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DOI: 10.1111/1600-0498.12282

SPECIAL ISSUE ARTICLE

Centaurus WILEY

Putting astronomy on the map: The launch of the first geographical-astronomical journal

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SPECIAL ISSUE
Editorship and the Editing of Scientific Journals, 1750–1950

GUEST EDITORS
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This Special Issue was selected by a dedicated ESHS committee after a public call for special issues.

Abstract

In 1798, astronomer Franz Xaver von Zach in Gotha and publisher Friedrich Justin Bertuch in Weimar launched the first astronomical-geographical journal, *Allgemeine geographische Ephemeriden* (*AGE*). The journal was intended to provide professionals and interested lay readership with high-quality maps, information about new discoveries, and statistical data. The periodical was shaped by Zach's expertise and Bertuch's economic potential. Their extraordinary collaboration and their different conceptions of a specialised periodical also played a role in how the journal developed. This paper examines the collaboration between the editor and the publisher of the *AGE* and their different ideas of the journal's purpose. By analysing the content of the *AGE* during Zach's time as editor, as well as shortly thereafter, and comparing them to Zach's second journal, the *Monatliche Correspondenz*, this paper shows the differences between a scientific journal aimed at a professional readership and one intended to address an interested lay readership by providing information, maps, and illustrations. The following pages illustrate how Zach's and Bertuch's ideas of a successful journal were reflected in the structure and content of the periodicals.

KEYWORDS
astronomy, editor and publisher, geography, German lands, scientific journal

In February 1806, well-known Weimar entrepreneur and publisher Friedrich Justin Bertuch (1747–1822) received a curious letter from someone claiming to be his former friend and partner, the astronomer Franz Xaver von Zach (1754–1832). It had come from Gotha and was written in strange, spiky handwriting; its content was confusing and contradictory. The author complained about an insult in Bertuch's journal, the *Allgemeine geographische Ephemeriden* (*General Geographical Ephemerides*; *AGE*) and asked to have their letter published in the next issue as a response and defence.[1] However, the author also mocked the astronomer's outstanding work as a "manager of science."[2] He asserted that Zach's work was not contributing to astronomical research, but was only meant to entertain his employer, the Duke of Saxe-Gotha-Altenburg. He further argued that the journal was only useful for telling "when it is true noontide in Gotha so as not to miss the right time to serve the soup."[3] The author did not acknowledge Zach's work as the editor of two successful journals nor his effort to support the scientific community by providing opportunities for researchers to exchange and communicate their discoveries and research measures.

Having justified doubts about the true authorship of the letter, Bertuch decided against publishing it. He suspected that it was a fraud perpetrated by the new Duke of Saxe-Gotha-Altenburg, August (1772–1822), who was famous for his odd sense of humour and did not share his late father's passion for natural history and astronomy.[4] However, while the originator of this curious prank might have hoped to cause trouble between Bertuch and Zach, the letter was most likely an uncomfortable reminder of their first dispute and the launch of the *AGE* as the first geographical-astronomical journal, 8 years prior.

Bertuch's successful publishing house and Zach's position as an astronomer in Gotha have already been studied from different perspectives. Their collaboration, however, is often seen as a mere detail compared to their activities as an outstanding businessman and publisher or astronomer.[5] However, it takes much more to make a successful geographical-astronomical journal than the fundamental interests of an editor or publisher. As Taszus shows in her study of the 19th-century journal for natural history, *Isis*, the relationship between editor and publisher, as well as the publisher's influence, were important factors in shaping the journal.[6] The present study provides insight into a similar case, the *AGE*, which has not yet received serious academic attention, and further illustrates the various elements that inform the conception of a scientific periodical. It aims to give a more differentiated idea of the editor's and publisher's roles and understanding of their work, as well as the challenges and considerations attendant on launching a specialised German periodical at the end of the 18th century. Studying the launch of the *AGE* and comparing the journal to its successor also sheds light on the many possible forms a journal could take and the factors required to maintain one. This analysis highlights the connection between the editor's and publisher's ideas of a specialised journal, the need to find a supporting readership, and the content that defines the journal. Finally, this case study addresses the often-overlooked fact that, although Bertuch's many projects made him one of the most active entrepreneurs of the late Enlightenment, they had their limits and could sometimes hinder the progress of knowledge.

The *AGE* was not only the first journal of its kind, but was also a result of the need to exchange information quickly among astronomers and geographers, and eventually to have a shared point of contact at a time when scientific research fields were rapidly developing into more clearly defined and professionalised disciplines.[7] While Bertuch aimed to attract educated lay readers interested in general geographical topics, Zach wanted to edit a

[1]The letters from Zach to Bertuch are located in the Goethe- und Schiller-Archiv in Weimar, Germany (hereafter GSA), with the signatures GSA 06 / 2164 (from 1 April 1790 to 18 March 1798), GSA 06 / 2166 (9 December 1798 to 22 April 1799), GSA 06 / 2167 (31 May 1799 to February 1806) and GSA 06 / 5544. The last bundle contains the correspondence concerning "the retirement of Mr v. Zach from the geogr. Ephemerides" which is separated from the other letters. The letters have yet to be fully published (Wattenberg & Brosche, 1998). I transcribed the letters during an internship, together with Johannes Schmidt. If not mentioned otherwise, the quotes are taken from the originals. All translations are mine.

[2]Balázs (2004).

[3]"Zach" [alleged] to Bertuch [Letter] (1800, Feb.), GSA 06 / 2167.

[4]Kotzauer (2017).

[5]Christoph (2012); Middell (2002); Brosche (2008).

[6]Taszus (2009).

[7]Breidbach & Ziche (2001).

scientific journal. Although combining both concepts gave the *AGE* a secure start, it soon turned out that the differences were too large for the project to be maintained.

1 | THE IMPORTANCE OF ASTRONOMY AND THE DEMAND FOR INFORMATION

Contrary to the anonymous letter writer's opinion, the former Duke's interest in astronomy and geography was not just an aristocratic caprice, but reflected his sense of the importance of astronomy for the welfare of a state. At the end of the 18th century, there was a demand for accurate geographical and astronomical data concerning, for example, distances, coast lines, heights, and inclines, which often could not be satisfied. Surveying the land and exploiting its resources as well as being able to move goods over vast distances were essential requests of the government and an increasing number of merchants. Therefore, a rising number of different people—from politicians and aristocrats to professionals, surveyors, tradesmen, and interested enthusiasts—asked for ways to inform themselves about those topics.[8] Additionally, educated citizens increasingly demanded historiographical, economic, and ethnological information, as well as travel reports and descriptions of foreign countries, all of which fell under the term of "geography" in a broader sense.[9]

Significantly fewer people were interested in astronomical calculations and observations of the sky, however, and those who were also practised it, since it was often too abstract or complex to only read about it. Astronomy was by nature a more scientific subject, closely connected to mathematics and—as the letter about Zach shows—often regarded as purely theoretical and of little use in everyday life. However, astronomy was essential to train surveyors, obtain reliable data, and develop new instruments, especially for naval purposes. Geographers and cartographers needed astronomical skills as well as opportunities and sources to extend their knowledge. The astronomical observatory in itself was a place of scientific cooperation, combining research and teaching.[10] Although astronomy was more abstract than geography, it was hardly less important.

Other disciplines relied on the exchange of sources and information between practitioners. Astronomers were well aware of the fact that the sky and the earth are too great an object of research to be investigated by one person alone.[11] They had to become "information specialists, experts in collecting, communicating, and analysing large amounts of data" and often maintained vast networks.[12] Traditionally, their primary medium of communication with each other had been letters, whose content was not publicly available. Using this method to share news was slow and cumbersome and could lead to misunderstandings.[13] Many books or almanacs, which were often used to publish large amounts of data, appeared only once a year and were therefore not suitable for reporting discoveries.[14]

Zach's position as a head astronomer of Gotha and his vast network helped him to stay in contact and become pivotal in the flow of information between astronomers. However, he had first-hand experience of the problems inherent in communicating news to colleagues and made several attempts to solve them before becoming an editor.

Zach was born in 1754 in the Hungarian capital Pesth and worked as an engineer and cartographer for the Austrian Empire before he travelled to Paris and London in the 1780s, where he studied astronomy.[15] In London, he met Duke Ernst II, who wanted to build an observatory in the capital of his small duchy, Gotha, and needed somebody capable of implementing this project. Zach's experience as a geographer and astronomer made him a suitable

[8]On the development of geography in Germany during the 18th and early 19th centuries, see Christoph (2012, pp. 53–56).
[9]In the case of travel reports, it was satisfied by an even vaster number of books about that topic: see Hentschel (1999); Baasner (1997).
[10]On the development and purpose of astronomy in the 19th century, see Aubin, Bigg, & Sibum (2010).
[11]In order to observe hard-to-trace celestial objects such as comets or planets, astronomers in Europe agreed to divide the sky into parts which they had to observe. See Vargha (2005, pp. 54–55).
[12]Widmalm (2010, p. 175).
[13]As was the case with Piazzi's discovery of Ceres: Cunningham, Marsden, & Orchiston (2011).
[14]Zach (1799b, p. 18).
[15]On Zach's time in England, see McConnell (2004).

candidate, and his connections to instrument makers helped equip the new observatory with the best tools for surveying the sky.[16] In 1789, the building was finished (although it was eventually built on the Seeberg, a hill an hour away from Gotha due to better observation conditions), and Zach was made its director and head astronomer.[17] He now had a modern observatory, but still needed exchanges with colleagues to gain more data and information. He therefore constantly strove to expand his network and stay in contact with important astronomers, but keenly felt the lack of a medium to spread news quickly.[18]

In 1793, he convinced his colleague Johann Elert Bode (1747–1826), the editor of the *Astronomisches Jahrbuch* (*Astronomical Almanac*), to add supplementary volumes to his almanac, which contained reports and essays on astronomical topics. However, the book appeared only once a year, and the supplementary volumes did not appear until 1795, 1797, and 1804. They might still have offered an opportunity to publish an essay, but it was even slower than sharing the information by letter. Zach, therefore, turned his attention to other options.[19]

One of them presented itself in the form of the increasingly popular new format of the scientific journal, which was regularly published and therefore better suited to spreading news, discoveries, and arguments. It was also often quicker and less complicated than circulating discoveries in letters or books. The number of journals increased significantly at the end of the 18th century, although many of them were short-lived.[20] Especially in the German lands, where distances between scholars were vast and written exchange crucial, journals became very successful. The lack of a scientific centre or institution such as the Académie des sciences in Paris or the Royal Society in London enabled ambitious German editors, often university professors, to launch their journals in order to back their disciplines or preferred theories.[21] While editors in other countries hesitated to specialise in one topic and risk having only a small number of readers, German editors such as Lorenz von Crell (1744–1816) and Friedrich Albrecht Carl Gren (1760–1798) proved that it was possible and necessary to provide a platform for discussion and exchange for the developing natural sciences.[22]

Early attempts to support geographers in this regard were rare and astronomical journals were unknown at that point.[23] Some periodicals, such as the *Beiträge zur Geographie, Geschichte und Staatskunde* (*Contributions to Geography, History and Political Studies*) by Johann Ernst Fabri (1755–1825) or Eberhard August Wilhelm von Zimmermann's (1743–1815) *Annalen der geographischen und statistischen Wissenschaften* (*Annals of Geographical and Statistical Sciences*), provided geographic information. However, Fabri's and Zimmermann's periodicals were abandoned after only 2 years.[24] The result was that there was neither a geographical nor an astronomical journal available in 1797.

Zach was not the only one to recognise the lack of a suitable medium. Friedrich Justin Bertuch, a successful entrepreneur and experienced publisher from the neighbouring duchy of Saxe-Weimar-Eisenach, saw the chance to remedy this situation in a way that could satisfy everyone. Bertuch's publishing house, part of the so-called Landes-Industrie-Comptoir, was the biggest employer in Weimar, providing work for engravers, illustrators, and painters.[25] It produced a broad variety of commodities, from paper flowers and wallpaper to engravings for children's books, as well as the famous, richly illustrated *Journal des Luxus und der Moden* (*Journal of Luxury and Fashion*).[26] It informed the upper classes about the newest French styles in clothing and furniture, which could conveniently be ordered at the Landes-Industrie-Comptoir. Bertuch also co-established and financed the

[16]McConnell (2004, p. 39); Wolfschmidt (2004).
[17]Brosche (1998, p. 5); Wolfschmidt (1992).
[18]There are several case studies that showcase Zach's collaboration and interaction with his colleagues: the afore-mentioned case of the discovery of Ceres (Cunningham et al., 2011), the so-called first astronomical congress (Herrmann, 1970), Zach's connections to Paris astronomers (Brosche, 2008), and his interaction with the instrument maker Giovanni Battista Amici (Meschiari, 2004).
[19]Herrmann (1968, p. 348).
[20]Fyfe (2016, pp. 388–390).
[21]Crosland (1994, pp. 65–67); Herrmann (1968, p. 350).
[22]Csiszar (2018, p. 135); Crosland (1994, p. 65); Stoeger (2020).
[23]Cunningham et al. (2011, p. 283).
[24]Kirchner (1958, pp. 222–224).
[25]Middell (2002).
[26]Güttler (2013).

Jenaische Allgemeine Literatur-Zeitung (*General Literature Journal of Jena*), a daily journal that aimed to review every new German book and periodical.[27]

In 1796, Bertuch entered the map business in order to meet the demand for high-quality maps. Thanks to his printing house and manufactory, he had the necessary resources and workers. What he lacked was a trained astronomer and surveyor who could provide expertise and had contact with reliable cartographers. Fortunately, he had known Zach since 1790, when he had first contacted him on behalf of his duke, Carl August (1757–1828), for help in building another observatory in Weimar.[28] Bertuch had offered Zach the post of director at the newly founded Landcharten-Verlag.[29] Zach had been "very pleased to hear that the Industrie Comptoir wants to concentrate on the matters of geography, which is a great desire of the German public."[30] He had seen in this offer a chance to provide geographers and astronomers with reliable information and maps, and accordingly signed his first contract with Bertuch on November 6.[31]

Bertuch knew Zach to be a reputable and experienced astronomer who had many contacts, high standards, and a desire to support the research progress of astronomers and "practical" geographers who focused on calculations and measurement. Zach, who had been searching for a chance to strengthen the astronomical community, was eager to take the opportunity offered by Bertuch's resources and his experience as a publisher. On September 1, 1797, Zach signed a second contract, becoming the editor of the first geographical-astronomical journal, the *Allgemeine geographische Ephemeriden*.

2 | THE *ALLGEMEINE GEOGRAPHISCHE EPHEMERIDEN*—A LEARNED JOURNAL?

At first, the astronomer and the entrepreneur working together seemed like an ideal collaboration. Bertuch not only provided the necessary infrastructure to launch and maintain a periodical, but his engravers could also produce illustrations and maps for the journal according to Zach's instructions, which added to its attractiveness. The astronomer's professional expertise, reputation, and connections to potential authors all over Europe supplied the journal with suitable and exclusive content. However, launching a geographical-astronomical journal held its risks and could easily become a financial disaster. The fact that no other geographical or astronomical journal existed might have been an advantage since Zach and Bertuch had no competitors, but it also raised the issue of whether there was even a readership large enough to support such a specialised periodical.

Publishing a journal about geographical, statistical, and astronomical topics was much riskier than printing maps or books about exotic places and exciting journeys. It was important to gain subscribers who were willing to pay regularly and up front.[32] To become an economically sound project, it needed, therefore, to address laymen and -women as well as professionals, by providing not only exclusive data and research, but also entertaining content such as descriptions and maps of exotic foreign regions to keep readers attracted to the *AGE* even if they were not interested in every article.[33] A mixed readership promised a larger number of subscribers and the chance to increase those numbers even further, instead of being limited to a small group of professionals.[34] Additionally, the combination of geographical and astronomical topics ensured a multidimensional perspective and allowed the editors to adjust the content to the readers' demands.

[27]Matuschek (2004).
[28]The observatory in Weimar was never finished, however: Middell (2002, p. 296).
[29]About the Landcharten-Verlag and its successor, the Geographisches Insitut (Geographical Institute), see Christoph (2012, pp. 46–52).
[30]Zach to Bertuch [Letter] (1796, Nov. 6), GSA 06 / 2164.
[31]Zach to Bertuch [Letter] (1796, Jan. 9), GSA 06 / 2164.
[32]Fyfe (2016, p. 387).
[33]From the beginning, Zach saw an opportunity to gain benevolent subscribers, not only among the male aristocracy, but also in the Duchess of Saxe-Gotha-Altenburg, who regularly ordered several copies of maps and other geographical or astronomical prints. See Zach to Bertuch [Letter] (1797, Jul. 24), GSA 06 / 2164.
[34]Topham (2016, p. 309).

The journal's title, *Allgemeine geographische Ephemeriden*, connected geography and astronomy on a literary basis. By creating a hybrid form of *ephemerides*, the genre of astronomical books, which ordinarily contained the positions of stars and other celestial objects, was now extended with geographical information. The *AGE*, as Zach explained in the introduction to the fourth edition, was "*Allgemein*" (general). It was not a journal "only concerning the sciences, which are included in the journal …. We want to point out, that we … broach issues of *every part* of those sciences in this journal."[35]

The periodical was planned to be released monthly beginning in January 1798. It was divided into five sections: exclusive articles, book reviews, map reviews, letters to the editor, and maps and illustrations. The letters were sent by German and other European members of Zach's network of scholars, such as Johann Friedrich Blumenbach (1752–1840), Jêrome de Lalande (1732–1807), and Zach's pupil Johann Karl Burckhardt (1773–1825), as well as the Austrian astronomer Franz de Paula Triesnecker (1745–1817) and the Swabian astronomer Johann Friedrich Wurm (1760–1833), who contributed several articles.[36] Authors of exclusive articles were paid, while authors of book reviews and letters to Zach, which together supplied most of the content, were not.[37]

Every issue was supposed to consist of six sheets of paper or 96 pages and cost six Reichsthaler. However, the editions in the first 2 years varied between 51 and 134 pages. The journal had approximately 100 pages on average, between one and three maps, and, in later issues, portraits of famous astronomers and geographers. The maps and engravings were produced in Bertuch's publishing house in Weimar, but the journal was edited and printed in Gotha.[38]

Zach had committed himself to writing 12 sheets of exclusive articles per year and to add further interesting content based on letters he received from colleagues. Bertuch paid him 300 Reichsthaler for this work, plus 10 Reichsthaler per extra sheet.[39] The scholar and teacher Johann Friedrich Hennicke (1764–1848), who also lived in Gotha, became Zach's assistant editor, but the management of content, arrangements for reviews and maps, and discussions with authors fell to Zach himself.[40] Articles in foreign languages were translated and given commentary, which made them accessible to readers who did not understand French or English or who were unfamiliar with the articles' background. Additionally, Zach busied himself with advertising, finding subscribers, and planning for future issues.[41] He sent copies to well-known scholars, aristocrats and scientific academies, encouraged other publishers to print reviews of the *AGE*, and followed the renowned publishers' secret for increasing the number of subscribers, which is "to mention many people by name."[42]

Although the editor was responsible for the journal's content, Bertuch was extraordinarily heavily involved in planning the editions' content and selecting the contributors. While it was much more common in Great Britain and France that a publisher would organise and pay for an editor to maintain a journal, German journals were mostly initiated and conducted by editors from the universities who used the journals to increase their influence.[43] Publishers might have produced the journal on commission, but were not usually involved in decisions about content.[44] Bertuch, however, coordinated the printing of maps and other engravings for the *AGE* in collaboration with Zach, since these were produced in his printing house. Apart from assessing the appropriateness of contributors, they also discussed matters of organisation such as subscriptions, paper quality, and printing issues.[45] Although Bertuch's collaboration with Zach was never officially announced in the *AGE*, his ideas were already shaping the journal at this early stage.

[35]Zach (1799a, p. IX). Emphasis in original.
[36]Brosche (1998, p. 69).
[37]German editors often paid their authors: Csiszar (2018, p. 4).
[38]Schwarz (2016, p. 71).
[39]Middell (2002, p. 294).
[40]Schwarz (2016, pp. 68–69).
[41]Middell (2002, p. 298).
[42]Zach to Bertuch [Letters] (1798, Jan. 29), GSA 06 / 2164; (1797, Jan. 22), GSA 06 / 2164.
[43]Fyfe (2016, p. 394).
[44]Seils (1995, p. 146). An exception can be found between Oken and Brockhaus: Taszus (2009).
[45]E.g., Zach to Bertuch [Letter] (1798, Feb. 14), GSA 06 / 2164.

Zach's concept of the *AGE* as a scientific journal and a cornerstone of the astronomical community can not only be found in his letters to Bertuch and colleagues, but also in the extensive introductions he wrote for several issues, starting with the first issue in January 1798.[46] The *AGE* was not limited to:

> providing the reader with every interesting fact [*Wissenswürdiges*], which emerges in the discipline of geography, astronomy, and statistics and to advertise [*anzeigen*] quickly and without bias the newest products of these sciences from every country, but also and *primarily* to support the progress [*Fortrückung*] and dissemination of these sciences and to expand their limits through new and original works.[47]

Contributed papers, "which should be new, important, instructive, and a benefit to science" were supposed to be the journal's core, supplemented by maps and tables. Zach declared:

> [O]ur *General Geographical Ephemerides* shall … be the collective conjunction point [*gemeinsamer Vereinigungs-Punct*] … to which all the astronomers spread over the whole world (of whom nearly all partake in our *Ephemerides* as co-workers) will send their corresponding astronomical and geographical observations. [48]

The journal would offer a place for astronomers and geographers to discuss and meet—if not in person, then at least through their contributions.

A year later, Zach also emphasised the neutrality of the *AGE*, which "has already been praised as a huge advantage by the most reputable and learned men."[49] The journal contained different opinions and enabled contributors to discuss them instead of promoting only one perspective. Other journals at that time focused on a particular theory, or were even founded to advocate one and provide its supporters with a place to publish their arguments, like Crell's *Chemische Annalen* (*Annals of Chemistry*) and its French counterparts edited by Antoine Lavoisier (1743–1794) and Jean-Claude Delamétherie (1743–1817).[50] Not favouring a side, on the other hand, avoided conflicts among the contributors. Zach did not intend to split the small community of astronomers. However, printing different points of view was not necessarily welcomed by lay readers who might have preferred that the journal provide a definite opinion, which would have been easier to follow.

Zach declared the journal to be a joint project of the "most dignified scholars in all of Europe" and soon earned the approval of many of his colleagues, although others challenged his selective approach to geography and its combination with astronomy in one journal.[51] They regarded the ethnological and historical aspects of the subject as much more important than the editor did.[52] Zach favoured the quantitative fields of geography, such as statistics, and preferred to approach the object of investigation through methodical analysis.[53] He argued that this precise part of geography descended from astronomy, "the mother of geography," explaining at length the importance of astronomical calculations as well as exact surveying and defending the concept of a scientific focus on geographical matters as one of the journal's main goals, followed by the wish to inspire more people to participate in the "hobby [*Liebhaberey*]" of practical astronomy.[54] To back his point further, he listed many historical examples where a lack of astronomical precision or high-quality maps had led to political, economic, or scientific failure.[55] Zach might have

[46]Namely January 1, 1798, January 3, 1799, and July 4, 1799.
[47]Zach (1798, p. 4). Emphasis in original.
[48]Zach (1798, p. 7).
[49]Zach (1799b, p. 6).
[50]Csiszar (2018, p. 41).
[51]Zach (1799b, p. 4).
[52]Christoph (2016, p. 146).
[53]Herrmann (1968, p. 356).
[54]Zach (1799b, p. 5; 1799a, p. XIII).
[55]Zach (1798, pp. 6–15).

agreed to edit a journal for professionals and lay readers alike, but his ambitions to produce a scientific journal were present from the very first issue.

Although the *AGE's* content was more specialised than Bertuch had planned, the journal was in high demand and soon praised for its quality and reliability. Its readers included dukes as well as members of the French Academie des sciènces.[56] Zach received many complaints from readers who were unable to buy the journal because it was sold out, and often passed these on to Bertuch.[57] Due to the many contributions, shifting papers to the next issue was common practice. However, Zach insisted on publishing the most important news as soon as possible and often persuaded Bertuch to extend the number of pages, pointing out that they would gain readers by distributing exclusive new content.[58] This meant that the abstracts of letters, comments, and papers were generally not older than 1 month. The guarantee of up-to-date information not only pleased the readership but was also attractive to contributors, who could expect their discoveries to be published and read by colleagues all over Europe within 2 months of communicating them to Zach—if he found them interesting enough to be put into the next issue. As Bertuch had hoped, the *AGE* was able to establish a broad readership consisting not only of specialised scholars but also of interested laypeople who appreciated the high-quality information and maps. The pair's aspiration that the journal would make a profit after the first year was fulfilled.[59]

3 | THE PARTING OF ZACH AND BERTUCH AND THE LAUNCH OF THE *MONATLICHE CORRESPONDENZ*

Time and time again, Zach emphasised in his letters the fruitful collaboration with his publisher as well as the importance of the *AGE* for astronomers and geographers.[60] Consequently, it was entirely unexpected when Zach suddenly resigned from his post as editor of the *AGE* in September 1799 to establish a new journal with a different publisher.[61] However, keeping in mind that he had pursued a goal very different from Bertuch's, neither his decision nor the further development of the *AGE* are very surprising, but show how Zach's editorial concept shaped the content of the journal. Zach did not want to spend time and energy on fulfilling Bertuch's requirements when they did not help the scientific community. Furthermore, Bertuch's demands and his interference with the editing process of the *AGE* annoyed Zach, as he stated in several letters to Hennicke. Writing to his friend, the Prussian cartographer Karl Ludwig von Le Coq (1757–1829), Zach accused Bertuch of exploiting his name and profession and declared that, as a true scholar, he did not write "because of gold and [he was] no map manufacturer."[62] He went on:

> Mr Bertuch has misemployed my name as a figurehead for every one of his scribblings; if I had not put an end to that nonsense, this acquisitive person would have put the Seeberg observatory between the fashion engravings of his fashion journal. He made advertisements in the ALZ [*Allgemeine Literatur Zeitung*] and other public papers in my name without my knowledge. His fiddling [*Schmuzeragen*] was without end; of course, I had to break up with that man, whose way of thinking and acting is so diametrically opposed to my own.[63]

[56]Zach to Bertuch [Letter] (1797, Jul. 24), GSA 06 / 2164.
[57]Zach to Bertuch [Letter] (1798, Feb. 22), GSA 06 / 2164.
[58]Zach to Bertuch [Letter] (1798, Feb. 4), GSA 06 / 2164.
[59]Zach to Bertuch [Letter] (1798, Feb. 18), GSA 06 / 2164. In 1804, Bertuch sold 699 copies, 211 more than were needed to cover expenses, which made it the second most successful journal of the Industrie-Comptoir's publishing program; see Middell (2002, pp. 308–309).
[60]Zach to Bertuch [Letter] (1798, Feb. 18), GSA 06 / 2164.
[61]Middell (2002, p. 300).
[62]Schwarz (2016, pp. 71, 78).
[63]Schwarz (2016, p. 78).

The "chasing of images [*Bilder-Pritscherey*]" and the discussions with Bertuch not only took much time but, in the astronomer's opinion, added nothing to the scientific value of the journal.[64] Bertuch's economic ideas eventually collided heavily with Zach's sense of scholarly behaviour and his belief that exchange and the development of research should be the journal's most important goals.[65] Zach not only felt restricted by his publisher and strove for more freedom as an editor, he was also unwilling to lower his standards to satisfy Bertuch's financial requirements.

In a letter to Bertuch on September 22, 1799, Zach explained that the increasing workload and the tasks of organising reviews and templates for illustrations and maps were overwhelming and keeping him from his work at the observatory.[66] Such complaints were neither new nor sudden. Zach had brought up the issue as early as January 1799 and had even already talked to Bertuch about an editorial successor.[67] Although Zach had never told Bertuch that he was displeased with the latter's interference, his decreasing will to encourage the journal's lay readership became more and more apparent. He declined articles written by famous scholars whose names promised to win new readers if the content did not meet his requirements.[68] After some critics asked for more entertaining content, Zach declared in the introduction of the issue of July 1799: "Even if the A. G. E. were not dedicated to geographers and astronomers of profession, which they first of all are, but were also meant only for enthusiasts and dilettantes," he would not change his policy of publishing ambitious research articles.[69]

Though dissatisfied with critics and publisher, the positive feedback and increasing interest Zach received from his colleagues raised his hopes that it was possible to maintain a journal which mainly focused on information and data for practical use and research. Two years prior, neither he nor Bertuch could have been certain that an astronomical journal was possible. Now, Zach was convinced that his network and reputation were capable of sustaining such a periodical. He had a stock of regular readers and writers and did not have to worry about running out of content anytime soon. In the autumn of 1799, he decided to launch a new journal, the *Monatliche Correspondenz zur Beförderung der Erd- und Himmelskunde* (*Monthly Correspondence for the Advancement of Geography and Astronomy*; *MC*). The title, referring to the traditional way of communicating between scholars via letters, declared the journal a public form of correspondence and exchange between astronomers and geographers. It also stated the journal's intention to support geography and astronomy as professional research fields, leaving no doubt about the readership Zach wanted to address.

Zach chose Rudolph Zacharias Becker (1752–1822) to be his new publisher in Gotha, finally uniting the editing and printing in one place. Becker was another businessman of the Enlightenment, but very unlike Bertuch, with whom he had his differences.[70] He was a successful publisher and author who was engaged in political activities and open to new ideas and concepts.[71] Becker also had experience in small, specialised printing projects, and saw potential for the new journal in the expertise and reputation of its editor.[72] Apart from an efficient map manufactory, Zach had everything he needed to establish another successful periodical: Hennicke, who would now work as co-editor of the *MC*, lived in Gotha; his new publisher Becker appreciated his ideas but did not insist on codetermining the content; and Zach himself was the centre point of the flow of geographical and astronomical information that would become the main content of the *MC*.

Zach made it clear that the *MC* should be viewed as a direct successor of the *AGE*. The *MC* provided astronomical and geographical-statistical information, as well as news and reports from foreign countries if they provided valuable information to researchers. Usefulness and quality of the contributions were again essential criteria for the

[64]Zach to Bertuch [Letter] (1799, Sept. 22), GSA 06 / 2166.
[65]The concept of scholarly behaviour and its importance in the 18th century has been discussed in many different works: e.g., Csiszar (2018); Shapin (2008). Cunningham et al. (2011), examines another example of the indignation of Zach and his colleagues when they suspected that greed and the pursuit of glory stood in the way of gaining scientific knowledge.
[66]Zach to Bertuch [Letter] (1799, Sept. 22), GSA 06 / 2166.
[67]Zach to Bertuch [Letters] (1798, Jan. 7), GSA 06 / 2164; (1799, Jul. 3), GSA 06 / 2166.
[68]Zach to Bertuch [Letter] (1798, Feb. 18), GSA 06 / 2164.
[69]Zach (1799a, pp. VI–VII); Herrmann (1968, p. 356).
[70]Middell (2002, p. 305).
[71]Siegert (1997; 1978); Freytag (2014).
[72]Middell (2002, p. 306).

editor. Like the *AGE*, the *MC* was released monthly, in keeping with Zach's goal of reporting news as soon as possible.

In the first volume of the *MC*, Zach again expressed his idea of a scientific journal, although in less detail, since he no longer had to justify his opinion to his readership. He assured readers that content and contributors would be the same as before and that the "former journal and this new one will form a whole." His correspondence with other scholars was intended to be the most crucial part of the *MC*, which would have more pages than the *AGE* in order to avoid delaying news.[73]

The *MC*, he argued, should not be based on content by authors to entertain readers, but should enable a productive exchange between astronomers and geographers, under his guidance. He promised:

> [An] even richer and more manifold harvest because my extended correspondence with the most well-deserved scholars at home and abroad will enable me, even more, to collect everything worth knowing … to extract interesting results, which are not only meant to satisfy [my readers'] curiosity but also to serve the extension and correction of geography and astronomy. The *Monatliche Correspondenz* is, therefore, like the A. G. E. has been until now, the common point of association [*Vereinigungs-Punct*] of astronomers and geographers.[74]

The contributions of Burckhardt, Triesnecker, Blumenbach, and Lalande now found their place in the *MC*. The new journal also provided tables and corrections of measured data, information about the latest discoveries in Europe and the world, and reviews of geographical and astronomical books. It refrained from printing maps as they would have been too expensive.

Zach's resignation from the post of the editor of the *AGE* did not go as smoothly as he would have liked. Although he referred to the *AGE* as "my property," he was willing to abandon the project to avoid a public scandal for the sake of both journals.[75] Nonetheless, he could not prevent Bertuch's anger nor allay the tension building quickly between them, partly because of personal issues but also because of the uncertainties a second somewhat-similar journal meant for the *AGE*.

Zach tried to persuade his former publisher that he did not intend to challenge the *AGE*, but rather to split the readership according to their preferred conceptions of the journal. Moreover, the interested lay readers of the *AGE* could still profit from Zach's connections. He suggested to Bertuch that Adam Christian Gaspari (1752–1830), the geographer and professor of philosophy who would continue his work as editor of the *AGE*, should use the *MC* as a "plentifully provided repository [*Vorrathshause*] from which you can take a good deal of material."[76] Since the *AGE* would no longer focus on publishing original articles, Gaspari could select what he deemed most attractive to his readers and add suitable exclusive content.

Zach's new journal still made Bertuch nervous, however. He learnt from an advertisement in Becker's *Allgemeiner Reichsanzeiger* (*General Intelligencer of the Empire*), that Zach's new publisher was his business rival and that the *MC* would cost only 5 Reichsthaler, which was less expensive than the *AGE*. Although the *AGE* had another capable editor in Gaspari, Zach's reputation and influence within the scientific community were significant. Most of the *AGE*'s content had been based on his connections, and the cheaper new journal could provide a level of competition that the *AGE* had yet to face. Although Bertuch hoped to successfully split the readership and claim the better-paying group for the *AGE*, there was no guarantee that the journal would not meet the same fate as Zimmermann's *Annalen*. Therefore, he decided to use the change of editors as an opportunity to announce a new concept for the *AGE*, in line with his demands and making plain its differences from the *MC*, to keep his stock of lay readers.

[73]Zach (1800, pp. III, IV).
[74]Zach (1800, pp. III, IV–V).
[75]Schwarz (2016, p. 78).
[76]Zach to Bertuch [Letter] (1799, Sept. 22), GSA 06 / 2166.

Comparing the content of the *AGE* during Zach's time as editor in 1798–1799 and the first year of the *MC* to the first 12 issues by Gaspari in 1800 shows the significant differences between Zach's and Bertuch's ideas, how they were implemented in the *AGE*, and how they changed the structure and content of the journal. Although Bertuch followed Zach's suggestion to divide the readership, they did not agree on how to do so. Zach wanted to split it between professionals and lay readers, while Bertuch declared the *AGE* to be a geographical journal and the *MC* an astronomical one. The January edition of the *AGE* contained a new introduction by Gaspari and Bertuch, who were now listed as editor and publisher. It announced a "new period" for the successful journal, which would become exclusively geographical with a focus on "regional geography, ethnology and national geography" (*Länder-, Völker- und Staatenkunde*), while the field of specialised and theoretical astronomy would find its place in Zach's new periodical.[77] Bertuch insisted on claiming geography because it was the much better-established and easier to maintain subject, and would also connect well to his Landcharten-Verlag and other projects.[78] Moreover, without Zach, he could not convincingly provide astronomical content of the previous quality, and he was unwilling to have his former editor as a rival.

However, Bertuch still preferred to satisfy the demands of lay readers rather than trained geographers, which is reflected in the type of articles and reviews that followed this new beginning. Instead of talking about a "joint project of scholars," the editors distinguished between their readers—"enthusiasts of geography"—and their authors, who were paid to write articles for the *AGE*.[79] Under Zach, the overlap between contributors and readers had been an essential aspect of the journal. In particular, the letters to the editor were published to be read and sometimes answered by colleagues. The authors of the new *AGE* provided information for a different audience, however, and contributions were chosen according to the demands of those readers. The section with letters to the editor, which had previously taken up most pages apart from the reviews, was removed. Instead, Bertuch and Gaspari enlarged the book review section and asked for general letters from readers, containing questions, suggestions, or announcements. The reviews were intended to offer "lesser scholarly people a library" and were focused on more accessible German books, while additional illustrations of exotic places and people would increase the attractiveness of the journal and enhance a feature the *MC* did not have.[80]

Whereas Zach had been adamant about publishing only original information, the new *AGE* also contained translations or abstracts from foreign books, papers, or society transactions. Geographical-economic essays replaced articles about astronomical or theoretical topics. The focus became more general, and submissions on natural history, travel reports, and economic information—such as the "Description of a Journey on the Tanitian Arms of the Nile" or the list of "What England Borrowed in the Last 50 Years"—aimed to please enthusiastic readers of geographical news who were not too keen to face complex tables or specialised discussions.[81]

Previously, the most frequent contributors had been astronomers, such as Burckhardt, Wurm, and Triesnecker. Now, translations and extracts written by the editors dominated the section. They were easier for lay readers to follow than tables of the periodical appearances of Venus.[82] By eliminating the selected correspondence to the editor and changing the policy of articles, the *AGE* became a less exclusive journal, and one which did not rely on Zach's colleagues. Although still specialised, the *AGE* now became a commercially oriented journal addressing a somewhat similar readership as the *Journal des Luxus und der Moden*, rather than trying to be the centre for a scientific community.[83]

The new *AGE* also had to find new contributors. Well-known writers like Blumenbach, who had sent interesting news about expeditions and discoveries and would therefore still fit into the new concept, nonetheless ceased writing for the *AGE* because they had written to Zach in the first place; now their letters were published in the *MC*.

[77]Bertuch & Gaspari (1800, pp. 3, 5).
[78]Christoph (2012).
[79]Bertuch & Gaspari (1800, p. 7).
[80]Bertuch & Gaspari (1800, p. 7).
[81]Gaspari (1800, pp. 190–192), referring to Grellier (1799).
[82]Wurm (1798, pp. 309–317).
[83]Fyfe (2016, p. 391).

Bertuch and Gaspari, therefore, invited authors to write for them, which allowed for more variation and control over the topics covered. Additionally, this helped to disconnect the authorship further from the readership and thus ease the dependence on writers. Zach had found his contributors in fellow astronomers and friends to whom he wanted to provide a space to publish their work; Bertuch and Gaspari focused on the lay readers' interests.

Although splitting the *AGE* bore many risks, it worked well, thanks to the way the unique aspects of the periodicals served the interests of their respective audiences. Both journals were able to establish themselves successfully and existed much longer than the dispute between their creators. The *AGE* appeared until 1831, changing its title several times. The *MC* lasted until 1813, edited by Zach's pupils and successors in Gotha. For Zach, the *MC* was only the beginning of his efforts to organise astronomical research and communication. He became the co-founder and secretary of the Vereinigte Astronomische Gesellschaft in Lilienthal, trying to connect astronomers not only through written articles, but also through a joint venture.[84] To the astronomical community, Zach was an essential point of intersection. He provided information he received from his close connections to other important astronomers through his journal.[85] Though he resigned from his post as editor of the *MC* in 1806 after the death of Ernst II to join the dowager duchess in Genoa, he later launched another astronomical journal, continuing his work as an editor.[86]

Zach was not the only one who found the success of the *AGE* a reassuring starting point. At the beginning of the 19th century, many geographical and astronomical journals in the German lands and all over Europe followed its example.[87] Especially with astronomy changing from a court science to a community research field organised by learned societies, universities, and research institutions, the journal soon became an important medium.[88]

The dispute between Zach and Bertuch which had clouded the launch of the *MC* was reconciled privately between the two former partners—in letters, as their collaboration had begun. Eventually, Bertuch apologised and admitted to being a "tetchy creature."[89] However, the break was not meant to heal. The few letters following the discord between Zach and Bertuch are polite and reserved and do not mention editorial matters at all.

When the curious letter in spiky handwriting reached Bertuch in February 1806, the publisher was distressingly reminded of this unfortunate episode. Sending back the letter unpublished, he avoided another scandal and maybe even hoped to have heard the last of this one. However, the unknown author's hoax shows that they did not understand what the partnership had been about, nor the reasons for its dissolution: the challenges of establishing the first astronomical-geographical journal through the unique collaboration between an ambitious astronomer and an enlightened businessman, and its division in two because of their different concepts of a scientific and a popular journal.

4 | RESUME

The *AGE* and the *MC* were launched at a time when general interest in astronomical and geographical studies, as well as the professionalisation of those fields, was quickly increasing, but when there was still a dearth of suitable ways to gain information and enable rapid exchange. A journal provided such opportunities and therefore often became the centre of new or developing disciplines in the German lands.

The *AGE* is an example of a journal that was able to achieve the necessary numbers of readers through its high-quality content and focus on astronomical and geographical information. An examination of the periodical's content shows how different conceptions of the ideal journal were reflected in the structure and topics and hence shaped the periodical as a whole. By analysing the development of two early scholarly journals and focusing on the

[84]Cunningham et al. (2011, p. 294).
[85]Cunningham et al. (2011); Schwemin (2016).
[86]Regarding Zach's last projects in Gotha and the problems he faced without the protection of his patron, the duke, see Schwarz (2016).
[87]Christoph (2016); Holl (2004).
[88]Levitt (2010); Smith (2008).
[89]Middell (2002, p. 306).

collaboration of their publisher and editor, this paper has shown that the development of astronomy and geography as research fields in the German lands was not only influenced by epistemic ideas but also by economic interests and readership expectations. The often limited sources necessary to retrace the conditions of maintaining periodicals are a challenge. Therefore, cases like the *AGE* deserve more attention. This paper changed the focus from the ideal value and purpose of the journal, often praised by scholars, to the reality of economic and personal factors.

Although similar cases, like that of *Isis*, highlight the influence of the publisher, Zach's and Bertuch's opportunities were unique. They had access to a new observatory, the map libraries of two dukes, and a well-established manufactory able to provide high-quality maps and illustrations. At the same time, their contexts were closely connected with the different perspectives of the editor and his publisher, leading eventually to their divergence.

Bertuch's and Zach's unique backgrounds shaped the content of the journal as well as its development. This shows that generalising the creation and formats of German scholarly journals is hardly possible. To gain more in-depth insight into the complex publishing landscape and its influence on the development of research fields and scholarly understanding, further comparative studies are necessary. Those parties who are often overlooked for their apparent disinterest in scholarly matters are especially deserving of our interest. As this paper could show only briefly, the content of journals was significantly shaped not only by publishers, but also by printers, patrons, and the readership consisting of both scholars with professional interests and lay readers.

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How to cite this article: Stoeger A. Putting astronomy on the map: The launch of the first geographical-astronomical journal. *Centaurus*. 2020;62:54–68. https://doi.org/10.1111/1600-0498.12282