

**Katharine Anderson (York University, Canada), “Smyth’s Hyperborean Storms: meteorology at home and abroad”**

C.P. Smyth’s works on meteorology late in life such as “Madeira Meteorologic” (1882) and “Clouds Forms that Have Been” (1895-96) seem among his most eccentric productions, and they are more than tinged with a religiosity that has helped them pass into obscurity. Yet Smyth’s interests in meteorological research spanned his entire career. His approach to meteorology was both consistent and intriguing. To Smyth, meteorology represented the challenge and complexity of visual observation as well as the wearying work of accumulating and centralizing satisfactory instrumental data. Meteorology was also a way to remind authorities in London and Greenwich of the critical contributions of Scottish science – a perspective Smyth took up most pointedly in his analysis of the “Hyperborean Storm” of 1860. That storm analysis, published a decade after the event, placed Smyth at the heart of a contemporary crisis over weather forecasting. Drawing the thread from his later work to this earlier storm study, we can ask: in what ways was Smyth typical of Victorian science, and in what ways was he distinctive?

**Michael Barany (University of Edinburgh), “Charles Piazzi Smyth’s metrology and the cultural epistemology of heritage and decay”**

Charles Piazzi Smyth’s motivations for measuring the Great Pyramid at Giza were notoriously complex, involving a tangle of political, nationalist, religious, orientalist, colonial, physical, mathematical, astronomical, and other positions, many of them heterodox. I have previously characterized how the astronomer vested many of these commitments in the material form of a specimen of basalt, which he turned with the help of Jessie Duncan and an Egyptian man referred to in Piazzi Smyth’s accounts as ‘Alee the day-guard’ into a symbolically capacious metrological instrument. What I termed the ‘material politics of basalt’ solved, for Piazzi Smyth, interlocking concerns about history, measurement, authority, and expertise. My presentation will revisit this argument in the context of Piazzi Smyth’s convictions about heritage and decay, developed in his metrology and pyramidology. I will examine the stakes he assigned to preservation and transmission in Egypt and Britain, his cultural and material framing of timelessness, and their manifestations in a controversial program of national and universal metrology.

**John C. Brown (University of Glasgow, Astronomer Royal for Scotland), “Science, non-science and nonsense: The conflict between belief and scientific objectivity”**

Charles Piazzi Smyth is famous as father of mountain-top observing science and infamous for nonsensical aspects of his pyramidology. However, he is not alone among famous scientists in having beliefs which at best lack objective evidence or falsifiable hypotheses and at worst are downright weird. As a hard-nosed theorist, passionate sceptic and magician, I will

- look at the beliefs of some such characters ranging from Eddington & Dirac (particle cosmology) through Gerald Hawkins (of Stonehenge Decoded and corn circles) and Archie Roy (astrodynamics and parapsychology) to Richard Dawkins (biologist and dogmatic atheist)

- discuss the roles played by ego, belief and subjectivity in conventional scientific wisdom and paradigms, fired today by league tables and REF game-play argue that aspects of the yarns we spin, from Dark Matter and Energy to accretion and reconnection theory, are as yet little better than epicycles; and that many scientists are prone to being misled, being the easiest of magic audiences.
- define what science is, what science is not and what is not science, emphasising that: there are countless beliefs which are, by their nature or design, not falsifiable; the feeling that they are irrational or silly doesn't prove they are untrue.
- present examples where seemingly simple (diagnostic and predictive) questions about well-defined physical systems have no unique answers due to: analytic ill-posedness; ergodicity (classical chaos); quantum effects.

**Jenny Bulstrode (University of Cambridge), “Oriental Petrology and the Silicon Valley of the Smyths”**

A pyramid-shaped tomb in Sharow church graveyard, North Yorkshire, stands as testament to the pyramidology which defined Charles Piazzi Smyth's life and career. By putting Piazzi's pyramidology back into its original context of nineteenth-century metrology and material interests, virtuoso histories have not only revealed the conventional nature of his often fantastical-sounding science, but also mobilised its significance in showing how those interests worked. This paper looks to extend that manoeuvre by attending to the influence of Piazzi's family, and in particular of his older brother, Geological survey mining engineer and antiquarian, Sir Warrington Wilkinson Smyth, whose life's work was devoted to the properties of sand in the service of the imperial military state. Where Piazzi chose a pyramid for a tomb, his establishment figure of an elder brother, Warrington, insisted upon a particularly significant sand-pit in Cornwall: the source of sand for casting moulds in metal foundries throughout Britain and the site, Warrington believed, of the finest fossil finds. This paper considers the salience of silica to the Smyths, and what it reveals for the modernity Piazzi sought to cast in the Valley of the Kings, 'surrounded by a world of sand'.

**Clive Davenhall (University of Edinburgh), “Charles Piazzi Smyth and the Great Pyramid: Reception, Influence and Afterlife”**

Charles Piazzi Smyth worked and wrote on a wide variety of topics during his long career. Perhaps the most unusual was the origin and purpose of the Great Pyramid of Giza, which he considered to be divinely inspired, to prescribe units of length and capacity and to contain encoded predictions of subsequent events. From the mid-1860s he wrote extensively about these ideas and over the winter of 1864/65 he and Jessica Smyth conducted a survey of the Pyramid, at their own expense, to verify them. It was more accurate than any previous survey and included the first successful application of indoor flash photography outside studio conditions. Piazzi Smyth would remain convinced of the veracity of his Pyramid theories for the remainder of his life. His ideas were well known amongst the wider public but were not well regarded in scientific and scholarly circles. This talk will briefly summarise Piazzi Smyth's Pyramid work in the context of the religious, intellectual and cultural milieu of mid-nineteenth century Britain. It will review the reception and influence of his ideas, particularly in the burgeoning periodical press of the later nineteenth century. Finally it will briefly consider their afterlife in fringe pseudoscience throughout the twentieth century.

**Samuel Di Risio (University of Edinburgh), “The Geography of Astronomy: Photographs of Charles Piazzi Smyth’s 1856 Expedition to Tenerife”**

This paper examines Charles Piazzi Smyth’s photographs taken during his Tenerife expedition of 1856. At that time, it was not yet possible to take photographs of the stars. Instead, during his time on Tenerife, Piazzi Smyth took over 100 photographs and stereo-photographs in an effort to capture the expedition as a work of geographical enquiry. The photographs worked to authorise the sites, landscapes, and practitioners of science in the field through their representation in specific geographical and topographical contexts. The paper examines how the photographs depict the physical and cultural landscape of the expedition, how they helped legitimate and authorise the findings of the expedition, and how they constituted the site of the field observatory as a location from which astronomical observation was practised. The paper accounts for the subjects of the photographs, which include Piazzi Smyth’s wife Jessie who stood amongst Tenerife’s distinctive landscapes, the members of the expedition who posed next to telescopes and field equipment, and the island’s local people, flora, and geological features. The paper argues that the expedition was geographical from the outset and that photography served to authorise doing the science of astronomy primarily in these geographical contexts.

**Edward Gillin (University of Cambridge), “Sound and Vision: Charles Piazzi Smyth, the Edinburgh time-gun, and the politics of time for the ear”**

The Edinburgh time-gun, established in 1861, was about much more than dramatically conveying time across the city. At stake were much more urgent questions over the importance of precision and the sorts of people, in terms of social class, who should take note of accurate observatory-defined time. As lead spokesman for the gun, Charles Piazzi Smyth was keen to emphasize the benefits of communicating time aurally. Unlike a time-ball, a time-gun could be heard through mist or fog. But it also had political implications: time projected by sound could infiltrate the homes and shops of all social groups. Not only was the gun a novel spectacle, but it disseminated time to individuals who might not otherwise make the effort to observe the fall of a ball or hands of a clock. At Greenwich, Smyth’s enthusiasm for sound signals caused some discomfort to George Biddell Airy, who preferred the extreme precision of a visual signal. Alarming for the Astronomer Royal, Smyth’s time-gun proved popular with city councils across Northern Britain. This paper explores the discussions between Smyth and Airy over the benefits and drawbacks of visual and sonorous displays of time. It examines how Smyth built accuracy into his time-gun system through industrious measurements across Edinburgh, calculations on the speed of sound, and collaboration with map makers. Through these efforts, he secured his apparatus credibility in several cities that defied Airy’s advice to stick to time-balls and clocks. Sound provided Edinburgh with a rival system of time keeping to Greenwich.

**Stéphanie Hornstein (Concordia University, Canada) “‘Though both are equally called great’: Charles Piazzi Smyth, the Great Sphinx, and the Egyptian Other”**

In 1864, Charles Piazzi Smyth, Astronomer-Royal for Scotland, set out to measure and photograph the Great Pyramid of Giza in order to prove that its design had been devised by none other but God himself. The Pyramid, however, was not the only monument to catch

Smyth's attention: he also developed an obsessive loathing for the Great Sphinx that crouched not too far from his object of study. In his writing and lectures, Smyth constantly associated the Sphinx with what he perceived as the Egyptians' morally corrupt pagan worship. Unsurprisingly, his photographs—strategically taken at a great distance—often show it as a diminutive creature of no importance. The dichotomy Smyth established in text and image between the sinful Sphinx and the pure Pyramid foreshadows his controversial conclusion that “the Great Pyramid, though in Egypt it is not *of* Egypt”<sup>1</sup> and that its true inheritors are, conveniently, the Christian English. This paper examines Smyth's framing of the Sphinx as one facet of an ideological program that aimed to spur British patriotism by denying Egyptians their own built heritage in the Great Pyramid. Embroiled as he was in contemporary debates over Britain's potential adoption of the French metric system, Smyth's profoundly imperialist discourse emerged from his belief that the very foundations of his country were under threat. This attitude will be charted through Smyth's writing, the numerous photographic lantern slides he produced, and through a consideration of the very public dispute that opposed the astronomer to Colonel Henry James of the Ordnance Survey, who had conducted his own measurements at Giza.

**Hugh Hudson (University of Glasgow/University of California, Berkeley), “Charles Piazzi Smyth, the Sun as a star, and space weather”**

Based upon a long time series of temperature readings from a set of precise thermometers set deeply into Calton Rock, Charles Piazzi Smyth reported on solar variability, in the astronomical sense, and its influences on the Earth. This topic interested many of his peers, and still interests research workers in many fields that he could not have imagined - the habitability of exoplanets, for example. I will describe how, beginning in 1979, observations from space have almost defined the Sun's behavior and how it is reflected in stellar variability.

**Boris Jardine and Josh Nall (University of Cambridge/Whipple Museum), “The battle of the pyramid standards”**

Charles Piazzi Smyth is well known—notorious even—for his ‘Pyramid metrology’: the attempt to place the British Imperial system on the firm foundations of the measures embodied in the Great Pyramid of Giza. This work was neither an anomaly within Smyth's own career, nor within the broader ‘Battle of the Standards’. Smyth was merely the most energetic and ambitious of those who sought historical and material justification for non-metric standards. Smyth's programme depended on an elaborate array of measures and instruments, which are preserved at the National Museum of Scotland, but have never been the subjects of historical research. By considering these enigmatic materials alongside Smyth's papers at the Royal Observatory, Edinburgh, this talk sheds new light on the practices of metrology in the second half of the nineteenth century. Smyth, we show, used a range of techniques to promote his pyramidology, which went beyond standards of length to include volume, temperature, and time. Presented together, these complementary metrologies substantiated Smyth's case for the Great Pyramid as the cornerstone of Imperial

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<sup>1</sup> Charles Piazzi Smyth, *Our Inheritance in the Great Pyramid: New and Enlarged Edition* (London: W. Isbister, 1874), ix.

measures. While the attempt to disseminate the materials necessary for the establishment of Pyramid metrology failed, Smyth's programme was taken up by a surprising and diverse range of enthusiasts, ideologues, and cranks, prompting a very public battle of the pyramid standards.

**Bill Jenkins (University of St Andrews), “*Prisca astronomia: Charles Piazzi Smyth and the wisdom of the ancients*”**

The idea that ancient history was a story of decline from a prelapsarian state of both moral perfection and perfect knowledge of the natural world is often associated with such early modern figures as Francis Bacon and Isaac Newton, or with the pseudo-archaeology of twentieth-century popular writers such as Erich von Däniken and Graham Hancock. Charles Piazzi Smyth's espousal of this model of world history in his *Our Inheritance in the Great Pyramid* (1864) may therefore seem an anachronism in the Victorian age, often popularly perceived as an era of quasi-religious faith in universal progress. However, the vision of universal history as a story of decline was alive and well in the mid-nineteenth century. In this paper I will explore the work of prophets of decline such as John Stark, Edinburgh printer and naturalist, who read a paper denying 'the supposed progress of human society' to the Royal Society of Edinburgh in 1841, William Scott, the Evangelical phrenologist and author of *The Harmony of Phrenology with Scripture* (1837), and George Campbell, 8th Duke of Argyll, who published a critique of progressivism entitled *Primeval Man* in 1869. Viewed in this context, Smyth's opinions appear not so much an isolated aberration, but an expression of an anti-progressivist discourse which had a significant following in mid-nineteenth century Britain.

**Andy Lawrence (University of Edinburgh), “The past, present and future of the Peripatetic Astronomer”**

We are just at the end of a golden age for the Peripatetic Astronomer. Following Charles Piazzi Smyth's pioneering work, there was a rush of interest, culminating in the establishment of Lick, the first true mountain observatory. For mountain top observatories to become common however took another century, and Piazzi Smyth's vision was only half fulfilled; the astronomers were mobile but the equipment was not. This coincided with a great sociological transformation of astronomy; rather than working at the observatories, the astronomical community became diffused throughout universities across the world, leading to the great age of "jet set astronomy". Now however, with the development of technology and the push into space, the astronomers are returning home. I will trace these developments, relate them to my own career, and look at the future of Mountain Astronomy.

**Daniel Potter (National Museums of Scotland), “Charles Piazzi Smyth: Pyramid scholar or Pyramidiot?”**

Charles Piazzi Smyth's survey of the Great Pyramid of Giza is often disregarded within Egyptology due to his exhaustive application of unsupported theories. Despite this, his survey work and interior photography of the structure may be seen as the first action in the movement towards better scientific exploration of the Great Pyramid, directly inspiring more detailed work- conducted by the 'Father of Egyptian Archaeology' W M Flinders Petrie. Though his work was initially regarded as positive and deserving of scientific recognition, his conclusions and theories drawn from his work became increasingly jarring. This aspect led to

him being referred to as a 'pyramidiot' and also inspired the continuance of a pseudo-scientific undercurrent in pyramid studies outside of Egyptology. This paper seeks to reflect on Piazzi Smyth's Egyptian legacy; discussing his work concerning the Great Pyramid of Giza, his connections with Egyptologists of the time and the long lasting reception of his theories from the perspective of Egyptology. Taking into account the aims and methods of Egyptology at the time and the consequences of his work today.

**David Rooney (freelance historian and curator), “National observatories, status, and the public signalling of time”**

The arrival of Charles Piazzi Smyth at the Royal Observatory Cape of Good Hope as First Assistant in 1835 coincided with the final testing of a time ball visible to ships in nearby Table Bay, which began operating the following year. Moving to the Royal Observatory Edinburgh in 1846, Smyth established a time ball and gun, both triggered by an electrical signal from the observatory. Smyth's signal also fired guns at Glasgow, Newcastle, North Shields and Sunderland. In 1865, Smyth's peer at the Royal Observatory Greenwich, George Airy, commented that it was 'a very proper duty of the National Observatory to promote by utilitarian aid the dissemination of a knowledge of accurate time which is now really a matter of very great importance'. Airy's own systems sent precise standard time around the world. Why did astronomers such as Smyth and Airy go to such lengths? This paper will examine the role of national observatories in the public signalling of time, suggesting that it provided them with a valid social purpose and status. It will also consider the long-lasting political consequences of this activity by examining the 1894 anarchist bombing of the Greenwich Observatory and the 1913 suffragette attack at Edinburgh.

**Simon Schaffer (University of Cambridge), “Smyth's Elevation: Victorian Astronomy's Vertical Empire” – Keynote**

Charles Piazzi Smyth's charismatic and journalistic advocacy of the virtues of mountain observatories won him widespread recognition and a degree of legitimacy in the Victorian astronomical community and well beyond. The talk uses a range of projects developed around the 1856 expedition to Tenerife and its aftermaths to understand practices and interests involved in managing observation, recording and displacement in high-level astronomy in the mid-nineteenth century. Particularly significant in these cases were connexions between technologies to capture and publicise phenomena at elevated positions and the geopolitics of command over remote uplands in a wider imperial setting.

**Margaret Serpico (University College London), “Astronomers, antiquarians and ancient Egypt”**

While Charles Piazzi Smyth is traditionally associated with astronomy, the pyramids and ancient Egypt, his interests can in fact be traced back to his father, Admiral William Henry Smyth. This was the time of the polymath, when it was possible to be a respected and learned amateur in a number of fields simultaneously. Some crossed the fields of science and antiquarianism, some also integrated biblical studies. Social and intellectual circles were important in the dissemination of knowledge; an example of this is the friendship between Admiral Smyth and John Lee, with whom Smyth shared interests in astronomy and ancient Egypt. Smyth came to live on Lee's estate where Lee had his own observatory and also, for

the period, one of the largest collections of ancient Egyptian artefacts in the UK. Not only were Smyth and Lee distinguished astronomers but the two also formed social and academic connections with some of the most well-known Egyptological figures of the time. Charles Piazzi Smyth was certainly introduced into these circles through his father but his path took an increasingly less conventional turn with his views on the Great Pyramid. The subsequent measuring of the pyramid by William Matthew Flinders Petrie opened the door to challenges to Piazzi Smyth's work. The background to these events, of how Petrie's father William came to be acquainted with Charles Piazzi Smyth, and how their shared interest in the Great Pyramid spurred Flinders Petrie on to visit Egypt is well documented. However, archive material and surviving museum objects from Flinders Petrie's excavations reveal that he managed to preserve his connections with the Smyth family, even after Piazzi Smyth's death. Thus, although these two generations of families reflected the transition from amateur to professional, personal relationships nonetheless continued to be important.

**Osmond Smyth (Smyth family archivist), "Beyond sibling rivalry...a peek into the family archives"**

The influence of Piazzi's father on his life and career is well documented, but Piazzi was also surrounded by role models in a family that was brimming with archetypal Victorian thinkers, characters and fighters. Many of them were active protagonists in the debates that raged about science, theology and history. This presentation will provide a brief introduction to Piazzi's family and consider the possible influences that his closest relatives brought to Piazzi's life and thinking. Drawing on letters, tales, paintings and documents passed down generations of the Smyth family, the great grandson of Piazzi's older brother (Sir Warrington Wilkinson Smyth) will reflect on the enduring nature of the Smyth family's values and provide a snapshot of Piazzi's parents, siblings, in-laws, nephews and a selection of his more remarkable (and possibly mythical) ancestors.

**Sara Stevenson (National Galleries of Scotland), "Opening the eyes: the Smyths and practice of photography"**

Charles Piazzi Smith sprang from the generation working in the early to mid nineteenth century, for whom science was a pragmatic and practical discipline, substantially dependent on individual thought and experiment. His phenomenal invention and energy may be seen in his pursuit of photography, which he practised from the earliest possible moment in the implausible setting of the Cape of Good Hope. In later years, he and his wife Jessie continued to work with photography, enjoying and pushing the new art to its practical limits. For C Piazzi Smyth and Jessie Smyth, photography was a key element both in the gathering of information and in communication.

**Matjaz Vidmar (University of Edinburgh), "Has the Birth of Mountaintop Astronomy led to the Death of Time Service? The Changing Public Role of the Royal Observatory Edinburgh"**

Amongst other achievements credited to 2<sup>nd</sup> Astronomer Royal for Scotland, Charles Piazzi Smyth (1819-1901), are innovations: on one hand significant improvements of a distributed time service in the city Edinburgh, and on the other hand advancement of empirical Astronomy through setting up mountaintop observatories. These two "missions" were at

loggerheads from the start. Ideologically, one was portrayed as Astronomers' civic duty to a mercantile empire and the other was deployed in pursuit of the greater good – pure academic knowledge. More practically, the Royal Observatory Edinburgh's (ROE) time service depended on time-keeping operation in the city, whilst the mountaintop Astronomy called for the relocation to site(s) overseas. In this paper, I will outline the critical tension between the ROE's performance of its civic and academic "duties" from when they were first pitted against each other in the time of Piazzi Smyth through to present day. In the end, the realisation of his pioneering vision for a more globalised Astronomy contributed to the ROE's eventual abandonment of its timekeeping service. However, I observe that through new paradigms of societal engagement and economic utility, the civic and academic aspects of the Observatory's public role are both alive and well and quite inseparably entangled.

**Peredur Williams (Royal Observatory Edinburgh), "Charles Piazzi Smyth's successor at the Royal Observatory: Ralph Copeland"**

Ralph Copeland succeeded Charles Piazzi Smyth as Astronomer Royal for Scotland and played a major role in the establishment of the new Royal Observatory on Blackford Hill. Both men were excellent observers, adventurous travellers and pioneers of Mountain Astronomy. Copeland's route to the Royal Observatory was very different from that of Smyth. At the age of 15, he left England to join the Australian gold rush but soon switched to the safer life of a shepherd. There the clear Australian skies kindled his interest in Astronomy. On his return to Britain, he worked as a locomotive engineer before going to the University of Göttingen, where he gained a PhD. He participated in the Second German North Polar expedition, working on a geodetic survey, and adding to the food supply with his rifle. On his return, he worked at Lord Rosse's observatory at Birr Castle and from 1876 at Lord Crawford's observatory at Dun Echt. In 1883, he made an expedition to study observing conditions in the Andes, making observations at Puno on Lake Titicaca and Vincocaya (elevation 14360 ft). In this contribution, I will consider Copeland as an observer and mountain astronomer and review his legacy in the context of his predecessor.

**Charles WJ Withers (University of Edinburgh), "Modernity, Measurement and 'the fate of the world': Charles Piazzi Smyth on Longitude"**

Considerable attention has been paid in the study of Charles Piazzi Smyth's many interests to his pyramidology and to his role in the 'Battle of the Standards' between proponents of the metric and imperial metrological systems. This paper examines Piazzi Smyth's interests in modernity and measurement not in his written defence of imperial metrology but in a lecture on longitude and navigation given in Edinburgh in April 1859. In this lecture – hitherto rather overlooked – Piazzi Smyth discussed the connections between measurement and modernity and their significance in what he called 'the fourth age of marine longitude'. For Piazzi Smyth, new forms of chronometry, advances in telegraphy and in steam travel (railways and at sea) were all indicative of 'the general movement that is characterising the mind of the nineteenth century, and carrying with it the destinies of our nation and the fate of the world'. The paper will examine Piazzi Smyth's lecture in relation to the concerns of contemporaries, and the interests of current scholarship, on questions of metrology, measurement and modernity.



