**Astronomers' contribution to library and information services at the South African Astronomical Observatory in their quest to understand the Universe.**

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## Introduction

Astronomical libraries provide valuable resources to astronomers in their quest to study the Universe and understand and interpret what they observe. These libraries reflect a rich history of astronomical research, a view that has not been adequately published. Astronomers have always valued the library as a useful tool in their research and many astronomers rely on their instruments and telescopes, as well as their access to published research in journals through their library.[1] However, there is a lack of knowledge around the involvement of scientific researchers like astronomers in the establishment and management of libraries due to their crucial need for easy access to literature to do research. This forms the basis of the rationale for this article which is to offer a significant South African and African angle to how astronomers contributed to the establishment and development of libraries at observatories. Moreover, substantive literature covering the establishment and development of the South African Astronomical Observatory (SAAO) Library is sparse, with only one very recent refereed paper[2] that gives an overview of the development of the SAAO Library alongside that of astronomical research in South Africa, over the 200 years of its existence.

This article is based on the findings of a qualitative research study undertaken at the South African Astronomical Observatory (SAAO) in 2021, within a current era of far-reaching advances in the scientific field of astronomy in South Africa, advances such as the building of the Square Kilometre Array (SKA), the world's largest radio telescope.[3] The study investigated the history of astronomy and astronomical library and information services (LIS), the current

state of astronomical LIS, as well as the possible futures of LIS in astronomy. The findings revealed three overarching themes responding to the topic: library management, library access and library value. Using these themes, this article will focus on the role of astronomers in the

establishment and development of the library at SAAO whilst doing astronomical research, a phenomenon also discovered at other observatories around the world. For instance, research done by Olostro Cirella et al. in Italy found that astronomy libraries are closely linked with 'the origins and development of the activities of each respective observatory'.[4]

First, this article will discuss key concepts and the context for the article, then it will give a brief overview of the methodology used for the research study on which it is based. Finally, it will take a closer look at the three overarching themes identified during the study (library management, library value, and providing access to information) that highlight how astronomers started and managed the SAAO Library for more than one hundred and fifty years, thus providing the evidence for the central argument of this article. The three themes also illustrate how astronomers viewed the library as a useful tool for performing astronomical research at the SAAO, from the time of its establishment in 1820, to when professional librarians were employed from the 1970s, and through to today. This contributes to the body of evidence that astronomers were instrumental in the establishment and development of astronomical LIS at the SAAO.

## Key concepts and contexts

To appreciate the establishment and development of astronomical LIS in South Africa by astronomers, it is useful to understand key concepts and outline the context that underwrites the research study informing this article.

### *Astronomy and astrophysics*

In his keynote address at the Third Astronomical Society of South Africa Symposium in September 1995, Robert Stobie, the then Director of the SAAO, explained that astronomy 'is a science based on fundamental physical principles'.[5] It is also known as astrophysics and is about the study of physics beyond the Earth, that is, the physics of the Universe. Astronomy is

an old science, inspiring people for thousands of years, a fact that is well supported in the literature.[6] In the prologue to their book *The Astronomy of Southern Africa*, Moore and Collins point out that 'even the cavemen of so long ago must have been stargazers, even though they had no idea of how the Universe is made up' and 'as human intelligence developed astronomy developed too'.[7] Astronomy is and has always been of interest to human beings.

***The Royal Observatory of the Cape of Good Hope***

In 1820 the Royal Observatory of the Cape of Good Hope, what is now known as the South African Astronomical Observatory (SAAO), was the first scientific institution to be established in the entire southern hemisphere.[8] On 20 October 1820, in the same year that the Royal Astronomical Society in London was established, the Royal Observatory of the Cape of Good Hope was formally established by an Order in Council issued in Great Britain: 'His Majesty ... doth hereby order the Lords Commissioners of the Admiralty to cause an Observatory to be erected at the Cape of Good Hope'.[9] However, as explained by De Young and Raju, the reasons for its establishment went beyond the need for an astronomical observatory in the Southern Hemisphere: 'it also provided time signals to ships docked at the Cape; a meteorological service; as well as the opportunity to map the Southern skies in the same way in which the Greenwich Royal Observatory mapped the Northern skies'.[10] One hundred and forty years later, after South Africa eventually became independent from Britain in 1961, the Royal Observatory at the Cape of Good Hope merged with the Republic Observatory in Johannesburg and the Radcliffe Observatory in Pretoria to form the South African Astronomical Observatory (SAAO) in 1972.[11]

***The current South African Astronomical Observatory***

The SAAO is the National Research Facility for optical and infrared astronomy in South Africa. Its main mandate is to conduct fundamental research in astronomy and astrophysics[12] and its telescopes are located in Sutherland in the dark Karoo of the Northern Cape province of South

Africa. It is an astronomical research facility of the National Research Foundation (NRF), an independent statutory body established through the National Research Foundation Act (No. 23 of 1998) of South Africa, financed by the South African government under the Department of Higher Education, Science and Innovation. The mandate of the NRF is that of 'supporting, promoting and advancing research and human capacity development (HCD), through funding and the provision of the necessary research infrastructure to facilitate the creation of knowledge, innovation and development in all fields of science and technology, including humanities, social sciences and indigenous knowledge'.[13] The SAAO not only provides a world-class facility that promotes astronomy and astrophysics in Southern Africa, it also connects South African astronomical research to the rest of the world. It collaborates worldwide on a scientific level with its prime function being to further important research in astronomy and astrophysics at a national and international level through the use and provision of an astronomical facility of world-class standard.[14] An example of such collaboration is the Southern African Large Telescope (SALT) that is owned by the international SALT Foundation, a consortium of institutions of which the NRF is the major stakeholder.[15] The SAAO also hosts fourteen other smaller telescopes owned by international and national organisations, as well as three that it co-owns and six of its own.[16]

***Scientific research in astronomy***

Scientific research is published by astronomers in core peer-reviewed research journals such as *Philosophical Transactions of the Royal Society*, *Monthly Notices of the Royal Astronomical Society*, *Astrophysical Journal*, *Astronomy and Astrophysics, Astronomy Journal,* and *Icarus*. In a paper presented at the *Library and Information Services in Astronomy VI* conference in Pune, India, in 2010, astronomer Terry Mahoney stipulated that these journals are seen as 'a collaboration between the ... scientists ... and the learned societies in combination with academic publishers'.[17] The earliest science produced by the Cape of Good Hope Observatory

was the work of the very first Astronomer Royal, the Rev. Fearon Fallows (1788–1831), who mapped the Southern stars. His star catalogue was published in *Philosophical Transactions of the Royal Society* in June 1823.[18] Scientific works carried out at observatories, including the Cape of Good Hope Observatory, are reflected in data from archival documents as well as in journal articles. The scientific research in astronomy at the Cape has been and is still firmly entrenched in optical astronomy where optical astronomers use optical telescopes that have lenses or polished mirrors that focus on objects using the visible ray, infrared and ultraviolet frequency, of the electromagnetic spectrum. The SAAO has several high-impact research interests in optical astronomy[19] such as planetary astronomy,[20] Milky Way companion objects[21] study and cosmology.[22]

***The South African Astronomical Observatory Library***

The SAAO Library has a collection of approximately 13 000 items, including more than eight hundred journal titles that have been collected over time through a publication exchange programme with astronomical facilities around the world.[23] It has a unique richness of pre-twentieth-century journals with the core astronomical journals starting at volume one. The SAAO Library also includes an archive of historical material of the SAAO. In all, the library's holdings consist of journals (electronic and print), books (electronic and print), databases, atlases and catalogues, meteorological reports, brochures, maps, photographs, plates, posters, staff publications, slides, media collections, CDs and DVDs, and many historic documents. Besides the collection itself, the library provides an environment which is conducive to research in astronomy. Space, building infrastructure and design are vital to an astronomy library, and its development and the evolution of the field of astronomy are intricately linked and operate in tandem. Numerous historical documents and artefacts that includes official and personal letters, employment registers, procurement documents and many more, housed in the SAAO Library archive, bares testimony to the fact that the SAAO Library has always been a

part of the main observatory building that housed the astronomers and their families as well as their instruments. The library continues to provide critical access to hundreds of e-journals, e-books, and physical books to support the research being done at the SAAO. Furthermore, it also provides statistical data on the key performance indicators (KPIs) of the SAAO for reporting purposes and keeps a well-maintained database of staff publications and papers produced by observers using data obtained at the SAAO. Its users are mainly SAAO researchers including students (PhD, Masters, Honours, and Post-doctoral), affiliated researchers, technical staff, and support staff. It is a subscription-based library but offers an open unlimited use option for its members. The library avails a service to other observatories and external clients who request items or copyright-free photographs or images. Additionally, photocopying, binding, and printing services are offered, and it is often used for photo shoots, interviews, and other media related activities.

In summary, these are the key concepts that support the understanding of how astronomers started and developed the SAAO Library: astronomy and astrophysics (the study of physics beyond the Earth, in the case of the SAAO, using optical telescopes); the Royal Observatory of the Cape of Good Hope (the first scientific institution established in the Southern Hemisphere in 1820 to do astronomical observations of the southern skies that later became the SAAO); the current SAAO (the National Research Facility for optical and infrared astronomy in South Africa that came into existence after South Africa became independent of Britain in 1961); scientific research in astronomy (optical astronomical research, published in core journals is firmly entrenched at the SAAO); and the SAAO Library (that provides researchers and astronomers with access to a variety of resources).

**Methodology**

Data generated from the qualitative research study on which this article is based, were collected in an exploratory manner and then interpreted using inductive reasoning through content analysis. Picardi and Masick[24] explain that content analysis is a technique used for coding and categorising qualitative data. According to Corbin and Strauss coding is more than just making sense of raw data; it should be seen by the researcher as 'mining' the data, digging beneath the surface to discover 'the hidden treasures contained within data'.[25]

The three data sources that provide the evidence for the argument of this article that astronomers started and developed the library at the SAAO, were semi-structured interviews, literature and primary documents. This allowed for triangulation, a means of comparing information from different data sources and instruments and not just relying on one source of data, in this way verifying that any conclusions emerging from the research was substantiated with valid evidence. Creswell and Creswell[26] confirm that triangulation is a means of adding validity to a study because it justifies themes emerging from different sources of data. The exploratory methods for gleaning[27] (gathering information bit by bit) valid data from the sources is now discussed in detail.

For interview data, theoretical sampling was used from the start of the study's research process. According to Walliman, 'theoretical sampling is a useful method of getting information from a sample of the population that you think knows most about a subject'.[28] In this form of sampling, the researcher uses personal judgment to choose a sample to help respond to the critical questions a research study. The sample of interview participants for the study was therefore purposefully selected because the researcher 'handpick[ed] the cases to be included in the sample on the basis of … judgment of their typicality'[29]. Moreover, according to Glaser and Strauss, theoretical sampling is 'the process of data collection for generating theory whereby the analyst jointly collects, codes and analyses … data and decides what data to collect next and where to find them in order to develop …. theory as it emerges'.[30] This escalates into '...

snowball techniques, where you contact a small number of members of the target population and get them to introduce you to others'.[31] Nieswiadomy explains how 'the researcher looks for certain subjects who will be able to shed new light on the phenomenon being studied [and] … diversity rather than similarity is sought in the people that are sampled'.[32] Due to the scope being limited to that of a master's research study, the researcher initially targeted a group of 15 individuals to interview, and obtained referrals to other relevant individuals who could contribute towards the data collected, thus adding to the sample which finally totaled the 18 participants. Eighteen semi-structured interviews were conducted on a diverse range of participants across the field of astronomy (astronomers, librarians, historians and SAAO staff members) both in South Africa as well as internationally, with a collective experience of three hundred and sixty-nine years and with an average of twenty and a half years of experience in the field of astronomy, making the data rich and reliable. The participants were asked to respond to, amongst others, questions relating to the establishment of astronomical libraries as well as the role of astronomers and librarians in the development of the LIS at the SAAO and elsewhere.

The second source of data was literature accessed through a search of literature for astronomical LIS conducted on the SAO/NASA Astrophysics Database System as well as Web of Science, which resulted in the selection of twenty-four of the most relevant sources responding to the objectives of the research study that includes the history of astronomy LIS at the SAAO. Of these, eighty percent were papers delivered at Library and Information Services in Astronomy (LISA) conferences by very experienced astronomy librarians making the data very valid and relevant. The other twenty percent of literature took the form of monographs, peer-reviewed journal articles, papers from the International Astronomical Union's general assemblies, and theses, to name a few, all of which were relevant to the research.

A third source of data of relevance to astronomers starting and developing the library at the SAAO came in the form of documentary evidence, identified by searching the SAAO archive catalogue for documents that responded to the study's objective. This resulted in the selection of ninety-five primary documents (ranging from 1832 to 1980) including astronomers' notebooks, previous librarians' notes, annual reports, accession registers, card catalogues, correspondence (letters, memos and notes), official memoranda, speeches, scrap books, and other primary documents from the SAAO.

Data were analysed and interpreted, resulting in patterns or trends grounded in the data emerging from the data sources at the end of the research process. The result were the three overarching themes: library management, access to information, and the value of the SAAO LIS. These merged seamlessly and often overlapped as they highlighted how astronomers started and managed the SAAO Library for one hundred and fifty years.

**Overarching themes supporting the argument**

As revealed earlier, informed by the three overarching themes that emerged from the research study, this article argues that astronomers were the original librarians who established and maintained the SAAO Library. The article will now take a closer look at the three overarching themes that underscore this argument.

***Library management***

The theme Library Management reveals how important libraries are to astronomers and that they were the first to start and manage the library at the SAAO. It discloses how four Astronomer Royals from the 1820s to the early 1900s – Revd Fearon Fallows (served 1820–1831), Sir Thomas Maclear (served 1833-1870), Edward James Stone (served 1870-1879), and Sir David Gill (served 1789-1907) – also served as trustees and committee members on the then-called South African Public Library[33] (now the Cape Town campus of the National Library

of South Africa) confirming how significant libraries were to them. Many mentions in the literature covering the history of astronomy in South Africa from the 1820s through to the beginning of the twenty-first century, such as the following one made by Glass and Catchpole in 1980, highlights what is required for astronomers to do their research: 'for work, computational facilities and a good library of astronomical journals, books and atlases are essential'.[34] Astronomers knew this and so they are pioneers not only in the field of astronomy but also in that of setting up an astronomical LIS at the SAAO.

Interview participants, mainly the librarians and historians, gave their opinions and views as to the reason for the need of astronomers to have a library and telescopes to do astronomical research. One participant (Participant 8, interviewed on 8 December 2020) pointed out the fact that in the early 1800s, the Cape was very far away from modern astronomical research being conducted in the Northern Hemisphere, hence the need to establish a library on arrival of the first Astronomer Royal at the Cape. In the early 1800s the nearest library with astronomical scientific resources would have been at the observatory at Bogotá in Colombia about 5000 kilometres to the west in South America, and a few in the north, in Europe, about 6000 to 7000 kilometres away (for example Palermo Astronomical Observatory, Sicily, established in 1770; the Royal Observatory in Madrid, established 1790; Greenwich Royal Observatory Greenwich, established 1675).[35] The nearest library in South Africa at the time, the South African Public Library was and still is 8 kilometres away, and had only just been established two years before the Royal Observatory at the Cape of Good Hope, in 1818.[36] This could be seen by some as a reactive approach, that is, the need to set up and take responsibility for a library to do astronomical research, and the study found that it was indeed a lived experience for astronomers working at the SAAO from the start. Responses from the librarian participants also pieced together the role of the Astronomer Royal in the development of the SAAO Library collection. For instance, a participant (Participant 6, interviewed on 8 December 2020),

commented on how, in the 1850s when one of the government departments in London was discarding books, the Astronomer Royal at the Cape requested to have them, which accounts for a large proportion of the collection at the time. Evidence supporting this comment can be found in the SAAO Library archive.

To further strengthen the argument, half of the participants interviewed during the study recognised that astronomers started, managed, and took responsibility for the library at the SAAO from the start, as they began official astronomical research at the Cape in the 1820s, up until the 1970s when the need for the services of a professional librarian came about. At this point the library had developed beyond the capacity of astronomers to take it on as an extra duty and the situation had 'escalated to a point when, in 1975, the SAAO Director Michael Feast, wrote to the South African Council for Scientific and Industrial Research (CSIR) the then administration, regarding the urgent need for order in the library and a system to find things'.[37] According to an interview participant (Participant 6, interviewed on 8 December 2020), this led to the appointment of a part-time librarian and eventually a professional librarian in 1979 who catalogued and arranged the material according to the University Decimal Classification system and introduced a card issue system all of which were requested in the same letter.[38] Nonetheless, the role of astronomers in maintaining the library continued, as was aptly expressed by an astronomer interview participant (Participant 1, interviewed 14 January 2021), who had the following to say:

> when I first arrived at the observatory [in 1975] as a relatively young astronomer, … the astronomer who was responsible for the library was the director. The director considered the library to be all important … the librarian reported directly to him. He ordered all the books.

This suggests that even with professional librarians managing the library, astronomers still played a significant role in developing the SAAO Library and its collection.

Further evidence for the argument of this article comes from the primary documents analysed. They reveal how, from the early years (the 1800s), astronomers and other observatory staff were given the responsibility of the library, for example, an astronomer's notebook circa 1879 housed in the SAAO Library archive[39] outlines the library duties of third assistant as 'The Librarian will be responsible for all books contained in the Library' and 'Members of the Observatory Staff who desire to consult books must receive them from the Librarian who will record the date of giving and of return'. This is perhaps the earliest recording of a librarian's job description at the SAAO and reflects how the duties that come with administering a library at the then Royal Observatory of the Cape of Good Hope were left to astronomers to take on as an additional duty. Many of the annual reports made by the Astronomer Royal at the Cape to the British Admiralty from 1854 to 1948 also offer evidence to confirm how the duty of the librarian at the Royal Observatory at the Cape was left to astronomers. An example of such a report can be seen in the Report of Her Majesty's astronomer at the Cape of Good Hope to the Admiralty for the year 1896[40] where the Astronomer Royal comments about 'the earnestness and success with which Mr Innes [an astronomer] has applied himself to extra-meridian observations, in addition to the satisfactory performance of his duties as Secretary Librarian and Accountant'.

Documents reveal how the first library rules were introduced by astronomers before becoming more strictly enforced as the collection grew and professional librarians took up duty in the mid-1970s. Later documents from the 1980s, also point out how circulation (that is, the issuing out and the return of library materials) was done according to an honour system a system that

relies on the honesty of those borrowing the library material to return the material to the library to be shelved away. This honour pledge[41] took a circular shape with the signatures of those in agreement surrounding the centre with the inscribed pledge reading:

> We the circumscribed request that rules be established and enforced to prevent the taking out of unreasonably large numbers of books from the library and the keeping of them for a very long time. It is suggested that a maximum of twelve items be allowed at a time and that a limit of two months be placed on the time they may be kept for.

These primary sources therefore revealed, on paper, how astronomers managed the day-to-day running of the library at the SAAO, providing clear evidence for the argument of this article that astronomers started and developed the astronomical library at the SAAO.

Furthermore, the evidence for this article's argument is strengthened in the literature[42] that note this trend of how astronomers started and developed observatory libraries across the world. Also, the history of astronomy in South Africa, extensively covered in the literature[43], as well as primary documents studied in the research study[44], points to how Fearon Fallows (1788-1831), the first Astronomer Royal at the Cape, brought books with him and this saw the beginnings of what the SAAO Library is now. Several of the global literature sources support this idea that astronomers had a hand in not only building the collections of astronomical libraries from scratch, but also in developing it in later years through recommendations and input and sharing and exchanging of library items amongst astronomical institutions around the world.[45] This emphasis is not surprising, given that organising data and information are what librarians and astronomers have in common and the development of astronomical libraries by astronomers appears to be a natural consequence of events to further their research into the Universe. This is why the discipline of astronomy has taken the lead in also developing the

very first technical libraries through maintaining databases such as the Astronomy Database System (ADS), established in 1988, which is a database that astronomers rely on very much even today.[46]

***Library value***

A good library is appreciated as a valuable tool within the area of scientific research including astronomy. The great astronomer Ptolemy[47] believed that knowledge and data were a resource to be stored as scrolls in libraries for further use. Copernicus[48] had a rich personal library and started buying books when he enrolled at university according to his interests in mathematics, astronomy, medicine and law. Galileo Galilei[49] had more than five hundred books in his private library and Carl Sagan[50] a famous astronomer, is known to have said 'books break the shackles of time. A book is proof that humans are capable of working magic'. Through time, outstanding astronomers around the world have always had access to good research and reference material provided by libraries and were avid supporters of libraries.

The research study's findings reflect how from the time of its establishment under Britain in 1820, astronomers valued libraries as a tool for doing astronomical research at the SAAO, even before professional librarians were employed from the 1970s through to today. Value is a deeply human experience and therefore the high value placed on the library is an important finding of the study as it supports the argument that astronomers established and developed the library at the SAAO, why they did so, and why this is significant. One example of the value of the library to astronomers was revealed in documents reviewed during the study showing how in the 1980s, when the hoarding of library material by astronomers in their offices became a problem at the Royal Observatory at the Cape, the librarian spelt out the loan procedures in the April, 1980 issue of the SAAO Library newsletter, *Library News,* highlighting the value astronomers placed on library material. Five literature sources from the study also highlight

this point.[51] For instance, even in more modern times, such as in 2005, academics such as Carol Tenopir et al. outlined in their article 'Relying on electronic journals: reading patterns of astronomers' published in the *Journal of the American Society of Information Science and Technology,* how astronomers read 24% of their time for background research, 47% for primary research and how they also read 10% of the time for current awareness.[52]

Additional evidence from the literature and the documents, reflect the essential need to read and keep abreast was also highlighted by the interview participants who all agreed that the library was valuable to researchers and astronomers throughout the history of astronomical research at the SAAO. Ten of the eighteen participants recognised and acknowledged the value of the library. One participant (Participant 6, interviewed on 8 December 2020), who worked at the library during the 1970s through to the early 2000s claimed that:

> More than one visiting astronomer told me that the SAAO Library was the most outstanding one in the world, because they had access to journals from volume one, they had access to the very early work, going up to the most recent, the visitors who came to research specially at the observatory were usually interested in the historical works because we had them.

Furthermore, interview participants also commented on the rich historical value and the high quality of the SAAO Library, making it one of the best astronomical libraries in the world, with one astronomer (Participant 7, interviewed on 2 December 2020), with 20 years' experience working at the SAAO, also making this point very clear: 'and you know, [I've worked at] other really good institutions, but their library wasn't anywhere near as good as this. Absolutely SAAO has a fantastic library really, completely, that gives access to everything'. In keeping

with this theme of library value, eleven of the eighteen participants contributed responses that pointed towards the actual make-up of the valuable library collection at the SAAO Library and how it developed and was preserved by astronomers over the 200 years of astronomical research at the SAAO. Therefore, all of these findings from the research, referring to the value of the SAAO Library to astronomers, contribute evidence to prove that astronomers, whist conducting astronomical research at the Cape, developed and managed valuable collections that evolved into the astronomical library at the SAAO.

***Access to information***

The third overarching theme, the need for access to information and literature, is what drove both the origin and evolution of LIS at the SAAO by astronomers and naturally resulted in the establishment of LIS in astronomical research. This is the basis for understanding how LIS at the SAAO evolved historically within the context of astronomical research at the SAAO. All the interview participants agreed that access to a library has always been important for astronomical research throughout the history of the SAAO. Astronomers and librarians were the main interview participants contributing to this theme, thereby acknowledging the importance of access to LIS to conduct astronomical research throughout the development of astronomical research in South Africa. All the astronomers interviewed pointed out how important access to journals and the latest research has been for astronomical research over the years. Sixteen of the eighteen participants interviewed saw the value of the library in providing access to the latest research results published in journals and to the literature that astronomers need to consult to conduct their astronomical research. One participant (Participant 13, interviewed on 30 Jan 2021) commented:

> and you know that that's an act, that's a daily task that any reputable scientist does, they read the new literature every day, because they have to keep on the front line. So that's

what the primary function of the library is, supplying the scientists with up-to-date information about the research going on around the world.

This is corroborated with evidence from the literature sources that pointed to the importance of access to scientific information within the context of astronomy in South Africa as well as internationally and throughout the evolution of LIS provision at astronomical institutions including the SAAO. As did the participants interviewed, the literature especially highlighted the importance of access to journals as fundamental for conducting astronomical research and reflected the value that astronomers place on having access to scientific literature through an astronomy library and information service to keep astronomers abreast with developments in the astronomical research field.[53] It was clear from the findings that essential access to journals and other scientific literature was within the underlying understanding and experiences reflected in the evidence. Access therefore supports the rationale that astronomers started and managed libraries because they needed access to it as a crucial tool to do astronomical research.

**Conclusion**

This article has presented evidence from the findings of a research study that astronomers at the SAAO actively set up and developed an astronomical library and took on the duties and responsibilities of a librarian, as did other astronomers around the world. The three overarching themes discussed in this article opens further debate around whether astronomers in South Africa and elsewhere still value and access LIS and participate in developing libraries today given the fact that the history of astronomical libraries is intricately linked with that of astronomical research activities at observatories around the world. These conversations and debates pave the way for further studies and serve to extend the existing literature in LIS and astronomical research for use by other researchers in this and related areas in South Africa and

around the globe. It builds an awareness around the idea that just as astronomers started, managed and developed libraries during their quest to understand the Universe, so it is possible that professionals in other disciplines may also have played such a critical role, historically, in the establishment of LIS in their disciplines. Finally, this article adds a significant South African and African contribution to international historical astronomical LIS literature.

(5534 words)