

A history of comet discovery from South Africa

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Abstract: The history of comet discovery from South Africa is as old as the first settlement by the Dutch at the Cape in 1652. This paper records the discovery of 57 comets from South Africa since this time. The most prolific discoverers are shown to be William Reid and Michiel Bester. Interesting facts relating to the discoverers and their comets are presented. The paper constitutes a summary and is part of a larger ongoing effort by the author to produce a concise historical manuscript of South African comet discovery.

Introduction

Notwithstanding the fact that the last comet discovered from South Africa was in 1978, this country has a vibrant history of comet discovery. During the current lull in discovery, I feel it pertinent to take stock and summarise the discoveries that have been made over the last 350 years and give some impetus to discovery in the 21st century.

A comprehensive treatise of South African comet discoveries has never been produced. The closest are McIntyre's (1949) 'Comets in Old Cape Records' and Overbeek's (1995) list of discoveries. The former is rather a record of comet observations, though some of these descriptions are clearly the first documented records of some comets which may thus be considered discoveries from the Cape. The latter reference is a list of South African discoveries made by amateurs only.

McIntyre records discovery observations of comets C/1652 Y1, C/1686 R1, C/1689 X1, C/1733 K1 and C/1742 C1. These may be considered as true South African discoveries since the recorded dates predate any others. However, he also describes observations of C/1664 W1, which was observed one

month earlier from Spain, P/1682 Q1, which was comet Halley, and C/1695 U1, which was observed two days earlier from Brazil. McIntyre also gives an account of C/1830 F1 which he describes as "the only independent discovery of a comet by a woman in South Africa". Mrs Fallows observation on March 20 was four days after the first sighting of this comet from Mauritius on March 16.

Table 1(a). Discoveries 1652–1910

Comet	Discoverer
C/1652 Y1*	van Riebeeck
C/1686 R1*	van der Stel
C/1688 E1*	unknown
C/1689 X1*	van der Stel
X/1702 D1*	unknown
C/1733 K1*	unknown
C/1742 C1*	unknown
C/1830 F1*	M-A Fallows
C/1882 R1*	W Finlay
C/1886 S1	W Finlay
C/1888 D1	H Sawerthal
C/1910 A1*	R T A Innes

* not officially listed as a South African discovery

In this paper I intend to concisely summarise the comets discovered from South Africa and present some of the details of the discoveries.

Summary of the discoveries

Consulting various sources I find the number of comets that can be attributed to discovery from South Africa to be 57. These include 11 comets which do not carry the name of an individual South African discoverer but for which evidence exists that the comet was detected independently from these shores, and 46 officially named comets, which carry the names of 18 different South African discoverers. (The term 'South African' refers not to the nationality of the discoverer but to the fact that the comet was discovered from within the borders of South Africa).

Table 1(b). Discoveries 1915–1936

Comet	Discoverer
P/1915 W1	C Taylor
C/1918 L1	W Reid
C/1919 Y1	JF Skjellerup
C/1920 X1	JF Skjellerup
C/1921 E1	W Reid
C/1922 B1	W Reid
P/1922 K1	JF Skjellerup
C/1922 W1	JF Skjellerup
C/1924 F1	W Reid
C/1925 F2	W Reid
C/1925 X1	GE Ensor
C/1926 B1	TB Blathwayt
C/1927 A1	TB Blathwayt
C/1927 B1	W Reid
P/1929 P1	AFI Forbes
C/1930 L1	AFI Forbes
C/1932 G1	HE Houghton/GE Ensor
C/1932 Y1	AFI Forbes
C/1935 A1	EL Johnson
C/1935 M1	C Jackson
P/1936 S1	C Jackson

The concise list of discoveries is given in Table 1(a)–(c). From this list several interesting points can be gleaned.

The most prolific comet discoverers were William Reid and Michiel Bester with six discoveries each, followed by Daniel du Toit with five.

There were no discoveries outside the Cape until Ensor's comet of 1925. However, there have been no discoveries from the Cape since 1941.

There were four discoveries in the 1600s, three in the 1700s, four in the 1800s and 46 in the 1900s. Of the 57 discoveries, 38 were made in the 30-year period from 1920–1950.

Table 1(c). Discoveries 1940–1978

Comet	Discoverer
C/1940 O1	JS Paraskevopoulos
C/1941 B2	RP de Kock/JS Paraskevopoulos
C/1941 K1	H van Gent
P/1941 O1	D du Toit
C/1943 W1	H van Gent
P/1944 K1	D du Toit
C/1944 K2	H van Gent
P/1945 G1	D du Toit
C/1945 L1	D du Toit
C/1945 X1	D du Toit
C/1946 U1	MJ Bester
C/1947 F1	MJ Bester
C/1947 K1	MJ Bester
C/1947 S1	MJ Bester
C/1947 X1*	various
P/1948 Q1	C Jackson
C/1948 R1	EL Johnson
C/1948 W1	MJ Bester
C/1949 K1	EL Johnson
P/1949 Q1	EL Johnson
C/1959 O1	MJ Bester
C/1969 Y1	JC Bennett
C/1974 V2	JC Bennett
D/1978 R1	J Campos

* not officially listed as a South African discovery

The last discovery was made in 1978, 24 years ago. Only two South African discoverers remain alive, Jose Campos, who now lives in Portugal, and Michiel Bester, who lives in Mpumalanga.

The comets of the 1600–1800s

To all intents, it appears the history of comet discovery from South Africa is as old as the settlement of the country itself. Jan van Riebeeck landed at the Cape on 1652 April 6. During his first year, he busied himself with the building of accommodation and planted the first vines that were the origins of the Cape wine region. On the evening of December 17 he sighted the comet C/1652 Y1, writing in his journal:

‘At night about 9 or 10 o’clock saw to the east south east from the head of the giant about 80 degrees above the horizon a strange star with a tail; the tail extending northwards right on the knees of the giant and the head mostly to the south about 10 degrees away.’

Van Riebeeck continued to observe the comet until December 24. Though the telescope had been used astronomically since 1609, and no doubt the early Dutch seafarers used them while at sea, there is no record that van Riebeeck observed the comet telescopically.

Simon van der Stel found the first of his two comets nearly 34 years later, on 1686 August 12. In his journal he recorded:

‘This night appeared in the fifth house of the heavens, at 1 o’clock, in the horizon a comet corresponding in length with Saturn and Venus conjoined, on the left shoulder of the hare...The tail extended right, east

and west to the length of 35 celestial degrees, in Gemini.’

The position at discovery appears to have been near beta Lupi.

Van der Stel’s second comet, discovered on November 24, 1689, was perhaps one of the most spectacular comets discovered from South Africa. It was first seen in the early morning sky shortly before sunrise, but moved into the evening sky after perihelion on November 29 and grew a tail ‘like a great sabre’ around 100° long.

The account of Mary Anne Fallows’ comet is of interest. Known as the Great Comet of 1830, it was discovered on 1830 March 16 by Faraguet in Mauritius. His discovery was presented in a paper to the South African Institution, where he described the discovery position as between the Chameleon and the Large Magellanic Cloud, “and the tail never exceeding 5°”. Mrs Fallows first observed the comet on March 20 according to McIntyre (1949: 14). Warner (1995: 206) quotes from a letter of Fallows to Barrow: “Mrs Fallows discovered a comet in ... Octans very early in the month of March.” The published observations by Airy (1851) commence on 1830 March 22. The discovery is recorded as a naked-eye object with a tail several degrees long located a few degrees from the south celestial pole. Bortle (1998) gives the discovery magnitude as 3. The comet moved due north parallel to 21h right ascension. It was magnitude 2 with a short tail located in Microscopium on April 1, and magnitude 4 with a 2° tail in western Pegasus at the beginning of May. It remains the only comet co-discovered by a woman from South Africa.

William Finlay discovered two comets in the late 1800s. The second, P/1886 S1 can still be observed today. Now designated 15P,

it follows a short period of 6.75 years. It reached perihelion again on February 7 this year, peaking at about magnitude 12. However, it was Finlay's first comet that became one of the most remarkable comets of the 19th century. Though it had been spotted earlier on September 1 (Bortle 1998), Finlay made the first independent observations from South Africa on September 7 which, according to Gill (1882a), were the first exact observations of the comet. Known officially as the Great Comet of 1882, it was magnitude 2–3 at discovery, with a short tail and located in western Hydra. It moved rapidly sunward to perihelion on September 17, and by September 13 the comet was brighter than Jupiter with a 12° tail. At perihelion the comet was easily visible at noon, near the Sun, at an estimated magnitude of –17, with a tail of 3°. It continued to be visible for another week in broad daylight, moving south-eastwards into the evening sky, and by end September it was still magnitude 0 with a 25° tail. But the comet's remarkable performance was to continue. Gill (1882b) obtained photographs of the comet from South Africa, starting on October 19. In a letter from Gill (1882c) to a Mr Knobel he first commented on the break-up of the nucleus of the comet. He wrote:

“whether before perihelion the Great Comet of 1882 showed a duplex or compound nucleus, the observations by Finlay and Elkin on September 7 and 8 prove clearly that no duplicity could be detected with our optical means.”

Gill glimpsed the comet on September 9 and then the day after perihelion, reporting the nucleus as resembling a star of first magni-

tude. But on September 30 Finlay reported in his notebook: “there seem to be two balls of light in the head”. On October 1 he sketched the two, separated by a line of light. On October 9 he noted several points in the nucleus. On October 17 Gill counted five points of light in a pale cigar-shaped nucleus, which he described in the *Cape Quarterly Review* as a “narrow line fully an arc minute in length with five nuclei looking like small beads strung on a thread of worsted.”

By the end of October the Great Comet of 1882 had faded to magnitude 2 with a 30° tail. By December it was still shining at magnitude 3, and only became lost to the naked eye in February 1883. And so one of the most remarkable comets of all time faded into history.

The heyday of comet discovery, 1900–1950

It was really in the 20th century that South Africans made a major mark in the field of comet discovery. In 1910 another bright comet made its appearance, the Daylight Comet of 1910. The comet was observed by many in the morning twilight of January 12, but the first astronomer to do so was R T A Innes (Bortle 1997, Petterson 1998). At about magnitude –1 at discovery, the comet rapidly moved into conjunction with the Sun. At perihelion on January 17 it was magnitude –5 and visible in daylight. After perihelion it moved northwards, and by the end of January was magnitude 1 with a 25° tail, early February it was third magnitude with a 50° tail, and thereafter faded rapidly, being lost to the naked eye by mid-February.

Another comet which can be observed today is P/1915 W1, discovered by Clement Jennings Taylor on 1915 November 24. Travelling in an orbit of just under 7 years,

it is now designated comet 69P, and last reached perihelion on 1997 December 12 when it reached magnitude 12. Taylor was born in Lincolnshire in 1861 and came to South Africa at an early age, ending up working in the Kimberly diamond fields. He returned to the Cape in 1890 after he and his wife had lost their infant child, and continued business as a cloth merchant. He observed from an observatory 'Herschel View' in his yard in Claremont. Taylor discovered his comet at magnitude 10 in Orion. It reached perihelion on 1916 January 31 (Kronk 1984), and on February 3 van Biesbroek noted the nucleus appeared elongated. By February 10, E E Barnard reported two perfectly distinct comets. The nucleus referred to as A was last seen on March 23, while the other, nucleus B, is still observable today. Taylor died on 1992 June 30 and on his grave in Plumstead Cemetery are the words, 'The Heavens Declare the Glory of God', as was inscribed above his observatory door.

In 1918, William Reid discovered the first of his six comets, after three years of dedicated comet searching. He wrote:

'At first it was a very big undertaking. My knowledge of the southern skies was very limited – it took me some time to get familiar with the many nebulae which could be mistaken for comets, and it was only after I had mapped down hundreds of them that I was able to recognise them as old immovable friends. I must admit that it took me some time to develop a rubber neck and back'.

But master the technique he did, discovering five more comets between 1921 and 1927.

J F Skjellerup discovered four comets, between 1919 and 1922. Houghton (1947) quotes him as being "an assiduous comet explorer". His third comet, discovered on 1922 May 16, was found independently later the same evening by Reid, who, the story goes, stood aside to allow Skjellerup the sole credit as discoverer. Had Reid been credited discovery of this comet he would stand alone as South Africa's foremost comet discoverer. Orbital calculations showed that this comet was the same one discovered by Grigg in 1902, and the comet now known as 26P Grigg-Skjellerup is still visible today. Skjellerup was to make a further discovery in 1927, but by that time had returned to his native Australia.

G E Ensor discovered two comets during his variable star observing from Pretoria. The first one, discovered on 1925 December 13, initially developed a short tail (Weir 1927), large coma and sharp stellar nucleus, and it seems would have become quite bright (Moore & Collins 1977). But by the end of February when the comet should have been seen in the eastern sky, it could not be found despite constant searches. The comet was finally seen on March 10 by the well-known British amateur Bertrand Peek, and photographed at Bergedorf on March 16 and 20, appearing as a faint nebulous mass without any apparent nucleus. The appearance was referred to as resembling a "celestial jelly fish" and it seems this comet was the first example of one which literally ran out of gas.

Ensor discovered his second comet on 1932 April 2 while observing the variable star T Apodis (Overbeek 1995). Reporting his discovery to the Union Observatory he was told that Harold Egerton Houghton had already discovered the comet the night before from Cape Town. Nevertheless, both

were credited with the discovery of comet Houghton-Ensen. Houghton wrote:

“a new comet was seen by the writer at Cape Town on April 1st (a rather unfavourable day for making announcements).”

Houghton was born in England in 1892 and came to South Africa in 1920 to join the staff of the High Commissioner’s Office. He succeeded Ensen as Director of the ASSA Variable Star Section in 1934, making over 10 000 observations, and co-discovering a comet in the process.

Theodore Ballantyne Blathwayt is another discoverer of two comets, in 1926 and 1927. He was an active comet searcher, spending 130 hours searching in 1931 (Forbes 1931), though he failed to discover any more before his sudden passing in 1932. Blathwayt graduated at Oxford and emigrated to South Africa. After the Great War he moved from Cape Town to Johannesburg, where he searched for comets using a 4-inch refractor and an 8-inch reflector. He died suddenly on 1932 October 12, aged 72.

Alexander Forbes himself discovered three comets. He was born in Scotland in 1871, came to South Africa in 1896, but returned to Scotland to study. He finally emigrated to the Cape in 1909 where he practiced as an architect, before retiring to Hermanus in 1932. He observed and searched with a self-built 8-inch reflector, which still

exists today at his old observatory in Hermanus (Kleyn & Turk, private communication, 2002). In 1956 he returned to Cape Town due to failing health and lived with his niece, Ms Hewitson. His first comet was discovered after more than a years dedicated searching¹, on 1929 August 1 at magnitude 11 in Microscopium, and is the periodic comet today known as 37P. It had made a close approach to Jupiter, and might have been found in 1923 had it not been badly placed (Kronk 1984). He made further discoveries in 1930 and 1932, the latter on December 15 when the comet was close to the bright star Fomalhaut. The comet was independently found by G F Dodwell, Government Astronomer at Adelaide two days later, and was named comet Dodwell-Forbes.

Ernest Leonard Johnson was an astronomer at the Union Observatory, perhaps best known for his discovery of 12 minor planets, including 1580 Betulia during a close approach on 1950 May 22. As a result of his photographic searches he discovered four comets, the first in 1935, and then in 1948 and two in 1949. He retired from the Union Observatory in 1956.

Another prolific discoverer of minor planets was Cyril Jackson. Born in 1903, he joined the Union Observatory in 1928, where he worked until 1947. Jackson discovered three comets, two of which can still be observed today. He discovered his first comet in 1935, and found his second, a twelfth magnitude object in Aquarius on 1936 September 20 on a plate exposed five days earlier. The comet was independently found by Grigory Neujmin in Russia, and the comet is today known as 58P Jackson-Neujmin. Jackson’s third comet was found by accident on a plate exposed on 1948 August 26, while testing a 50cm focal-length camera for its

1: The obituary in *MNASSA* gives comet Pons-Coggie-Winnecke-Forbes as his first discovery. This was in fact a recovery, and Forbes is today not credited as discoverer of this comet, which is known as comet Crommelin.

ability to detect fast-moving minor planets. The comet was found 12 hours earlier by Joseph Ashbrook on a visit to Lowell Observatory (Kronk 1984). This comet too is observable today as comet 47P Ashbrook-Jackson.

Another well-known amateur who serendipitously discovered a comet while observing variable stars was Reginald Purdon de Kock. On the morning of 1941 January 15, he trained his 3-inch refractor on the variable star R Lupi, immediately spotting the comet at magnitude 5.8, with a $\frac{1}{2}^\circ$ tail. De Kock reported at a meeting of the Cape Centre on March 19:

'I had been observing variable stars for almost an hour before I tried to pick up R Lupi. It was then about half past three...It [the comet] was to the left of the field of R Lupi...

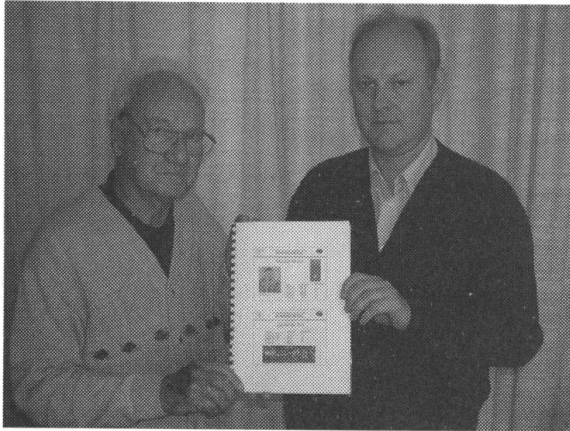
In the following weeks it brightened to magnitude 2 and displayed a long tail visible in both the morning and evening sky. The comet was noted for a dark division which appeared to separate the tail into two streamers, resembling comet Donati of 1858. The comet was found by several others, and due to war-time communications, the first official report was by J S Paraskevopoulos from Boyden on January 23, by which time the comet had brightened to magnitude 3.5. The comet became known officially as comet de Kock-Paraskevopoulos.

The period that follows was characterised by a number of accidental discoveries by professionals. Hendrik van Gent discovered three comets and numerous minor planets while photographing variable star fields with the Franklin Adams camera at the Leiden Southern Station. He arrived in 1928 and

observed there until less than a year before he died suddenly of a heart attack on 1947 March 29, aged 47. His brightest comet, Van Gent-Daimaca-Peltier, reached magnitude 6.

Michiel John Bester holds the joint distinction as South Africa's most prolific comet discoverer, with six discoveries. Bester was born in Colesburg on 1917 May 16. He grew up and finished school in Philipolis in the southern Free State. His father died in 1925 at the early age of 35, and young Michiel was forced to enter business with a paint company, B P Jones, to help the family. But a vacancy existed for an observer at Boyden Observatory, and after an interview with Paraskevopoulos, Bester joined a team of three other observers – Du Toit, de Villiers and Steyn – on 1937 December 1. It was their job to check the photographic plates taken on behalf of Harlow Shapley, then Director at Harvard. The exposures were generally 45 minutes on Cramer High Speed Blue plates, or later Kodak 103a, taken with the 10-inch Metcalf or 8-inch Bache telescopes. It was during the examination of the exposures for image quality that Bester discovered his six comets. Despite the fact that Bester only retired on 1982 December 1 after 45 years service at Boyden, five of his comets were discovered in the period 1946–1948, and the sixth in 1959.

Bester's colleague at Boyden, Daniel du Toit, discovered five comets in similar fashion. He was already an observer at Boyden when Bester joined, and discovered his five comets from 1941–1945. He left astronomy to take up a business in the building trade, losing a leg in the process (Bester, private communication, 2002 July). Curiously, three of Du Toit's five comets can still be observed today. His first comet is 57P du Toit-Neujmin-Delporte, his second is 66P du Toit, and



Michiel Bester, seen with the author, on handing over a copy of the author's ASSA Symposium paper, in commemoration as South Africa's foremost living comet discoverer. Photo (c) 2002 July, The Ridge newspaper.

his third is 79P du Toit-Hartley. The latter has been in the news recently due to the breakup of its nucleus.

In 1947, another bright comet was discovered from South Africa. Known as the Great Southern Comet, it was first detected outside South Africa on December 7. The comet was seen from South Africa on the evening of December 8 as darkness fell (Jackson 1947). The fact that astronomers here were unaware of its existence indicates that it might be considered an independent South African discovery. Paraskevopoulos (1948) writing in *Sky & Telescope* reported:

'This spectacular object was first seen in south Africa on the evening of December 8 1947 by practically everyone who happened to be out under a clear sky. The observatory telephone rang almost continuously... and each person claimed to be the first to see the comet. It was a magnificent object. The head [about magnitude 0]

pointed in the direction of the southwestern horizon at an altitude of only 2–3°, and the long slightly curved tail extended upward for about 25 degrees with its convex side toward the west."

On December 10, Dr W H van den Bos, then Union Astronomer, observed the nucleus to be double with the 27-inch refractor at the Union Observatory. The two fragments were magnitude 4.5 and 8.5 separated by 6 arcseconds. The comet had been at perihelion on December 2, and by December 16 had faded to magnitude 2.5–3. The following night a 40 minute exposure on the 10-inch Metcalf camera at Boyden showed the tail to be quintuple. By December 20 the comet was magnitude 4–5 and on December 25 was no longer visible to the naked eye (Bortle 1998). The comet was photographed continuously at Johannesburg from December 10 until January 4 when it became too low, and was sketched over several nights by Mrs H E Wood (Jackson 1948).

The later discoveries

Our list of discoveries rounds up with four comets, discovered in 1959, 1969, 1974 and 1978. Bester's sixth comet was discovered while examining plates taken for Cuno Hoffmeister, who was on a short visit from Sonneberg in the old East Germany. The comet was magnitude 8 at discovery on a plate taken July 26, and was fading after passing perihelion on July 15.

No account would be complete without reference to Pretoria's own Jack Bennett. He was born on 1914 April 6 in Estcourt, Natal, and became interested in astronomy as a teenager, his mother pointing out objects to him while walking home from

church. In 1968 Bennett took over as Director of the ASSA Comet and Meteor Section from S C Venter, and he was ASSA President in 1968-69. On 1968 July 16 he discovered a supernova in the galaxy M83, and on 1969 December 28, after 333 hours of comet searching he found his first comet. He had been sweeping for only 15 minutes when he found the magnitude 8.5 comet, small and diffuse with no tail. With perihelion only on 1970 March 20, the comet was on its way in and brightening, and by the end of January the comet was magnitude 7. During February it brightened to magnitude 3, reaching perihelion on March 20 and closest approach to Earth on March 26. By then it was magnitude 0, moving from Aquarius into Pegasus, with a beautiful curved tail of 10–12° containing filaments. In early April it was magnitude 1–2, sporting two tails, the longest about 20°, and exclusively a northern object. By month-end comet Bennett had faded to magnitude 5, and to magnitude 9 by end May. With its bright, long, curved tail, comet Bennett was one of the most memorable comets of recent times.

Bennett's second comet was very different. He discovered it the first clear night in a week, after a further 432 hours of searching. Discovered on the morning of 1974 November 13 with his 12cm Apogee scope, it was a magnitude 9 object resembling a globular cluster with no central condensation. The comet faded rapidly, becoming larger and diffuse, and may well have been undergoing an outburst at time of discovery. As a result, he concluded that suspects he observed in 1965 March and 1966 February may also have been undergoing outbursts which did not last long enough to secure confirmatory observations.

The last comet discovered from South Africa was Haneda-Campos in 1978. Jose Campos observing from Durban, independently discovered comet D/1978 R1 on 1978 September 1, shortly after Toshio Haneda in Japan. The comet was magnitude 9, diffuse with slight condensation. It made its closest approach to Earth on September 9 and was at perihelion of its six year orbit on October 9. After perihelion the comet remained very faint and diffuse, and at its predicted return in 1984, no trace of the comet could be found. It remains an example of a lost comet.

Conclusion

I hope this paper has given some idea of the rich history of comet discovery from South Africa, the discovery circumstances of some of the comets and an introduction to the discoverers themselves. It is a sad fact that South African comet discoveries have dried up.

A study of the facts would seem to indicate that South Africa is long overdue another comet discovery, even more so a comet discovered from the Cape. The fact that none have been discovered from here since 1978 is not due to the lack of comets, since they are regularly discovered from Australia. No, I presume it is rather due to the lack of impetus on behalf of South Africans to carry our regular comet searching, and to the continual deterioration of our skies in urban areas where most observers are resident. Clearly, many comets were discovered photographically during professional asteroid and variable star search programs which are no longer carried out, but the discovery by dedicated amateurs has also dried up. I hope that this trend can be reversed as we enter the 21st century.

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