

“Boletín de los Observatorios de Tonantzintla y Tacubaya” 1952 to 1972: Preliminary results of a bibliometric study

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Abstract. We analyzed the scientific production of astronomers published in the first Mexican journal of astronomy, the *Boletín de los Observatorios de Tonantzintla y Tacubaya* (BOTT), from 1952 to 1972. The bibliometric behavior of the BOTT is provided, identifying the most productive authors, article usage, as well as impact and visibility.

1 Introduction

Editing the publications of the Mexican astronomical community started in 1880 with the first volume of the *Anuario Astronómico Nacional*, which continues to be published today. Ten years later, in 1890 publication of the *Boletín del Observatorio Astronómico de Tacubaya* started, ending in 1896. In 1952, fifty six years later and in a different Mexican historical time, the *Boletín de los Observatorios de Tonantzintla y Tacubaya* [BOTT] was published [1].

The first issue of the BOTT was published in January 1952 with a 9 page article in Spanish, with an abstract written in English, by the Mexican astronomer Guillermo Haro. The first five issues copies of the BOTT were mimeographed, a very popular, artisanal and inexpensive way to print at that time and it was disseminated to the international astronomical community by postal mail (Fig. 1).

The BOTT was totally financed by the *Instituto de Astronomía* of the Universidad Nacional Autónoma de México (UNAM). The back of the title page of volume 5, number 35 (1970), specifies that the BOTT was partially sponsored by the *Instituto Nacional de la Investigación Científica* and for the first time included the names of the editorial board members: Guillermo Haro, Paris Pismis and Silvia Torres-Peimbert.

The BOTT was published from January 1952 to December 1972, and it was the main publication where Mexican astronomers published their research results. It was founded and edited throughout the 20 years mainly by Guillermo Haro, “to publish only the original astronomical research, which, were not being published elsewhere” [2]. The main objective of this work is to show preliminary results of the BOTT bibliometric behavior.

2 Methodology

The BOTT was not a peer-reviewed publication, the works were not included in any commercial databases, therefore the sources used for this research were NASA’s Astrophysics Data Systems and

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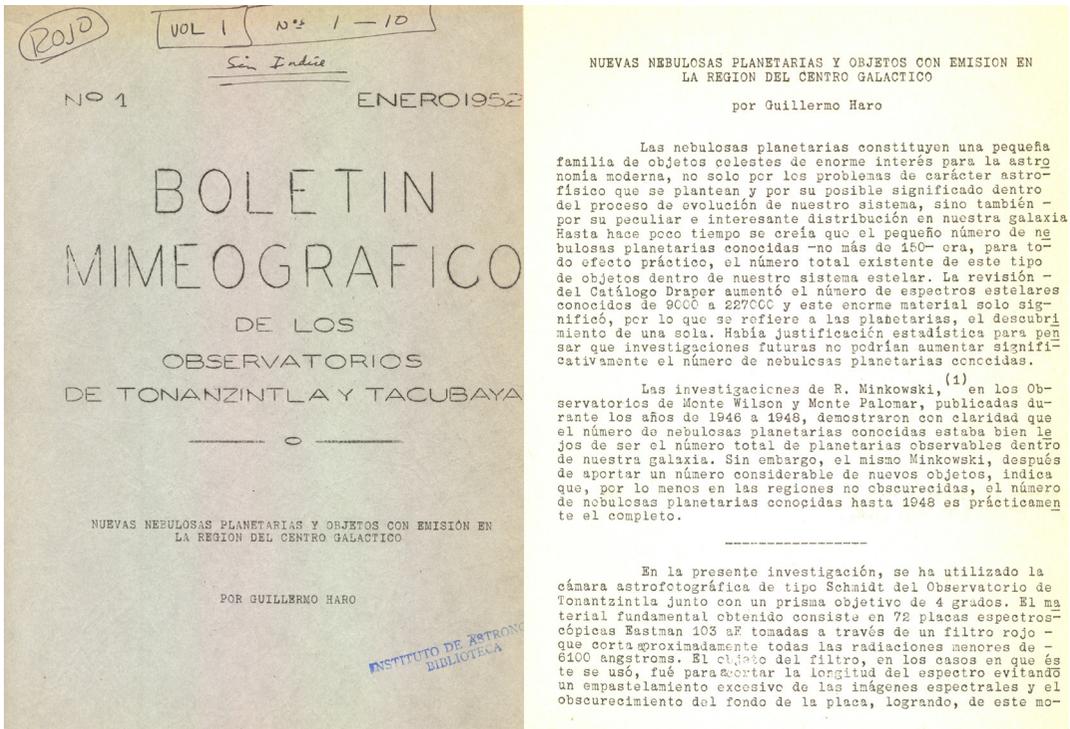


Figure 1. First issue cover and first article title page in the BOTT.

the BOTT itself, both in the printed version available at our Library as well as digital versions available online.¹ The BOTT published 176 papers in 6 volumes with 1,698 references and received 2,407 citations until April 2017. In order to facilitate our study three databases were made, one for scientific production, a second one for the references and a third one for citations (results which are not included in this work). Standardizing authors, titles and institutions in order to appear under a single and unique denomination was done. The software used to analyze the data was Microsoft Excel®

3 Results

Publication date and the number of articles published by volume number were found to be irregularly distributed in time. Some of the volumes included just one article. However, in 1970 the publications reached 21 articles, being the highest number of articles published in a year in the BOTT (Fig. 2).

Principal author analysis shows that 102 of the 176 articles published in the BOTT were written by 6 authors; a 57.95% of the total scientific production reported (Fig. 3, left)

A strong collaboration between Mexican and American astronomers, from prestigious observatories and university departments, was observed. Collaborations with other nations included astronomers from the former Soviet Union, N. Ireland, Argentina and Chile (Fig. 3, right).

¹www.astroscu.unam.mx/bott

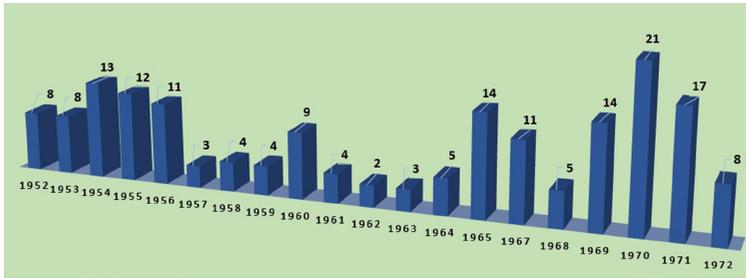


Figure 2. Number of articles published per year.

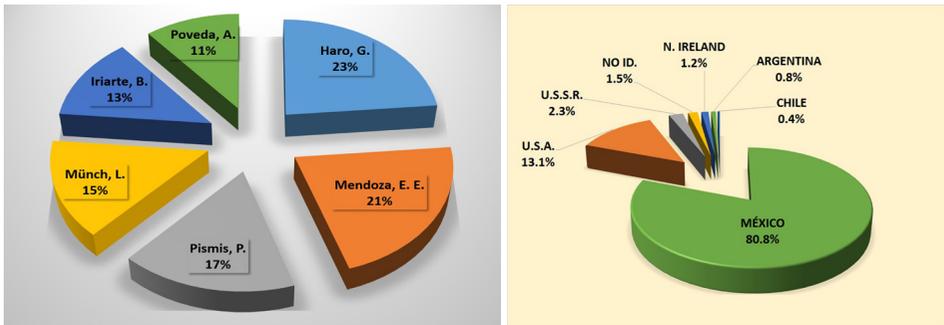


Figure 3. (Left) First author distribution. (Right) Distribution of BOTT publications by authors' affiliation.

The BOTT published original works on mainstream topics in astronomy and astrophysics. Six articles received 1,123 cites, which means 46.7% of the 2,407 citations received. The distribution of Authors, Article Title, Number of Citations received and percentage is shown in Fig. 4 .

AUTHOR	ARTICLE TITLE	CITATIONS	%
Peimbert, M.	Chemical Abundances in Galactic HII Regions	393	16.33
Poveda, A.	Run-away Stars as the Result of the Gravitational Collapse of Proto-stellar Clusters	175	7.27
Johnson, H. L.	The colors, Bolometric corrections and effective temperatures of the bright stars	174	7.23
Mendoza, E. E.	Multicolor Photometry of Stellar Aggregates	155	6.44
Mitchell, R. I.	Photoelectric Photometry of Cepheid Variable Stars	119	4.94
Haro, G.	Preliminary Note on Blue Galaxies with emission lines	107	4.45
		1123	46.66

Figure 4. Distribution of the six most cited articles published in the BOTT.

The Bradford's law was applied to the total data sample of references cited on the BOTT. More than half of the references (59.48%) are in a core list of six journals titles, that included the BOTT, as shown in Fig. 5. The latter indicates that astronomers who published in the BOTT used mainstream science journals of astronomy and astrophysics.

The first scientific document published in the BOTT written by Mexican women astronomers, was written by Guillermina and Graciela González (who were sisters) in 1952 entitled: “*Estrellas de alta luminosidad en las vecindades de las constelaciones del Cisne y Cefeo*” (NASA ADS title: A finding list of high luminosity stars around Cygnus and Cepheus); see Figure 6.

Journals	Docs.	No. docs.	Cumulative Journals	Cumulative docs.	% Cumulative docs.	%Cumulative Journals	JOURNAL TITLES
1	585	585	1	585	34.45	0.40	The Astrophysical Journal
1	199	199	2	784	46.17	0.80	Boletín de los Observatorios Tonantzintla y Tacubaya
1	67	67	3	851	50.12	1.20	The Astronomical Journal
1	64	64	4	915	53.89	1.59	Monthly Notices of the Royal Astronomical Society
1	60	60	5	975	57.42	1.99	Publications of the Astronomical Society of the Pacific
1	35	35	6	1010	59.48	2.39	The Astrophysical Journal Supplement Series

Figure 5. Journals used by astronomers publishing in the BOTT.

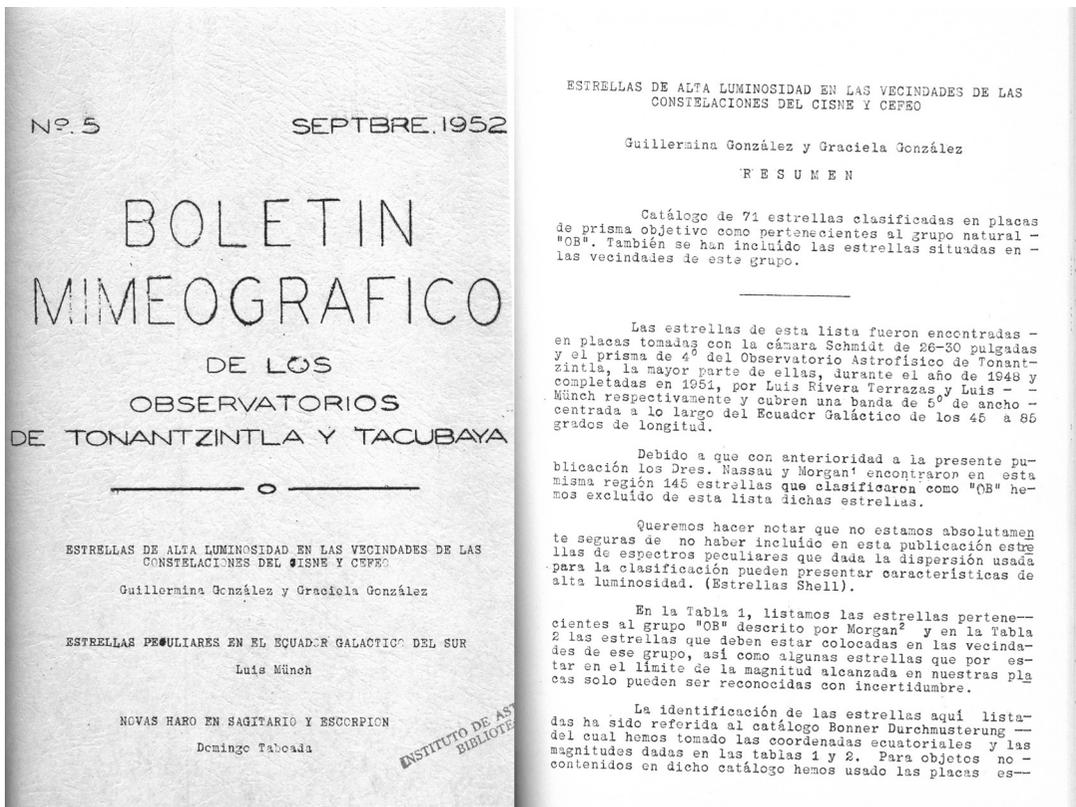


Figure 6. First document published in the BOTT by Mexican women astronomers.

The BOTT had a strong presence of women with 5 as principal authors. The gender distribution of principal authors in the BOTT indicates that 31 articles of the 176 articles were written by a woman; that is a 17.6%. Women authors' distribution is shown in Fig. 7.

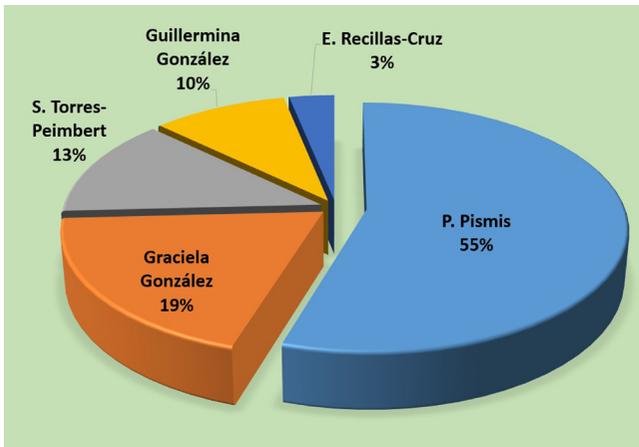


Figure 7. Distribution of the BOTT publications by women as first author.

4 Final Remarks

- An emerging relationship with Latin American and international astronomers was initiated by the BOTT; this was confirmed by the results of the study of the *Revista Mexicana de Astronomía y Astrofísica* 1976-2000 by Mata Acosta [1]
- The BOTT also published the first research articles on optics in México [3].
- A complete citation analysis is ongoing and a paper is being prepared for publication.
- The BOTT and Mexican astronomy was very open to female research, as indicated by the publication of works by Pismis, the González Sisters, Torres-Peimbert (current president of the IAU) and others. A study on the participation of women in astronomy in México at the middle of the previous century is underway.
- A study of the recent Mexican scientific production in astronomy and astrophysics is planned in order to search patterns of coauthorship and international collaborations.

Acknowledgments

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- [3] A. Cornejo Rodríguez, *The First Years of Optics in Mexico and the role of the Boletín de los Observatorios de Tonantzintla y Tacubaya on its development in Highlights of Boletín de los Observatorios de Tonantzintla y Tacubaya*, edited by S. Torres-Peimbert, O. López-Cruz (2011), Vol. 39 of *Revista Mexicana de Astronomía y Astrofísica Conference Series*, p. 109–115

