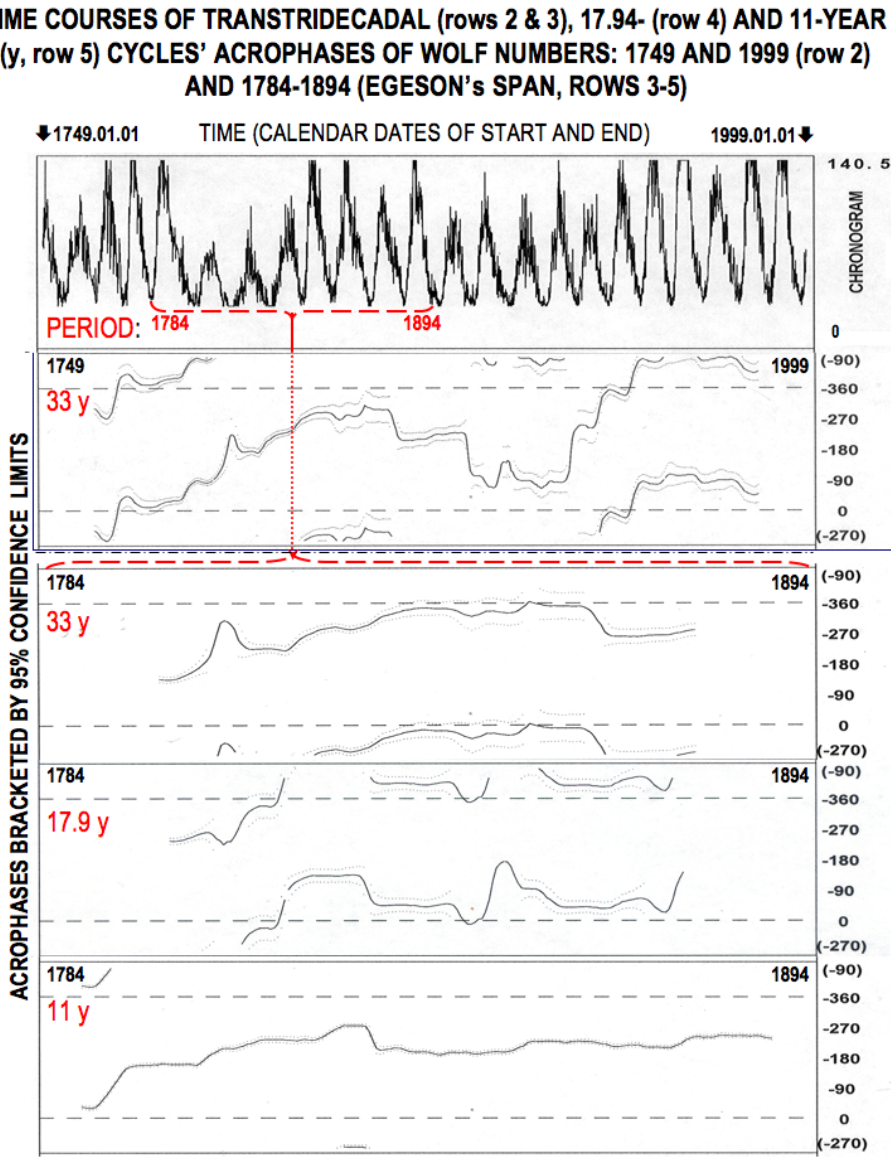

Figure 3. During the span examined by Egeson, indicated in the top row by a dashed horizontal line, the acrophase (peak) of a 33-year cosine fit scanned about 180° (row 3), as, during the same span, did the fit of other periods (rows 4 and 5), whereas in about 250 years (row 2), the phase of the 33-year cosine fit covered all of 360°. © Halberg.

In the spring of 1903, several New Zealand newspapers made note of a report in the Hot Lakes Chronicle. The version quoted below appeared in the Nelson Evening Mail (The Native Trouble at Kaikohe, 23 April 1903):

The main portion of Mr. Egeson's prediction has been verified almost to the very letter. Poor Egeson was dismissed for his pains and died in a lunatic asylum. Those who were so cruel to this man of genius, for undoubtedly he was a genius, no doubt have, during the past ten years often regretted their action, and that they did not make provision to cope with the drought so accurately predicted by him. (From personal knowledge, both of Egeson and the period of the production, we may add that the reason why poor Egeson was dismissed from the Sydney Observatory was the cry that his prediction had depreciated the values of sheep stations.) (The Native Trouble at Kaikohe, Nelson Evening Mail, 1903).

A letter to the Hawera and Normanby (New Zealand) Star of 18 April 1903, signed only "G.V.B.", corrects a typographical error in the Hot Lakes Chronicle that gave the date of publication of the *System* as 1899 rather than 1889. This note then provides a summary:

By the nature of his employment in the Sydney observatory he had access to the records from the earliest date. It would seem he made a great study of these records, and no doubt

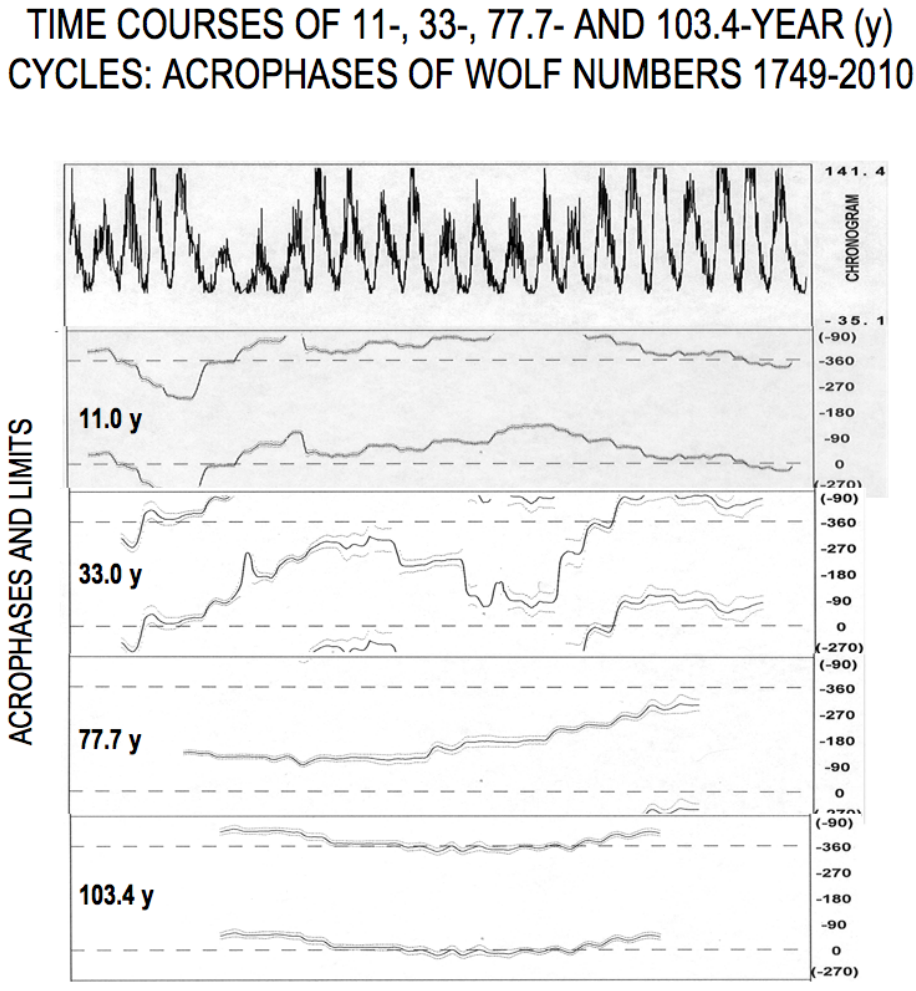

Figure 4. The 33-year fit's variability of acrophase (row 3), as compared to that of other periods during 260 years (rows 2, 4 and 5), is much greater. This circumstance requires a glocal approach and may obscure results in studies based on the analyses only of fractions of data (locally) or only of all data at a given time (globally), in either of which the information is incomplete, possibly misleading, and is often used only to check on the global result, without realizing the changing (aeolian) nature of solar activity. © Halberg.

after much labor, and diligent research, came to the conclusion that drought visited the Australian continent at certain fixed periods. He foretold a great drought for 1888–90 and some years following, his arguments and conclusions being so plausible and convincing that several squatters sold their stations; but, unfortunately for Mr Egeson, New South Wales and Queensland were visited that year with the most severe floods that had been experienced for years, after which and up to the commencement of the drought they had exceptionally good seasons, so much so that "Egeson's drought" became a by-word and a mockery, enabling persons with small minds to air their wit. (Correspondence. – Drought Prophecy, Hawera & Normanby Star, 1903)

G.V.B. ends "I believe [Egeson] died some time prior to 1899" (Hawera & Normanby Star, 1903).

According to a personal communication from Ralph Sanderson, Reference Librarian, Information Services, National Library of Australia, to Andrew E. Smith, Chief Scientist, Leximancer (Question # NLAref36286 sent by e-mail on 12 February 2010 at 09:29):

In the New South Wales Gazette of 2 March 1886, the following notification (published in the Sydney Morning Herald) appeared:

"SYDNEY OBSERVATORY. – Mr. J. Arthur Pollock to be astronomical observer; Mr. Henry Ambrose Hunt to be meteorological observer; and Mr. Charles Egeson to be map compiler at the Sydney Observatory."

Ancestry.com. Sands Directories: Sydney and New South Wales, Australia, 1858–1933 [database on-line]. Provo, UT, USA: Ancestry.com Operations Inc, 2009. Original data: Directories reproduced from microfiche copies courtesy of W. & F. Pascoe Pty, Ltd.

The following entries for EGESON appeared from 1887–1892:

1887 – Sands Directory – Sydney/NSW p.607 Egeson Charles, 1 Sydney st, Macdonaldtown

1890 – Sands Directory – Sydney/NSW p.607 Egeson Charles, map compiler, Bellevue st, Glebe

1891 – Sands Directory – Sydney/NSW p.567 Egeson Charles, Bellevue st, Glebe

1892 – Sands Directory – Sydney/NSW p.587 Egeson Charles, 36 Flood st, Leichhardt

1893 – Sands Directory – Sydney/NSW p.587 Egeson Mrs, Concord rd, Concord

There were no entries for Charles EGESON past 1892. It is not known if the "Mrs Egeson" listed above was his wife...

I have also looked at two references in the NSW Police Gazette in 1893, which I have attached, and find that Charles EGESON was going by the alias (or vice versa) of John Joseph GEORGE when he was charged with false pretences in Lismore on 31 July 1893. He appeared before the local Police Court on 1st and 2nd August and I have provided a copy of the newspaper report of the proceedings from The Northern Star for your information. Although this report does not indicate the name Charles Egeson it does appear in the Police Gazette of 15 November 1893 which states that GEORGE and EGESON is one and the same person.

If he was going by the name of John Joseph GEORGE, it may be that this was his real name, and that Charles EGESON, was an alias, as I can find no confirmation of a birth, arrival, marriage [or] death of anyone by that name in NSW records. However, there are death entries for a John and a John J. GEORGE in 1896 and 1895 respectively. If EGESON continued to use the name or alias of GEORGE then this name may be worth pursuing further, especially in verifying whether a John (Joseph) GEORGE was listed as an asylum inmate in NSW in the mid to late 1890's.

Sanderson allows that "It is possible that EGESON/GEORGE may have assumed another alias following his encounter with the law in Casino/Lismore and returned to Sydney or fled elsewhere" and sums up "An interesting character!"

6 Chronometaanalyses supporting the BEL cycle

Some recent articles, one of them in the journal Science, confirms the BEL cycle and extends its scope, but may not recognize the cycle's origin and simply places 33 years in bold type on a graphed spectrum of the sediment of an African lake (Shanahan et al., 2009), Fig. 2. New data also document the BEL cycle in human physiology and more broadly in human affairs, resolved by linear-nonlinear rhythmometry with the extended cosinor. These transtridecadal cycles are spectral components with a CI of the τ estimate overlapping the range between 30–40 years.

Figure 3 shows the time courses of sunspots in the top row along with their variability in the span available to Egeson. The second row displays acrophases (phase of the maximum

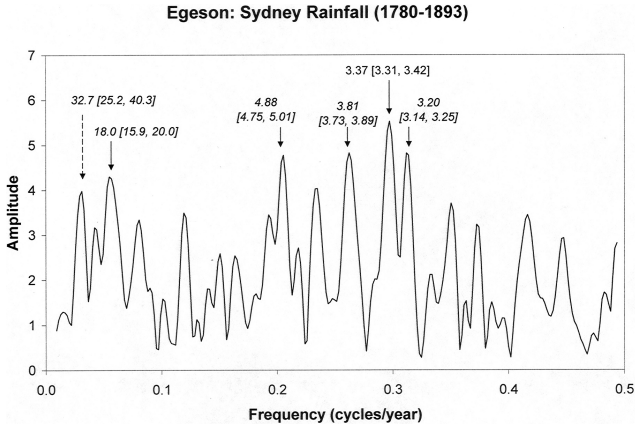

Figure 5. An extended linear-nonlinear cosinor spectrum of data taken off Egeson's graph on rainfall, on top of Fig. 1b, validates his, Francis Bacon's and others' intuitions. Egeson, however, did take the time to compile data in support of their proposition. This extended cosinor analysis shows the great uncertainties involved, by ordering 95% confidence intervals of the periods. The 95% confidence interval of the 32.7-year estimate extends from 25.2 to 40.3 years with Marquardt's conservative method[4]. The confidence intervals are dubbed "ordering" since the assumption upon which they are based may not apply. They are offered in the want of more pertinent procedures that account for nonstationarities. © Halberg.

[4]Marquardt's (1963) algorithm provides three measures of uncertainty of the period estimate and of the other parameters of the fitted model. One is an equivalent of the usual standard error and is called the "1-parameter" approach. Another is called "conservative" in the sense that the corresponding confidence intervals are slightly wider than the "true" or "nonlinear" 95% limits. The nonlinear limits, a third measure, are more complex, but generally do not differ much from the more easily derived "conservative" approximation. In view of the non-stationarities of the biological data analyzed, the approach called "conservative" by Marquardt is actually too liberal and is used in the want of a more appropriate method that accounts for non-stationarities.

of the cosine function with the specified period fitted by least squares to the data in consecutive intervals; Halberg et al., 2008a) in a chronomic serial section on sunspots during ~250 years, including the data of the time available to Egeson up to 1889, from which he apparently extrapolated. The overall variability of the 33-year cosine, covering more than 360°, is much greater than the variability during Egeson's time, even though it is similar in extent to the variability of other known solar cycles during Egeson's time.

In Fig. 4, the long-term variability of acrophases of three other components is compared to that of the BEL. These other components vary much less as compared to the variability of the BEL. The wide excursions of the acrophases from the fit of a 33-year period, as compared to certain other cyclic solar variability, benefit from a systematically combined global and local (glocal) analysis in Figs. 3–5. The linear-nonlinear rhythmometry applied in Fig. 5 shows the wide (still only ordering) uncertainties of the BEL. This fact does not detract from due credit for Egeson's contributions used for our analyses in Figs. 3–5. Gauss's least squares were published in 1809: they were available, but computers, which could apply them in seconds once the data were formatted, were not. Nonetheless, Egeson had the correct

point estimate of his cycle length by scholarship in reading statements by his predecessors whom he cites, by good intuition and, literally and figuratively, by good vision both in examining the data and in thinking about their origin, respectively.

7 Postscript

A genealogical record for a John Joseph George, born in 1856 in Braidwood, New South Wales, Australia, and died in Queensland, Australia (no date or other more specific information given), has been posted on http://www.familysearch.org/eng/search/PRF/individual_record.asp?recid=460061252&lds=2&region=-1&regionfriendly=&frompage=99 by Donald Stephen Herbert Snr of Bindoon, Western Australia, and was also one of several records for persons with similar names located by Ruth Morgan, PhD candidate in history at the University of Western Australia in Crawley.

Acknowledgements. Dedicated to the memory of Hubertus Strughold, who started formal US Space Science at Randolph Field, Texas and whose second love was biologic rhythm, priorities shared by some of the authors in reverse order. Extensive constructive comments be Giovanni Gregory are greatly appreciated, notably with respect to an item revealing that the shared frequencies of the human mind and the solar wind's speed more than match by odds ratios the association of interplanetary and terrestrial magnetism.

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Reviewed by: G. P. Gregori and another anonymous referee

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