

**TWO ITEMS OF ASTRONOMICAL AFRICANA**

*by*

**DAVID S. EVANS**

Reprinted from the *Quarterly Bulletin of the South African Library*, v. 7,  
pp. 3-9, September 1952, Cape Town.

## TWO ITEMS OF ASTRONOMICAL AFRICANA

### I. Lacaille writes to his friend de la Condamine

The South African Library has recently acquired two astronomical documents, one a letter by Lacaille, the other a series of papers relating to Sir John Herschel. The Abbé de la Caille, whose name is usually written today as Lacaille, came to the Cape from 1751 to 1753 on the instructions of the Academy of Sciences of France. Detailed accounts of his work have recently been published.<sup>1, 2</sup> in connection with the bicentenary of his arrival.

Lacaille ranks as the founder of southern hemisphere astronomy as a science: from his observatory at a site in Strand Street, Cape Town, he determined the positions of nearly ten thousand stars and, in his own lifetime, produced a catalogue of nearly two thousand of them. He defined and named most of the southern constellations adopted by modern usage. He made extensive meteorological observations and magnetic determinations. From his observations at the Cape, combined with those made at the same time in Europe, he was able to make a quite accurate estimate of the average distance of the earth from the sun. He undertook survey work, the most important part of which although not the most accurate, was his survey of an arc of a meridian of longitude extending north from Cape Town to Piketberg.

The true value of his work is best appreciated by considering the state of astronomy at the time: astronomical knowledge was of first importance for navigation, but the means of determination of position at sea were then very defective, since accurate sea-going chronometers were only just being developed. The longitude of the Cape of Good Hope, the most important intermediate stop on the route to the East Indies, was uncertain to a dangerous extent. The positions of the stars in the southern sky which would be observed by navigators were not accurately fixed. Southern hemisphere astronomy was so little developed that fundamental information stopped short at the limits of the sky observable from Europe. Information about the scale of the solar system was essential for both theoretical and practical reasons, and could only be acquired by simultaneous observations from two points in the same longitude on the earth, one in the northern hemisphere and one as far south as possible. Europe and the Cape offered the only two civilised places on the earth at the time which satisfied this condition.

The problem of the shape of the earth was bound up with applications of the recently developed science of mechanics. Observations in the northern hemisphere had shown that the earth was an oblate spheroid, as was to be expected from its rotation, but no similar observations had been made in the south. Lacaille's survey of an arc of meridian of longitude was intended to

---

<sup>1</sup>Donald McIntyre. An astronomical bicentenary: the Abbé de Lacaille's visit to the Cape, 1751-1753 (*Quarterly Bulletin of the S.A. Library*, vol. 5, pp.79-90, March 1951).

<sup>2</sup>David S. Evans. Lacaille: 10,000 stars in two years (*Discovery*, October 1951).

help determine the shape of the southern part of the earth. It was a matter of great concern that the results suggested that the southern hemisphere was a prolate spheroid. Only in the next century was the discrepancy cleared up when it was shown that the error was due to deviations in the direction of the plumb line produced at Lacaille's southern station by the mass of Table Mountain.

Lacaille left the Cape, not as he had hoped, direct for France, but, on instructions from the King, for the Isles of France and Bourbon (Mauritius and Réunion). He finally reached home in 1754 and returned to his observations at the College Mazarin. He died in 1761 at the early age of 49<sup>3</sup>.

Lacaille's letter, which is believed to be the only surviving specimen of his own handwriting in South Africa, is written to M. de la Condamine of the Academy of Sciences, and is initially addressed to Plombières, but re-addressed to Paris. There are two places named Plombières, but this is presumably Plombières-les-Bains about 220 miles east of Paris, where M. de la Condamine had gone to take the waters for his health. Lacaille's letter is presumably something in the nature of an interim report on his work, written very soon after his return to one of the men chiefly concerned in organising his expedition.

Charles Marie de la Condamine, 1701-1774, was a geographer and mathematician who forsook an early military career for science. In 1735 he had joined an expedition to Peru organised by the Academy to measure an arc of a meridian of longitude near the earth's equator. This was one of the forerunners of the similar measurement made by Lacaille in South Africa, and explains de la Condamine's special interest in work of this type. On his return from this expedition de la Condamine made the first exploration of the Amazon. Later he interested himself in metrical problems, including work intended to determine the precise length of the ancient Roman foot.

I have not been able to find any reference to the lawsuit in which de la Condamine was evidently involved at this time. This topic might repay investigation since, to judge from Lacaille's words, the court concerned was of an unusual kind. Equally intriguing is Lacaille's reference to "the ladies to whom you introduced me" for it has always been thought that Lacaille was a complete recluse and misogynist, and, even if this phrase has, and doubtless it has, an entirely innocent connotation, it seems very much out of keeping with the character given him by posterity.

---

<sup>3</sup>He was born on 15th March 1713 and died on the 21st March 1762, and would thus appear to have been 49 years old when he died. Grant, *History of physical astronomy from the earliest ages*, p. 147, London 1852, says he died "in the forty-ninth year of his age." If both dates are "French", Lacaille was just over 49 when he died. If the dates are "English" he was just under 48 for England adopted the Gregorian calendar in 1752 omitting 11 days from the reckoning, and, in addition, putting New Year's Day back from March 25th to January 1st.

The third paragraph of the letter summarises his scientific work at the Cape. He speaks of his star observations and of the planisphere on which he laid out his proposals for the nomenclature of the southern constellations.

The length of 70,000 toises to which he refers is his measurement of the arc of the meridian. The toise was a length of 76.735 inches, or 194.907 cms., making the length measured 136.435 kilometres or about 85 miles. Lacaille's determination of the distance between two parallels of latitude separated by one degree was 57,037 toises, or about 111.17 kilometres: the present accepted value in the latitude of the Cape is about 111.30 kilometres. He gives his result for the length of the seconds pendulum (a double beat in two seconds) as 36 inches 8.07 lines. The figures "07" are uncertain because Lacaille's otherwise good handwriting is here rather hard to make out. The "inches" referred to are "Paris inches" each equal to 1.0658 of our modern inches, and a "line" is one twelfth of a Paris inch. The length 36 inches 8.07 lines, Paris measure, corresponds to 39.09 inches in modern measure. The actual value for Cape Town is about 39.08 inches. These results show that Lacaille was conducting scientific work with an accuracy foreshadowing modern standards of precision. The temperature of "between  $12\frac{1}{2}$  and 13 degrees" to which he refers is probably on the Réaumur system, and would correspond to about 60°F.

A translation of the text of the letter follows.

*The letter is addressed, on the verso of folio 2, to*

Monsieur de la Condamine of the Royal Academy of  
Sciences at Plombières

*This has been amended in another hand, to:*

At the Avenue des Petits Champs, Paris.

*There is a small wax seal bearing an ostrich  
as imprint.*

*Folio 1a*

*At top right-hand corner, presumably in the hand of  
M. de la Condamine.*

Returned from Plombières. Received at Paris on  
my return from Plombières, end [sic] August 1754

*Below in the hand of Lacaille*

Sir,

It is certainly not my fault that you have not had my news sooner. On arriving here there was nothing more urgent than to go in search of you at the Place Royale, whence I was sent to the Palais Royal, and finally I learned from the first Academician I met that you were at Plombières and would return immediately. Because of the uncertainty of knowing whether my letters would find you there still I have been obliged to wait for positive news, either of your return to Paris or of your stay for some fixed time in the country. I

am sorry that you are out of sorts, but I hope to see you very soon, since it is rare to make a long stay at the waters.

I am as usual very well. On my return journey I had one of the best crossings in the world. I have not brought back here any great number of discoveries. I had sent a complete summary of all my observations and of memoirs of all sorts. The packet left the Cape on 2nd February 1753 addressed to M. Trudaine. It was enclosed in the packet for the Dutch [East India] Company. The vessel arrived there but I have not yet had news of my papers. I am busy making new copies for the Academy.

Everything I did at the Cape can be summarised as the most exact determination possible of 240 principal stars in the southern part: to a summary of observations of 9800 stars included between the South Pole and the Tropic of Capricorn. Of these I have extracted a catalogue of 1930 visible to the naked eye which I shall put on a planisphere which I am at present having made: to meteorological observations: to the measurement of a length of 70,000 toises from which I conclude that the degree of the meridian which passes through south latitude  $33^{\circ} 18'$  is 57037 toises in length: finally to a summary of observations of eclipses, conjunctions and oppositions etc. I have also determined the length of the [seconds] pendulum as 36 inches 8.07 [?] lines: and the number of vibrations in one mean day of your invariable pendulum as  $98790\frac{1}{2}$ , the thermometer being between  $12\frac{1}{2}$  and 13 degrees.

From the Cape I went to the Isles of France and of Bourbon, where I was bored to tears. Having observed several satellites there I returned here by the first ships. It seems that one can be fairly satisfied with my work, and this will serve me I believe as my sole reward, but I ask no other.

I received at separate times the three items which you had sent to me. I could have wished that your lawsuit could have been hushed up and I assure you that there will be no great glory for whomsoever wins in the open [court]. However sensitive one may be to attack, it is certain that one always gains much by seeming to be indifferent, because a reply rarely lacks a rejoinder: and there, where there is no judge *ex professo* the documents can multiply themselves *ad infinitum* while the public have nothing better to do than to look for amusement at the expense of the parties. As I await you here all the time we should have a chance of talking everything over. I hope for nothing better than that you should be sufficiently restored [to health] not to need to go so far afield in search of remedies. I would have been glad if you could have given me news of the ladies to whom you introduced me. I hope to learn of them on your return. I await it with impatience, and am, very perfectly,

Sir, Your very humble and very obedient servant,  
Lacaille

At Paris 20th August 1754.

Tout ce que j'ai fait au Cap se reduce a la determination la plus exacte qu'il a été possible, de 240 étoiles principales dans la partie du Sud: A un recueil d'observations de 9800 étoiles, compris entre le pôle Austral et le Tropique du  $\pi$  Dont j'ai extrait un Catalogue de 1930 visibles à la vue simple, et que je dois placer sur un Planisphere que je fais construire actuellement. à des observations Meteorologiques: à la mesure d'un espace de 70000 toises d'où j'ai conclu le degré du meridien qui passe par  $33^{\circ}18'$  de latitude Australe de 57037 toises. Enfin à un recueil d'observations d'élipses de Conjonctions et Oppositions &c. J'ai encore déterminé la longueur du Pendule de 36 pouces 8, lignes: et le nombre de vibrations en un jour moyen à notre Pendule invariable de 98790½ la Thermometrie étant entre  $12\frac{1}{2}$  et 13 degrés.

Du Cap j'ai passé aux Isles de France et de Bourbon ou je me suis ennuyé extraordinairement: après y avoir observé quelques satellites je suis revenu-icy par les premiers Vaisseaux. Il parait qu'on est assez content de mon travail, et cela me fera je crois l'unique récompense, mais je n'en demande pas d'autre.

J'ai reçu à diverses fois les trois pieces que vous m'avez fait tenir. J'aurais souhaité que votre procès eût été adouci et je vous avoue qu'il n'y a pas grande gloire pour celui qui l'auroit gagné en plein. Quelque sensible qu'il soit de me voir attaqué, il est certain

que l'on gagne toujours beaucoup à y paraître indifférent parce qu'une  
réponse ne manque guère de réplique, et que là où il n'y a pas de  
juges ex professo, les Evénements se peuplent multipliés à l'infini sans que  
le public y cherche d'autre chose que ce qui peut l'amuser aux dépens  
des parties. Comme je vous attends incessamment si nous aurons  
l'occasion de nous entretenir plus au long de tout, je ne souhaite  
autre chose sinon que vous vous rétablissiez assez bien pour n'avoir  
plus de sujet d'aller chercher des remèdes si loin. J'aurais été bien  
si que vous m'eussiez donné des nouvelles des Dames, dont vous  
m'avez procuré la connaissance, j'espère en apprendre à votre retour  
je l'attends avec impatience et suis très parfaitement

Monsieur

Votre très humble et  
très obéissant serviteur  
Lacaille

Paris le 20 Nov 1754

### H. Observations at the Cape by Sir John Herschel

The interest of the documents relating to Sir John Herschel is less striking since none of them is in his own handwriting. They are three in number: a record of meteorological observations made at the Cape in 1835; a document containing copies of letters by Mr. (later Sir John) Lubbock<sup>4</sup> and Herschel in connection with the candidacy of the former in an election in 1832; and a lengthy newspaper cutting, entitled "The Herschels at Slough" dated 1854.

The background of these documents is as follows: Sir John Herschel, son of Sir William Herschel, one of the most skilled of astronomical observers ever to live in England, came, as a private person, to the Cape in the years from 1834 to 1838. From a site in Claremont now marked by an obelisk, he made systematic observations of the nebulae and star clusters in the southern sky. These were published several years later after Herschel's return to England, as "Results of Astronomical Observations at the Cape of Good Hope, 1834-1838". As a general survey this work was of the greatest importance, and much of our knowledge of the southern nebulae has not, even now, advanced much beyond the point reached in Herschel's researches. Herschel was a man of wide interests, and one of them was meteorology. The observations recorded here, now of only slight interest in themselves, are a continuous series of meteorological observations made every hour from 6 a.m. on December 20th 1835 to 9 p.m. on December 22nd. The times are given as Greenwich or Local Mean Time (it is not clear which) on the system which prevailed until 1925, i.e. the day begins at noon, not at midnight. The observations include measurements with the Actinometer, an instrument, now obsolete, of Herschel's own invention. It consisted of a closed box with a plate glass front containing a thermometer with a large bulb filled with a dark liquid. This absorbed the heat of the sun and from the readings in sunlight and shadow, the intensity of the sun's radiation could be estimated.

The observations are a copy, for a note to them reads "Copied by Charles Piazzi Smyth at the Cape of Good Hope and presented to the Hartwell Observatory by Miss Smyth. J. Lee. Hartwell". Piazzi Smyth is one of the more picturesque characters of astronomy. His family was distinguished. His father was an admiral and an enthusiastic astronomer who named his second son after a friend, the well-known Italian astronomer Piazzi. Several of his sons and daughters have claims to fame, one of them as the mother of Baden-Powell. Piazzi Smyth, brought up in an astronomical milieu, adopted the science as his profession and came to the Cape in 1834 when only sixteen as assistant to Maclear, then recently appointed H.M. Astronomer at the Cape. His fellow assistant was T. W. Bowler, the artist, and it is thought that Smyth, who was an accomplished draughtsman, some of whose work

---

<sup>4</sup>Sir John William Lubbock (1803—1865) was the father of the better-known Sir John Lubbock (1834—1913), who became the first Baron Avebury.



survives, actually instructed Bowler. Smyth was employed on all sorts of work, including the giving of assistance to Herschel, and in the verification by Maclear of Lacaille's arc of the meridian.

This explains how Piazzzi Smyth came to copy these observations. Hartwell House near Aylesbury, Buckinghamshire, was run as a private observatory for some years by his father, Admiral Smyth, and Dr. John Lee. Their observations have little claim to scientific merit, and books describing them like "*Speculum Hartwelliana*" by Admiral Smyth are more remarkable for the pretentiousness of their language and the oddity of their illustrations than anything else<sup>5</sup>.

The second document is of little scientific interest. Lubbock was a candidate for the seat for the University of Cambridge at the end of 1832. The letter is addressed to the electors. Then follows a statement by the committee supporting him, ending with a letter from Sir John Herschel, urging his candidacy. It is not clear whether or not Lubbock was elected<sup>6</sup>, but he afterwards became notable in scientific affairs and made a number of contributions to astronomy.

The last of the three documents consists of a lengthy newspaper cutting describing the life and work of Sir William Herschel, his discovery of the planet Uranus, and his removal to Slough. There he erected what was for the time a gigantic reflecting telescope of 48 inches diameter and focal length 40 feet. The mirror was, of course, made from speculum metal: glass and pyrex mirrors are a relatively recent development. His son afterwards lived there, but it must be emphasised that Sir John Herschel was never so enthusiastic an astronomer as his father, and, to quote the Ninth Edition of the *Encyclopaedia Britannica*, "In fact Herschel had become an astronomer from a sense of duty, just as his father had become one by fascination and fixed resolve; hence it was by filial loyalty to his father's memory that he was now impelled to undertake the completion of that work which at Slough had been so grandly commenced". The reference is to the fact that the survey of southern nebulae made at the Cape was intended to complement the work on the northern sky undertaken by his father. In fact after his return to England Sir John Herschel did little or nothing more in astronomy. The forty-foot telescope fell into disrepair and it was dismantled at the end of 1839. The occasion drew from Sir John a poem, quoted in the cutting, the first stanza of which reads:

---

<sup>5</sup>The study of the headgear worn by astronomers when observing is a neglected subject. Berets, sometimes stuffed with cotton wool, conical woolly caps, sometimes adorned with pom-poms or stripes, peaked caps in reverse, felt hats with part of the brim cut out, and many other types are all worn according to individual taste. Pride of place must however go to the astronomer shown in one of the illustrations to "*Speculum Hartwelliana*" who sports a smoking cap with tassel and the signs of the Zodiac embroidered round the lower border.

<sup>6</sup>He was not [Ed.]

*"Requiem of the forty feet reflector at Slough*

*Sung on New Year's Eve, 1839-40*

In the old Telescope's tube we sit  
And the shades of the past around us flit,  
His requiem sing we with shout and din,  
While the old year goes out and the new comes in.  
Merrily, merrily let us all sing,  
And make the old telescope rattle and ring."

DAVID S. EVANS