

Resonances and Repercussions of Kepler's *Harmony of the World*

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Abstract. In 1619 the *Harmonices mundi libri V* was published, which Kepler considered his greatest work. It is well-known and famous for containing the Third Law of Planetary Motion, but book IV deals with his attempt to reform astrology within a Pythagorean-Platonic framework, and here he presented a new understanding of the mechanism of the aspects. Kepler's "astrology of resonance" had repercussions among contemporary astrologers in the 17th century, such as Christopher Heydon, Abdias Trew and Peter Crüger. His ideas of a physical basis for celestial motions and were viewed critically however, and in the perspective of the Age of Enlightenment Kepler's speculative approaches, as well as his metaphysical and religious arguments met with skepticism and disapproval. The tide turned in the Romantic Era, when just these aspects came to the fore and paved the way to an edition of Kepler's works. The German philosophers F. W. J. Schelling (1775–1854), E. F. Apelt (1812–1859) and the astronomer J. W. A. Pfaff (1774–1835) played a crucial role in the rediscovery and reappraisal of Kepler. Pfaff worked on a German translation of the *Harmonices mundi*, and the teacher of mathematics Christian Frisch (1807–1881), who had studied under Pfaff in Erlangen, published the first critical edition of Kepler's works from 1858 to 1871.

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¹ Johannes Kepler, *The Harmony of the World*, trans. Eric Aiton, Andrew Duncan and Judith Field (Philadelphia, PA: American Philosophical Society, 1997), pp.281–385.

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Age of Enlightenment Kepler's speculative approaches, as well as his metaphysical and religious arguments met with skepticism and disapproval. The tide turned in the Romantic Era, when just these aspects came to the fore and paved the way to an edition of Kepler's works. The German philosophers F. W. J. Schelling (1775–1854), E. F. Apelt (1812–1859) and the astronomer J. W. A. Pfaff (1774–1835) played a crucial role in the rediscovery and reappraisal of Kepler. Pfaff worked on a German translation of the *Harmonices mundi*, and the teacher of mathematics Christian Frisch (1807–1881), who had studied under Pfaff in Erlangen and who was highly regarded as a teacher and educator, published the first critical edition of Kepler's works from 1858 to 1871.

By 1640 English astronomy was very much Keplerian, although few adopted Kepler's ideas on the physical basis for celestial motions, and his neoplatonic ideas were ignored. Kepler's astrological thoughts were assimilated also, albeit in some cases critically.² By the mid-seventeenth century, a number of astrologers were acquainted with Kepler's works, and some based their tables on the *Tabulae Rudolphinae* (e.g., Vincent Wing, 1619–1668). Kepler's claim for a reformed astrology was adopted, and the decline of the intellectual respectability of astrology in the course of the 17th century has been interpreted as a failed scientific revolution, not without reason.³ Kepler stayed in contact with Englishmen on astrological

² Wilbur Applebaum, 'Kepler in England: The Reception of Keplerian Astronomy in England, 1599–1687' (PhD dissertation, State University of New York [Buffalo], 1969), and Adam Jared Apt, 'The Reception of Kepler's Astronomy in England, 1609–1650' (PhD dissertation, St. Catherine's College, Oxford, 1982).

³ This is the central argument of an important, yet somewhat underrated study by Mary Ellen Bowden ('The Scientific Revolution in Astrology: The English Reformers 1558–1686', PhD dissertation, Yale University, 1974). Apt's remark: '*Kepler's astrology did not prove popular, with the exception of some of his forecasts, which were reprinted at the beginning of the turmoil of the 1640s*', as well as his statement '*He [Kepler] was, therefore, vehement in his polemics in defence of astrology, and he tried to propagate his innovations in the field. At least in England, he was not very successful in this*' ('The Reception of Kepler's Astronomy', Abstract, and p. 12) is definitely incorrect, and Bowden's thesis was apparently unknown to him. See also the chapter dealing with astrology and the 'Scientific Revolution' in Peter William George Wright, 'Astrology in Mid-Seventeenth-Century England: A Sociological Analysis' (PhD dissertation, University of London, 1984), pp.145–186.

matters, especially Sir Christopher Heydon (1561–1623)⁴ and Robert Fludd (1574–1637). With the latter he disputed on the theory of cosmic harmony in an appendix to his *Harmonice Mundi*⁵, whereas relations to Heydon proved to be more cordial. Kepler's creation of an 'astrology of resonance' impressed Heydon, who (with the assistance of William Bredon, himself a prominent astrologer) had published his *Defence of Iudiciall Astrologie* in 1603, the most substantial English defence of astrology in its time.⁶ A second book, the *Astrological Discourse*, followed about 1607.⁷ Despite disagreements on particular issues Heydon admired Kepler, often referred to his work and sought his help in defending judicial astrology from the attacks of calumniators.⁸ In the *Astrological Discourse* Heydon expounded Kepler's harmonic astrology for the first time in England (the book was only to be published posthumously, however). He followed Kepler in drawing an analogy between astrological aspects and musical harmonies, although his own theory of aspects was based on beams being emitted by celestial bodies, analogous to light beams. Heydon did not share Kepler's neoplatonic world view and clung to Aristotelian physics, but he did not adopt a firm stance on the nature of planetary motion. He adhered to the so-called 'Wittenberg Interpretation' of Copernicus, i.e. a separation of the astronomical content of *De revolutionibus* from its fundamental cosmological reflections and application to a geocentric framework.⁹ Regarding astrological issues the

⁴ *Oxford Dictionary of National Biography*, 26:946–948; for a comprehensive treatment of Heydon and his reception of Kepler's works see Apt, 'The Reception of Kepler's Astronomy', pp. 49–175.

⁵ Patrick J. Boner, *Kepler's Cosmological Synthesis: Astrology, Mechanism and the Soul* (Leiden/Boston, MA: Brill, 2013), pp.138–144.

⁶ The book was a rebuttal of *A Treatise Against Iudiciall Astrologie* by John Chamber (1546–1601, a fellow of Eton and canon of Windsor) printed two years before; see Don Cameron Allen, *The Star-Crossed Renaissance: The Quarrel about Astrology and Its Influence in England* (1941; repr. London: Frank Cass, 1966), pp.126–135.

⁷ *An Astrological Discourse With Mathematical Demonstrations, Proving the Powerful and Harmonical Influence of the Planets and fixed Stars upon Elementary bodies [...]* (London: John Macock and Nathaniel Brooks, 1650).

⁸ Kepler, *Gesammelte Werke* (Munich: C. H. Beck'sche Verlagsbuchhandlung, 1938-) 15:148–150, 231–239.

⁹ 'Doth not Copernicus and his followers, deliver us Astronomicall tables, whereby to supputate the true places of all starres [...]' ; Christopher Heydon, *A Defence of Iudiciall Astrologie* (1603; repr. Amsterdam/Norwood, NJ: Walter J. Johnson and Theatrum Orbis Terrarum, 1977); p.349; on the 'Wittenberg

important thing was to determine the configuration of the heavenly bodies for a specific location at a specific time with respect to the observer on the Earth, as he clearly asserted in his *Defence of Judiciall Astrologie*:

*For whether [...] (as Copernicus saith) the Sun be the center of the world, and the earth be in the Sunnes place, betweene the sphere of Mars and Venus, the Astrologer careth not. For so by any of these Hypotheses, he may come to the true place and motion of the Starres, this varietie of opinions, whether such things be indeede, and in what order they be, is no impeachment to the principles of Arte.*¹⁰

In his *Tertius Interveniens* Kepler argued in the same line:

*As for the doubt as to whether the sky or the Earth rotates, a similar reply is appropriate. This doubt does not bring the astrologer into suspicion, because it does not concern him, for it is sufficient if the astrologer sees how the streams of light move at times from the east, at other times from the south, and finally from the west, and then disappear [rising, culminating, setting]. Here it is sufficient to know when two planets are seen next to each other, and when they are in opposition to each other, and also when they make a sextile, quintile, quadrature, etc. [...]. Why would the astrologer (or rather the sublunar Nature) inquire further into how such a thing occurs? Indeed, as little as the farmer asks how summer and winter come about, and nevertheless is guided by them.*¹¹

Interpretation' see Robert S. Westman, 'The Melanchthon Circle, Rheticus, and the Wittenberg Interpretation of the Copernican Theory', *Isis* 66 (1975): pp.165–193.

¹⁰ Heydon, *A Defence*, p. 71.

¹¹ Johannes Kepler, *The Baby, the Bath Water, and the Third Man in the Middle*, tr Ken Negus (Amherst, MA: Earth Heart Publications, 2008), thesis 40, p.101; the German original reads: 'Ob Himmel oder Erden umbgehe? Welcher Zweiffel darumb die Astrologiam nicht verdächtig macht, weil er sie nichts angehet; dann da ist gnug, daß der Astrologus siehet, wie die Liechtstreymen jetzo von Orient, dann von Mittag, endlich von Occident daher gehen und darauff gar verschwinden. Da ist gnug, daß man weiß, wann zween Planeten neben einander gesehen werden und wann sie gegen einander uberstehen, Item, wann sie ein sextilem, quintilem, quadratum &c. machen [...]. Was fragt allhie der Astrologus

John Goad (1616–1689), headmaster of the Merchant Taylors' School in London, was also familiar with Kepler's astrology and kept a weather diary from 1652 to 1685.¹² In 1686 he published a major work entitled *Astro-Meteorologica, or Aphorisms and Discourses on the Bodies Celestial, their Natures and Influences*. Goad followed the Baconian programme (as set out by Francis Bacon) to reform astrology by using experimental natural philosophy to save its rational and useful core, and discard its superstitious accretions.¹³ Given its empirically accessible nature he (like his close friend John Gadbury, 1627–1704) saw the weather as a suitable testing ground for astrology. The basic assumption was an influence of the planet's aspects on the atmosphere. Goad was a follower of Kepler, and his meteorological diary kept in Linz and Ulm (1621–1629) was used by him to confirm some of his own findings. But all attempts to arrive at decisive conclusions were defeated by the sheer complexity of meteorological phenomena and serious shortcomings of the applied methodological and statistical tools. Notwithstanding his enduring labours Goad soon fell into oblivion.

Joshua Childrey (1623–1670), a fervent Baconian and Copernican, introduced heliocentric aspects into astrology, but expressed disdain with Kepler's reforms.¹⁴ He worked in close contact with the Royal Society on meteorological research and requested holding collections of nativities, which should be recalculated for heliocentric aspects and then compared

oder vielmehr Natura sublunaris darnach, wie solches zugehe? Warlich so wenig als der Bauwer darnach fragt, wie es Sommer und Winter werde, und doch nichts desto weniger sich darnach richtet; Johannes Kepler, *Warnung an die Gegner der Astrologie: Tertius Interveniens*, ed Fritz Krafft (Munich: Kindler 1971), p.65.

¹² Bowden, 'The Scientific Revolution in Astrology', pp.176–187; *Oxford Dictionary of National Biography*, 22:531–532 (Patrick Curry); Bruce Scofield, 'John Goad: Astrological Research Pioneer', (1986–87), https://www.academia.edu/16566224/John_Goads_Astro-Meteorologica [accessed 20 May 2019]; Scofield, 'A History and Test of Planetary Weather Forecasting' (PhD dissertation, University of Massachusetts Amherst, 2010), pp.34–48.

¹³ Francis Bacon, *The Works*, eds James Spedding, Robert Leslie Ellis, Douglas Denon Heath (Boston. MA: Houghton, Mifflin & Co, n. y.), 8:489–498.

¹⁴ In his booklet *Indago astrologica: Or, a Brief and Modest Enquiry into some Principal Points of Astrology, as it was delivered by the Fathers of it, and is now generally received by the Sons of it* (London: Edward Husband, 1652), pp.8–9; see Bowden, 'The Scientific Revolution in Astrology', pp.169–176. For biographical information see the article by W. P. Courtney and Patrick Curry in *Oxford Dictionary of National Biography*, 11:449.

to the biographies of the subjects. It may be noted by coincidence, that a lot of seventeenth-century biography had roots in empirical astrological enquiry.

Kepler's 'astrology of resonance' also had repercussions on the European continent. One example was the Lutheran Peter Crüger (b. 1580), who was Professor of Poetry and Mathematics at the Academic Grammar School in Danzig from 1607 until his death in 1639 and teacher of Johannes Hevelius.¹⁵ He was quite critical, but agreed with Kepler in emphasizing the powers and effects of the aspects of the planets, and also concurred that their geometrical configurations resonated with the soul at the time of birth, thereby imprinting on the soul a certain temperament.¹⁶ Given a precise time of birth (which was almost impossible to obtain), only the individual's temperament and inclination could be determined, but on no account his entire life. Crüger voiced strong criticism of the common practice of casting nativities, rejected the astrological houses¹⁷, and, like Kepler, adamantly argued for the free will of man.¹⁸

A reformed astrology, in the Keplerian sense, was also presented by the Protestant theologian, mathematician, astronomer and astrologer Abdias Trew (1597–1669), who had been professor of mathematics and physics at the university of Altdorf near Nuremberg since 1669.¹⁹

¹⁵ Derek Jensen, 'The Science of the Stars in Danzig from Rheticus to Hevelius' (PhD dissertation, University of California, San Diego, 2006), pp.51–67, 118–122.

¹⁶ Peter Crüger, *Cupediae Astrosophicae Crügerianae, Das ist Frag und Antwort Darinnen die allerkunstreichsten und tieffesten Geheimbnüss der Astronomiae deß Calender-Schreibens der Astrologie, und der Geographie, dermassen deutlich und verständlich außgeführt sind daß dieselben beydes von Gelehrten und auch Ungelehrten gar leicht können gefasset und begriffen werden* (Breslau: Georg Baumann, 1631), fol. NIIIv–NIVv.

¹⁷ Crüger, *Cupediae*, fol. Fv–FIIIr.

¹⁸ Crüger, *Cupediae*, fol. EIIIr.

¹⁹ See the excellent and comprehensive treatment by Hans Gaab, *Der Altdorfer Mathematik- und Physikdozent Abdias Trew (1597–1669): Astronom, Astrologe, Kalendermacher und Theologe* (Frankfurt a. M.: Harri Deutsch, 2011); regarding astrological matters pp.251–341, and Klaus Matthäus, 'Zur Geschichte des Nürnberger Kalenderwesens: Die Entwicklung der in Nürnberg gedruckten Jahreskalender in Buchform', *Archiv für Geschichte des Buchwesens* 9 (1969): pp.1063–1067, 1231–1234.



Fig. 1. Portrait of Abdias Trew. Engraving by Wolfgang Philipp Kilian (1654–1732); in possession of the author.

Trew tried to make astrology a matter of physical science and largely adopted Kepler's reformed astrology, but, in his opinion, it needed some

improvements for practical use.²⁰ In 1651, his *Nucleus Astrologicae correctae* appeared, the first work in which Kepler's approaches were presented in textbook form.²¹ Trew referred to Kepler's *Tertius interveniens*, *De stella nova in pede serpentarii* and *Harmonice mundi*.²² But he did not quite follow his radical restriction of astrological effects, which limited the realm for predictions seriously. He did not find any physical justification for Kepler's theory of aspects, but it seemed to be confirmed by meteorological observations as well as by the course of diseases. For Trew, the influence of the respective planet depended above all on the five classical aspects familiar from Ptolemy (opposition, conjunction, quadrature, trine, sextile), and he rejected the new aspects introduced by Kepler.²³ On the other hand he followed Kepler in denying any meaning of the names of the constellations. Kepler had considered a mutability of the influence of the planets but, referring to Aristotle, Trew disagreed.²⁴ With the negation of the astrological effect of the zodiacal signs, the doctrine of the 'planetary houses' and 'dignities' also ceased to apply, and he rejected rectifications of horoscopes (the *Trutina Hermetis* and *Animodar*) as well.²⁵ Kepler's geometric-harmonic causality of the sky was substituted for a more physical theory of the influences of the elements, in which aspects still played a role. Trew disenchanting the sky, thus cutting any perceived links between astrology and demonology. He advocated a symbiosis of mathematics and physics and tried uniting the views of Kepler and Melanchthon.²⁶

²⁰ 'Wieweit sich solche Wirkung der Sternen und die darauß geflossene Kunst erstreckt oder erstrecken möge, daran hat zwar Herr Keplerus Kaiserlicher Majestät Mathematicus einen guten Anfang gemacht. Will mich aber doch beduncken, wann man sonderlich auff die Praxin gehen und solche handeln oder davon urtheilen wolle, es bedörff fernerer Erläuterung'; Abdias Trew, *Discursus Von Grund und Verbesserung der Astrologiae* (Nuremberg: Wolfgang Endter, 1643), fol. AIIr.

²¹ *Nucleus Astrologiae correctae, Das ist Kurtzer Bericht vom Nativitätstellen* (Nuremberg: Jeremia Dümler, 1651); transferred to modern German by Josef Fuchs: *Grundriß der verbesserten Astrologie (Reformastrologie)* (Diessen vor München: J. C. Huber, 1927).

²² Trew, *Nucleus*, preface, fol. A5v.

²³ Trew, *Nucleus*, p. 29.

²⁴ Trew, *Discursus*, fol. AIIIv.

²⁵ Trew, *Nucleus*, pp. 1–2, 24–27, 36–42.

²⁶ William Clark, 'Der Untergang der Astrologie in der deutschen Barockzeit', in Hartmut Lehmann and Ann-Charlott Trepp, eds, *Im Zeichen der Krise:*

Like his English contemporaries, Trew occupied himself with astrometeorological predictions. But as early as 1652 he had to admit that astrology had fallen into disrepute²⁷, and Johann Christoph Sturm (1635–1703), his successor in Altorf, forcefully rejected astrology.²⁸ In 1679 Sturm remarked that hardly any mathematician of distinction and worthy the name did not reject astrology.²⁹

Eight years later Isaac Newton's (1642–1727) *Mathematical Principles of Natural Philosophy* (*Philosophiae Naturalis Principia Mathematica*) appeared. Newton could explain the shape of planetary orbits concisely by gravity and presented physical reasons for Kepler's descriptive laws of planetary motion. In the course of the eighteenth century astronomy made great progress, profiting largely from the rapid advances in mathematics, and astrology saw a distinctive decline. The intellectual climate of the 'Age of Enlightenment' proved to be extremely unfavourable, and at the end of the eighteenth century astrology was almost dead – at least as far as Germany is concerned.³⁰ But the emerging Romantic natural philosophy offered astrology a place of refuge. Here nature was viewed as a work of art constructed by a divine imagination and veiled in emblematic language. It was an organically unified whole, not, as rationalists would have it, a system of mechanical laws and mathematically defined motions. The notion of the clockwork universe, in which God had only wound up the mainspring, was replaced by an organic image. Symbolism and myth were given greater prominence. Placed above the supremacy of reason, imagination became the supreme faculty of the human mind. Only imagination allowed man to read nature as a system of symbols. Intuition, instincts, and feelings were seen as necessary supplements to logic and reason. Consequently, August Wilhelm Schlegel (1767–1845) spoke of a missing sense of the miraculous in his lectures 'On Literature, Art and Spirit of the Age' (*Ueber Litteratur, Kunst und Geist des Zeitalters,*

Religiosität im Europa des 17. Jahrhunderts (Göttingen: Vandenhoeck & Ruprecht, 1999), p.458.

²⁷ Gaab, *Abdias Trew*, p.331.

²⁸ Gaab, *Abdias Trew*, pp.112–115.

²⁹ In a disputation on the influence of the stars with Christoph Wegleiter as respondent the following conclusion was drawn: '*Quamvis hodie vix ullibi reperitur celebrior aliquis et isto nomine dignos mathematicus, qui vanissimam arte celebrior explodat*'; *Sidera influentia, hoc est Efficacia in mundum hunc sublunarem* (Altdorf: Heinrich Meyer, 1679), p.31.

³⁰ Rainer Baasner, *Das Lob der Sternkunst: Astronomie in der deutschen Aufklärung* (Göttingen, Vandenhoeck & Ruprecht, 1987), pp.207–217.

1803).³¹ Mankind thought only in categories of quantity and utility. Therefore, astronomy had to become astrology again because the observer of the heavens was far more elevated if he believed in the stars' assistance as if he were a bondsman of nature. Similar thoughts can be found in the writings of Friedrich von Hardenberg (Novalis, 1772–1801). Johann Wolfgang Goethe's (1749–1832) description of his own horoscope in his autobiography *Dichtung und Wahrheit* (1811–1833) is well-known. But this rather aesthetic and symbolic reception of astrology was confined to literature and philosophy and separated from the rapid development of the natural sciences at the turn of the nineteenth century. Controversies about an adequate scientific methodology between the extremes of empiricism and speculation, inductivism and a priori approaches were fought out. In 1840 the chemist Justus v. Liebig (1803–1873) spoke of the influence of natural philosophy as a '*pestilence, the black death of the century*'.³²

In these times Johannes Kepler's works re-emerged, and this was to no small extent due to a professional astronomer who 'converted' to astrology. Johann Wilhelm Andreas Pfaff was born in Stuttgart in 1774, and from 1791 on he studied in the famous Protestant Theological Seminar, called 'Stift', in Tübingen. But he also acquired knowledge in the natural sciences and must have had close contact with Christoph Friedrich Pflaiderer (1736–1821),³³ professor of mathematics and physics, and probably also with his successor Johann Gottlieb Friedrich Bohnenberger (1765–1831), who was appointed as professor of mathematics and astronomy in 1798.

In 1802 the University of Dorpat (Tartu) in Estonia (then belonging to the Russian Empire) had been reopened, and Pfaff was nominated as professor of mathematics and astronomy³⁴ and also became director of a

³¹ August Wilhelm Schlegel. *Vorlesungen über Ästhetik*, ed Ernst Behler (Paderborn/München/Wien/Zürich: Ferdinand Schöningh, 2007), 2.1:227–229.

³² *Die Thätigkeit, das Wirken der Naturphilosophen war die Pestilenz, der schwarze Tod des Jahrhunderts; Über das Studium der Naturwissenschaften und über den Zustand der Chemie in Preußen* (Brunswick: Friedrich Vieweg, 1840), p.29.

³³ On Pflaiderer see Wilfried Lagler, 'Christoph Friedrich von Pflaiderer: Mathematiker und Professor 1736–1821', *Lebensbilder aus Baden-Württemberg*, Stuttgart 1998, 19:163–176.

³⁴ Tartu, Eesti Ajalooarhiiv (Estonian Historical Archive): Best. 402, Reg. 3, N. 1374 (Acta des Conseils und Directoriums der Kaiserlichen Universität zu Dorpat betreffend Johann Wilhelm Pfaff), fol. 5r-6r. A detailed account of Pfaff's time in

projected observatory. But life in Dorpat was very expensive, and the administration of the university was restrictive, which caused many problems. So Pfaff left in 1809, and received a teaching post at the Nuremberg Realinstitut. Head of this institute was Gotthilf Heinrich Schubert (1780–1860), a natural philosopher who had been trained in medicine at Jena. Schubert was a pupil of Johann Friedrich Schelling (1775–1854) and had studied galvanism with Johann Wilhelm Ritter (1776–1810).³⁵



Fig. 2. Portrait of Gotthilf Heinrich Schubert. Lithograph by Johann Georg Schreiner (1801–1863); Munich, Deutsches Museum: PT 03367-01 GF.

Dorpat was given by Grigori Levitzkij, *Astronomy Yur'evskago universiteta s 1802 po 1894 god* (Yur'ev [Tartu]: K. Mattisen, 1899), pp.23–55.

³⁵ On Schubert see Franz Rudolf Merkel, 'Der Naturphilosoph Gotthilf Heinrich Schubert und die deutsche Romantik' (PhD dissertation, Munich, C. H. Beck, 1913); Dietrich v. Engelhardt, 'Schuberts Stellung in der romantischen Naturforschung', in *Gotthilf Heinrich Schubert: Gedenkschrift zum 200. Geburtstag des romantischen Naturforschers* (Erlangen: Universitätsbund Erlangen-Nürnberg, 1980), pp.11–36; Heike Petermann, *Gotthilf Heinrich Schubert: Die Naturgeschichte als bestimmendes Element* (Erlangen: Palm & Enke, 2008). Schubert's autobiography *Der Erwerb aus einem vergangenen und die Erwartungen von einem zukünftigen Leben: Eine Selbstbiographie* (Erlangen: J. J. Palm and Ernst Enke, 1854–56) is an important source for the Romantic Era in Germany.

In 1807–08 Schubert delivered a series of public lectures on natural history, psychology, and animal magnetism in Dresden, which were published under the title *Ansichten von der Nachtseite der Naturwissenschaft* (*Views from the Dark Side of Natural Science*) in five editions through 1840. The 'dark side' of natural science Schubert treated consisted of elements and appearances inexplicable by rationalistic science. With their emphasis on irrationality, fantasy, and vision, these lectures had a lasting influence on Romanticism and made him an instant celebrity³⁶, influencing many poets, including E. T. A. Hoffmann, Justinus Kerner, and Heinrich von Kleist. Schubert had a deep appreciation of the religious meaning of nature, and saw all things as existing in spiritual interconnection, resulting in a coherent physical and historical existence. Thus no part of human experience should be ignored or omitted, and for Schubert the history of science was fundamentally important for understanding man and nature both past and future. Evidence for deeper insights could be found in extinct civilizations and cultures. The oldest of all the sciences was astronomy. Indeed, astronomical knowledge was revealed to mankind from a higher spirit and had immediately attained the highest perfection.³⁷ This ancient all-embracing knowledge had been obscured over the course of history, although some of its traces could still be found in astrology and alchemy. In the beginning of the modern age new impulses had been released, but to Schubert Renaissance meant the reanimation of old traditions. With Kepler the entrance to the innermost sanctuary of science had been found.³⁸ In contrast to Germany, 'next to Kepler's sublime views' a mechanical and artisanal view of lifeless nature developed in France, a science 'in which only mechanic forces moved like worms gnawing rotten bones.'³⁹

Beyond doubt, Pfaff was attracted by Schubert, who connected antirationalistic piety with a Romantic spirit and became a leading

³⁶ Frederick Gregory, 'Gotthilf Heinrich Schubert and the Dark Side of Natural Science', *NTM: International Journal of History & Ethics of Natural Sciences Technology and Medicine* 3 (1995): pp.255–269.

³⁷ Schubert, *Ansichten von der Nachtseite der Naturwissenschaft* (Dresden: Arnold, 1808), pp.29, 33.

³⁸ Schubert, *Ansichten*, pp.14, 156.

³⁹ 'Neben Keplers erhabenen Ansichten, hat sich noch zu derselben Zeit, in Frankreich, eine mechanische und handwerksmäßige Ansicht einer toten Natur gebildet, in welcher sich wie Würmer, welche ein moderndes Gebein benagen nur noch die mechanischen Kräfte bewegen' (Schubert, *Ansichten*, p.14).

representative of the religious awakening in Southern Germany. Soon a deep personal friendship developed between these two kindred spirits. Pfaff was noted as an astronomer and had already written several papers on practical and theoretical astronomy, when in 1816 he published a book with the simple title *Astrologie* in Nuremberg. In twelve chapters – each under the heading of one sign of the zodiac – he set out to vindicate the ancient science of the stars in opposition to contemporary enlightened (and hence disapproving) views.



Fig. 3. Title page of Pfaff's *Astrologie*, 1816.

Pfaff sent a copy of his book to Bernhard von Lindenau (1779–1854), director of Seeberg Observatory and editor of the *Zeitschrift für Astronomie*, who was obviously somewhat irritated and asked for an

explanation. Therefore, Pfaff addressed a letter to him, which Lindenau published. Pfaff's letter is a key document for his 'conversion' to astrology:

*For more than ten years I have occupied myself with astrology. I felt that it deserved to be mentioned in popular lectures. [...] Earlier I only had a few works at hand, although some, viewed historically, made a marked impression on me. [...] Certainly, Ptolemy's book [Tetrabiblos] also had several curiosities for me. [...] Finally, I did not know either the origin, nor the end of this mysterious system. I then only knew the *Mysterium* [cosmographicum] by Kepler. Later I became acquainted with his *Harmony* [Harmonice mundi], also with his letters, the astrological movements of his time, and Kepler's views, which were so different from those of his age. Thus a number of things were collected, and the decision originated for establishing a monument to astrological belief. I collected what was available in my vicinity, looked around a bit in Arabic, and went for aphorisms, paragraphs, and sentences in many times and legends.*

Up to now Your Highborn will find everything in good order. But now the question arose: Which spirit should be blown into this lump of paper? Your Highborn has written to me absolutely correctly: The historico-critical spirit. But for several reasons this was impossible for me. Auxiliary means were missing, my reading was insufficient [...]. Finally I was convinced, that astrological belief – like other things – went through tradition; therefore no proof could be furnished about its origin; therefore a hypothesis had to be put forward. Admittedly, it was easy to say that it was clerical deception or misunderstood couchings of astronomical truths or false application of otherwise correct propositions, but I was unable to supply evidence. Moreover, Kepler's work and nature had to be described: For he certainly was an astrologer, that is, he believed in a connection of the celestial bodies with life on earth. It is true, he sank into many mistakes [...], but the nature, the mind, the life in with which he did it, must be of interest for everybody keeping himself receptive to the ambition of a great genius. It is in this sense that I have

said: It was in this sense, that I declared: He has written the spirit of legislation, and it appeared curious to me that he despised common astrology, but tried rescuing this belief against his age. For these reasons I had to give up the historico-critical way and gave another tone and mood to the whole. To refute astrological belief which had declined long ago would have been untimely; to defend and praise it in this age, which has more serious things to do, would not be decent also. So it was the plan to draw this image of astrological belief with all clarity and art, so to speak, from the soul of an astrologer, in varied form and style, but endowing the whole with a swaying movement, so that clarity would appear cloudy and the art mighty again. [...]. Finally the whole should be taken in such a way that none of the common people – in a broader sense – could learn astrology from this in order to use it. I was successful in the latter, because many a thing is indistinct for me, too. [...] This is the history of astrology, for which Your Highborn were not without concern for me in your last letter. [...] I do not believe that I have made interventions in astronomy. [...] Also, it is probably not so harmful if there existed a comet-like nature among astronomers – perhaps me – if they only move all around the Sun of truth and nobody takes the other one away with him. After all, the planets interfere with each other.⁴⁰

⁴⁰ 'Schon vor mehr als zehn Jahren hatte ich mich mit Astrologie beschäftigt. Bey populären Vorlesungen schien mir das ganze Erwähnung zu verdienen [...]. Damals hatte ich nur wenige Schriften, aber doch machte manches – historisch betrachtet – einen großen Eindruck auf mich. [...] Gewiß hat auch des Ptolemaeus Buch [Tetrabiblos] mehreres merkwürdige für mich gehabt. [...] Endlich war mir weder Ursprung noch Ende dieses räthselhaften Systems bekannt. Von Keppler kannte ich damals hierher gehöriges nichts, als etwa das *Mysterium [cosmographicum]*. Später lernte ich *Kepplers Harmonice [mundi]* kennen: auch seine Briefe, die astrologische[n] Bewegungen zu seiner Zeit, seine Ansichten die so ganz verschieden von denen seines Zeitalters waren. So sammelte sich manches, die Bilder erweiterten sich, und so entstand der Entschlus dem astrologischen Glauben ein Denkmal zu sezen. Ich sammelte was ich in meiner Nähe auftreiben konnte, sah mich etwas im Arabischen um, und so giengs nun in mannichfacher Zeit und Sage auf die Aphorismen, Paragraphen und Sentenzen los.

Bis hieher werden Ew. Hochg.[eboren] alles in Ordnung finden. Nun aber entstand die Frage: Was soll man dem Papierklos für einen Geist einblasen? Ew. Hochgeb.

The reactions of Pfaff's colleagues were hostile, they spoke disparagingly about his book and exchanged derisive remarks in their correspondence.⁴¹

[boren] schreiben mir unbedingt richtig: den historisch kritischen Geist. Aber der war mir aus mehrern Gründen unmöglich. Es fehlten mir die Hilfsmittel, meine Lecture reichte nicht hin [...]: Endlich war ich überzeugt, daß der astrologische Glaube – wie anderes – durch Tradition gieng, also sein Ursprung nicht nachgewiesen werden könne, also mußte eine Hypothese doch aufgestellt werden: da war nun freilich leicht zu sagen, es war Pfaffenbetrug; oder mißverständene Einkleidung astronomischer Wahrheiten; oder übertriebene Anwendung sonst richtiger Sätze: aber beweisen konnte ichs nicht. Dazu kam, daß Keplers Wirken und Wesen auch dargestellt werden mußte: denn er war gewiß ein Astrolog; d. h. er glaubte an den Zusammenhang der Gestirne mit dem Leben der Erde. Es ist wahr, er fiel mannigfach in Irrtümer, [...] aber die Art, der Sinn, das Leben mit dem er diß that, mus für jeden interessant seyn, der sich für das Streben eines großen Geistes empfänglich hält. In diesem Sinn sagte ich: er schrieb den Geist der Gesezgebung: und es schien mir merkwürdig daß er die gemeine Astrologie verachtet und jenen Glauben doch gegen sein Zeitalter zu retten sucht. Aus diesen Gründen muste ich also den historisch kritischen Weg aufgeben und dem ganzen einen andern Ton, und Stimmung geben. Den astrologischen Glauben der längst untergegangen, zu widerlegen, wäre unzeitig gewesen; ihn zu vertheidigen und zu preisen in unserer Zeit, die ernsthafteres zu thun hat, auch nicht anständig: So war also der Plan, diß Bild des astrolog.[ischen] Glaubens, gleichsam aus der Seele eines Astrologen heraus, mit aller Klarheit und Kunst, in abwechselnder Gestalt und Haltung vorzuzeichnen, dem ganzen aber eine schwankende Bewegung zu geben, so daß das Klare wieder getrübt erschiene, und die Kunst wieder mächtig. [...] Endlich sollte das ganze so gehalten seyn, daß niemand vom gemeinen Volk – im weitern Sinn – die Astrologie daraus erlernen könnte, um davon gebrauch zu machen. Diß letztere ist mir um so mehr gelungen, da mir manches selbst undeutlich ist. [...] Diß ist die Geschichte der Astrologie, für welche Ew. Hochgeb.[oren] in Ihrem lezten Schreiben nicht ohne Besorgniß für mich waren. [...] Ich glaube nicht, daß ich Eingriffe in die Astronomie gemacht habe. [...] Auch ist es wohl nicht so schädlich wenn unter den Astronomen je ein cometenartiges Wesen – vielleicht ich – wäre, wenn sie sich nur alle um die Sonne der Wahrheit bewegen: und keiner den andern mit sich fortnimmt. Stören ja doch auch die Planeten einander' (Partial transcription of the original letter written on 2.10.1816 in Nuremberg; in possession of the author. The text printed in excerpts by v. Lindenau [,Auszug aus einem Schreiben des Hrn. Professor Pfaff an den Director der Sternwarte Seeberg', *Zeitschrift für Astronomie* 1 [1816]: pp.471–476] shows numerous deviations.

⁴¹ *Astronomisches Jahrbuch für das Jahr 1820*, pp.249–250; *Wilhelm Olbers: Sein Leben und seine Werke*, ed Carl Schilling (Berlin: Springer, 1894–1909), 2.1:647–

His reputation was ruined, and in 1817 Pfaff also faced serious professional problems from quite another direction: The Bavarian government decided to dissolve the Realinstitut⁴², but fortunately Pfaff was transferred first to Würzburg, than to Erlangen a year later, where he lectured on mathematics and physics until his death on 26 June 1835.⁴³ In 1822 Pfaff began publishing an ‘Astrological Pocketbook’, which contained a German translation of books I and II of the ‘Bible of Astrologers’, the *Tetrabiblos* of Claudius Ptolemy.⁴⁴ In the second issue published the following year, the translation of books III and IV of the *Tetrabiblos*, as well as three essays on hieroglyphs and astrological monuments in Egypt appeared.⁴⁵ Pfaff announced the edition of his Pocketbook with the following words:

*Astrology takes her place in the order of the sciences again;
she takes possession of her genuine and inalienable property;
she collects what was scattered; everything is hers which
concerns the ancient beliefs of people on the significance of
time, the periodic course of nature, the sense of number,*

648, 653; *Briefwechsel zwischen Carl Friedrich Gauß und Christian Ludwig Gerling*, ed. Clemens Schaefer (Berlin: Elsner, 1927), pp. 136, 158. See also the sharp and highly critical review of Pfaff’s book in *Leipziger Literatur-Zeitung*, 1817, nr. 7, col. 49–56 (7 Jan. 1817); nr. 8, col. 63–64 (8 January 1817).

⁴² Nuremberg, State Archive: Kammer des Innern, Stadtkommissariat Nürnberg, 4584 (*Acta des Königl. Kommissariats der Stadt Nürnberg Die Organisation des Real Instituts betr. modo die Auflösung desselben*).

⁴³ Würzburg, State Archive, Universitäts-Curatel, 145, nr. 1-12; Würzburg, University Archive: Akten des Rektorats und Senats, 697, fol. 7; Erlangen, University Archive: Th. II. Pos. 1. P. Nr. 10.

⁴⁴ Pfaff, *Astrologisches Taschenbuch für das Jahr 1822* (Erlangen: Palm’sche Verlagsbuchhandlung, 1822), pp. 18–112. Pfaff used a Latin translation by Aegidius de Thebaldis printed first in Venice (1484), the Greek texts edited by Joachim Camerarius (Nuremberg 1535) and Melanchthon (Basle 1553), and also another edition by Nicolaus Prugner (1551). But mostly he relied on Melanchthon’s Latin translation, which accompanied the Greek edition of 1553 (Pfaff, *Astrologisches Taschenbuch*, pp.10, 18). Pfaff’s *Astrologisches Taschenbuch* is now a rarity, but his translation was reprinted in 1938 as a supplement to vol. 9 of the German astrological journal *Zenit*. After the Second World War this supplement was printed again as a separate booklet by a small astrological publisher near Hannover: *Tetrabiblos: Claudius Ptolemaeus astrologisches System* (Warpke-Billerbeck: Baumgartner, n. d.; c. 1950, with the erroneous author’s name Julius Wilhelm Pfaff).

⁴⁵ *Astrologisches Taschenbuch für das Jahr 1823* (Erlangen: Palm’sche Verlagsbuchhandlung, 1823), pp.3–128.

*likewise the elevation over time, not only the movement of the celestial bodies in the heavens with regard to the sidereal realm. Through the announcement of an Astrological Pocketbook for the year 1822, the author believes himself to fulfill the latest developments in science and the movement of time in the above respect. [...] The historical explanations, which it shall contain, may meet with the good response of an apt reader as well. The undersigned is pleased to have the participation of some excellent lovers of nature, and hereby invites the friends of sidereal wisdom to support him with advice, instruction and contributions.*⁴⁶

In the preface to his *Astrological Pocketbook* Pfaff remarked programmatically: 'The eldest relative of Urania, consecrated to heaven, astrology, misjudged and banished, rejected and abandoned, once again seeks her homeland; she seeks again a friendly reception in the circle of the sciences, nursed by the muses'.⁴⁷ But the two books only received a scornful comment from the Astronomer J. E. Bode in the *Berlin Astronomical Yearbook*: 'Both from a professor at a Bavarian university,

⁴⁶ 'Die Astrologie tritt wieder in die Reihe der Wissenschaften ein; sie nimmt Besitz von ihrem ächten und unveräußerlichen Eigenthum; sie sammelt das Zerstreute; alles, was den alten Glauben der Völker über die Bedeutsamkeit der Zeit, den Gang des Periodischen in der Natur, den Sinn der Zahl, selbst die Erhebung über die Zeit betrifft, das ist das Ihrige; nicht einzig in Beziehung auf das Siderische der Bewegung der Himmels-Körper am Firmamente. Durch Ankündigung eines Astrologischen Taschenbuchs für das Jahr 1822 glaubt demnach der Unterzeichnete in obiger Hinsicht dem Stande der Wissenschaft und den Regungen der Zeit zu entsprechen. [...] Auch nur die historischen Darstellungen, die es enthalten soll, mögen die Aufmerksamkeit eines sinnigen Lesers ansprechen [...]. Der Unterzeichnete erfreut sich der Theilnahme einiger ausgezeichneten [sic!] Naturfreunde, und ladet hiermit die Freunde siderischer Weisheit ein, durch Rath, Weisung und Beitrag ihn zu unterstützen'; Pfaff, 'Electrisch-magnetische Versuche, und Ankündigung eines Taschenbuchs für Astrologie', *Annalen der Physik und der physikalischen Chemie* 68 (1821): p.426.

⁴⁷ 'Die älteste Verwandte der Urania, der Himmelsgeweihten, die Astrologie, verkannt und verbannt, verstoßen und verlassen, sucht wieder ihre Heimath; sie sucht in dem Kreis der Musengepflegten Wissenschaften wieder freundliche Aufnahme' ('Über das Wesen der Astrologie', *Astrologisches Taschenbuch*, 1822, p.115).

who, with our current knowledge of the construction of the heavens, still confuses the heads of his audience and readers'.⁴⁸

Pfaff's speculative mind (already in his youth a lively fantasy had been attested) was by no means confined to astrology. Besides writing school textbooks and editing German translations of scientific works, he also took a lively interest in comparative language studies, oriental studies, and Egyptian archaeology.⁴⁹ For Cotta's *Morgenblatt für gebildete Stände* he wrote a series of articles, which he collected in a book with the significant title *Man and the Stars: Fragments towards a History of the World Soul* (*Der Mensch und die Sterne: Fragmente zur Geschichte der Weltseele*) shortly before his death in 1834.

Pfaff was fascinated by Kepler's works, and most likely his lively interest dates back to his student days at Tübingen, when Pfleiderer encouraged his students to occupy themselves with Kepler, whose books had fallen into oblivion.⁵⁰ In his book 'Man and the Stars', Pfaff combined an in-depth exposition of Kepler's *De stella nova*, enriched with detailed quotations, with a philosophical appreciation in which he emphasizes the anti-aristotelian implications of Kepler's treatise. Starting from a discussion of the ellipse strongly reminiscent of Hegel and Schelling, he saw in Kepler's planetary laws the approach of a new natural philosophy, quoting the term 'spiritualization' (*Vergeistigung*), which was repeatedly used by Schelling: '*This discovery spiritualized geometry and at the same time elevated the new philosophy of nature above the miserable, earthbound [precursor] of the ancients.*'⁵¹ The fact that Pfaff is thinking of Schelling is also shown by the subtitle of his work: 'Fragments on the

⁴⁸ 'Beide von einem Professor der Mathematik auf einer Baierschen Universität, der, bei unsern jetzigen Kenntnissen vom Weltbau, noch mit solchen veralteten Irrthümern die Köpfe seiner Zuhörer und Leser verwirrt' (*Astronomisches Jahrbuch für das Jahr 1825*, pp.252–253).

⁴⁹ For a survey of Pfaff's publications see Peter Michael Langhans, 'Personalbibliographien der Professoren der Philosophischen Fakultät zu Würzburg von 1803–1852 mit biographischen Angaben, gesichtet im Hinblick auf die Beziehungen zu Lehre und Forschung in der Medizinischen Fakultät' (PhD dissertation, University Erlangen-Nuremberg, 1971), pp.178–184, which is incomplete, however.

⁵⁰ Lagler, 'Christoph Friedrich von Pfleiderer', p.173.

⁵¹ '*Diese Entdeckung vergeistigte die Geometrie und erhob zugleich die neue Naturphilosophie über die irdisch armselige der Alten*'; Pfaff, *Der Mensch und die Sterne: Fragmente zur Geschichte der Weltseele* (Nuremberg: Friedrich Campe, 1834), p.153).

History of the World Soul', which is an allusion to Schelling's 'Of the World's Soul' (*Von der Weltseele*) of 1798.

When Pfaff demanded a treatment of the person and work of Kepler in its entirety (in particular regarding his astrological works), he appreciated an astrology 'in the nobler sense':

Nonetheless, Kepler is an astrologer, in the more noble sense; he indeed has a principle, because it is not scholastic, not mechanical, not theological, and recognizes a soul and unity in the world as a whole, without fairy tales like the magicians and Cabbalists or like the Thousand and One Nights to call for help. But what put Kepler in the [place of] philosophy of those parties? His astrology, I answer. But it is difficult to speak of Kepler's astrology, for it is now the endeavour of our writers to purge him of even the remotest stain of such madness, and to portray him as the most determined opponent of it. As certain as this may be, as certain is what is stated above. One could call this his principle of nature, the principle of harmony or sympathy in nature, and I would say in his writing on the New Star his new opinion is expressed most outright in contrast to the tastlessnesses of his time.⁵²

According to Pfaff, astrology, which is often treated as 'madness', should not be separated from the context of Kepler's work. This context is described by him in traditionally positive terms such as 'harmony' and 'sympathy'. In connection with astrological considerations Pfaff also dealt

⁵² 'Nichts desto weniger ist Kepler ein Astrolog, im edlern Sinne; er hat in der Tat ein Princip, weil es nicht scholastisch, nicht mechanisch, nicht theologisch ist, und eine Seele und Einheit in dem Weltganzen erkennt, ohne Märchen wie die Zauberer und Cabbalisten oder wie die Tausend und eine Nacht zu Hülfe zu rufen. Was setzte nun aber Kepler an die [Stelle der] Philosophie jener Partheien? Seine Astrologie, antworte ich. Es ist aber schwer, von Kepler's Astrologie zu reden, denn es ist jetzt das Bestreben unserer Schriftsteller, ihn auch von dem entferntesten Flecken solch eines Irrwahns zu reinigen, und ihn als den entschiedensten Gegner derselben darzustellen. So gewiß dieß seyn mag, so gewiß ist auch das, was oben angeführt ist. Man könnte dieß sein Naturprincip, das Princip der Harmonie oder der Sympathie in der Natur nennen, und ich möchte sagen in seiner Schrift über den neuen Stern ist seine neue Meinung im Gegensatz gegen die Abgeschmacktheiten seiner Zeit am ächtesten ausgedrückt' (Pfaff, *Der Mensch und die Sterne*, pp.157–58).

in detail with Kepler's biography. In his 'Astrological Pocketbook' he edited letters and documents on Kepler's defence of his mother against the charges of witchcraft.⁵³ Pfaff presented these documents as evidence of Kepler's character qualities: 'He acquires the highest respect through his sacrifice, perseverance and unshaken participation, surrounded by the prejudices and hatred of his enemies.'⁵⁴ The incongruence of scientific achievement and Kepler's often enough 'devastating situation' only increased respect: *'The veneration which we consecrated to the great Kepler as a scholar is now also his as a noble man. Hail Würtemberg, which has such ideals in the free realm of science.'*⁵⁵ Pfaff did not simply operate with a simple antagonism of enlightened science versus the 'dark Middle Ages', but views Kepler in a form of holistic approach. Moreover, he did not tune in to Kepler worship in Southern Germany at the beginning of the nineteenth century – in 1806–08 a monument for Kepler had been erected in Regensburg⁵⁶ –, but presented his publication as the result of new historical and archival research.

Pfaff was already working on a German translation of Kepler's *Harmonice mundi* in 1810.⁵⁷ Of these papers no traces exist anymore, but this early reception of Kepler proved to be fruitful. In 1814 Pfaff tried extending Kepler's harmonic investigations to the new planet Uranus, discovered in 1781 by William Herschel (1738–1822), and to the four minor planets, which had been found in the first decade of the nineteenth century.⁵⁸ Rather aghast, the astronomer Gustav Adolph Jahn (1804–1857)

⁵³ 'Briefe Keplers zur Vertheidigung seiner der Zauberey angeklagten Mutter: Aus den Original-Acten', *Astrologisches Taschenbuch*, 1823, pp. 303–335.

⁵⁴ 'Höchste Achtung erwirbt er durch seine Aufopferung, Beharrlichkeit und unerschütterte Theilnahme, umgeben von den Vorurtheilen und dem Haß der Feinde' (*Astrologisches Taschenbuch*, 1823, p.306).

⁵⁵ 'Die Verehrung, die wir dem großen Kepler als Gelehrten weihten, ist jetzt auch sein als edler Mensch. Heil Würtemberg, das im freyen Reiche der Wissenschaft solche Vorbilder hat!' (*Astrologisches Taschenbuch*, 1823, p.306).

⁵⁶ See Doris Becher-Hedenus, 'Wir durchlaufen alle eine exzentrische Bahn': *Die deutsche Kepler-Rezeption im 18. Jahrhundert und das Regensburger Denkmal von 1808* (Regensburg: Universitätsverlag, 2010), especially pp.259–306.

⁵⁷ 'Zufolge eines Schreibens des Hrn. Doct. von Lamberti aus Dorpat an mich vom 21. April 1810, giebt Hr. Prof. Pfaff in Nürnberg jetzt Keplers *Harmonice mundi* heraus' (*Astronomisches Jahrbuch für das Jahr 1813*, p.257).

⁵⁸ 'Ueber Keplers Weltharmonie', *Journal für Chemie und Physik* 10 (1814): pp.36–43.

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remarked: 'And what should we say about Pfaff's fondness for Kepler's *Harmonia mundi* and *Mysterium cosmographicum*?'⁵⁹

Christian Frisch (1807–1881) was responsible for the first critical edition of Kepler's works from 1858 to 1871. Like so many of his young compatriots he entered the 'Stift' in Tübingen as a theologian, but with the aim becoming a teacher. To further his studies in the exact sciences he matriculated in Erlangen and studied with Pfaff in 1830–31.⁶⁰

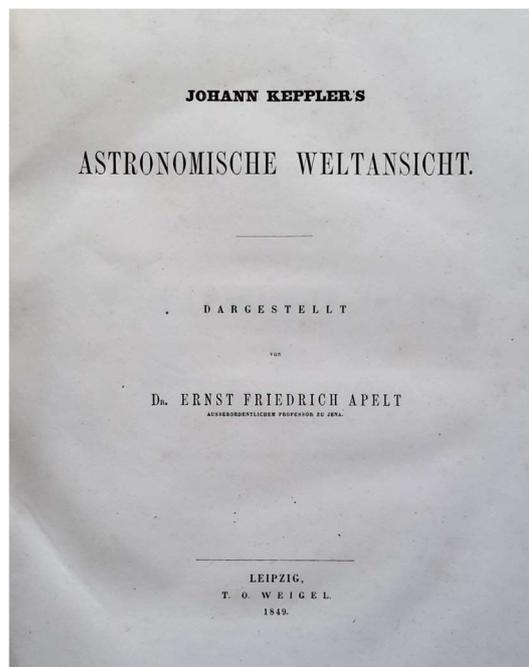


Fig. 4. Title page of Apelt, *Johann Kepler's astronomische Weltansicht*, 1849.

⁵⁹ Gustav Adolph Jahn, *Geschichte der Astronomie vom Anfange des neunzehnten Jahrhunderts bis zu Ende des Jahres 1842* (Leipzig: Heinrich Hunger, 1844), I:79.

⁶⁰ Karl Wagner, *Register zur Matrikel der Universität Erlangen 1743–1843* (Munich/Leipzig: Duncker & Humblot, 1918), p 180.

There is evidence of a direct connection between Pfaff's interest in Kepler and Frisch's edition project indeed, as can be deduced from important new sources which have surfaced recently.⁶¹ In 1837 Frisch received a letter from his brother-in-law, Joseph Kopp (1788-1842), who had been professor of philology in Erlangen since 1827. Kopp wrote, '*How about staying here next to me in your vacation? We could live together, philologize together, be enthusiastic, explore the sky, keplerianise [sygkepleriazeln]*'.⁶² Kopp was familiar with Schelling, who encouraged an edition of Kepler's works, and together with Frisch they formed a network. Regarding its intellectual background, the group was of a rather heterogeneous mixture, since Kopp had been trained by Jakob Friedrich Fries (1773–1843), who was an advocate of a 'mathematical philosophy of nature'. Christian Frisch was a politically progressive school teacher⁶³, and Schelling a speculative natural philosopher. In a newspaper article from 1845 Frisch gave an account how the idea of an edition of Kepler's works evolved:

A plan for the collection of these works had already been drawn up earlier by the late Professor Pfaff in Erlangen (in 1810), but was not implemented. However, Pfaff remained true to his belief in the importance of Kepler's writings for astronomers and natural philosophers, and their production seemed to him just as much in need as an act of piety against Kepler's manes. Many discussions with Pfaff and other friends in Erlangen about Kepler and his work made him more and more familiar with Kepler's writings, and many times asked to start the enterprise Pfaff had given up again, the undersigned undertook the difficult work, trusting the

⁶¹ Paul Ziche and Petr Rezvykh, *Sygkepleriazeln: Schelling und die Kepler-Rezeption im 19. Jahrhundert* (Stuttgart-Bad Cannstatt: Frommann-Holzboog, 2013), pp. 99–102, 140–144. The following account is based on the diligent researches of the two authors.

⁶² '*Wie wär's, wenn du deine Ferien hier neben mir zubrächtest? Wir wollten recht gemeinsam leben, gemeinsam philologisieren, enthusiastisch sein, den Himmel erforschen, keplerianisieren*' (Ziche/Rezvykh, *Sygkepleriazeln*, p.194).

⁶³ The constituency of Freudenstadt sent him to the Frankfurt National Assembly in 1848 and to the Württemberg state parliament in 1850. From 1871 to 1877 Frisch was delegate of the National Liberal Party in the German Reichstag (Frank Raberg, *Biographisches Handbuch der württembergischen Landtagsabgeordneten 1815–1933* (Stuttgart: Kohlhammer, 2001), pp. 224–225).

*promise of faithful support from several knowledgeable friends. Unfortunately, this support was only shared for a short time by Pfaff and the learned philologist Professor Kopp, who both snatched away an untimely death. On the other hand, others did not deprive him of their help which they had promised, the courtesy of the librarians in Stuttgart and Tübingen granted the means necessary for the preparation for the enterprise, of particular use was also the library of the city of Reutlingen, which contains an almost complete collection of mathematical works from the 16th century. During these preparations the wish to use the manuscripts in Petersburg had to be expressed.*⁶⁴

Frisch sketched the history of the origins of the edition as a continuation of efforts for Kepler starting with Tübingen, where knowledge about the astronomer was imparted at a high level and relevant materials were available. And there were personal relations among traditionally linked fellow countrymen: Schelling's acquaintance with Pfaff dates back to his time as a student in Tübingen, and during Schelling's stay in Erlangen there

⁶⁴ 'Schon früher wurde ein Plan zur Sammlung von diesen Werken durch den verstorbenen Professor Pfaff in Erlangen entworfen (im Jahr 1810), kam aber nicht zur Ausführung. Jedoch blieb Pfaff seiner Überzeugung von der Wichtigkeit der Kepler'schen Schriften für Astronomen und Naturphilosophen getreu, und ihre Herausgabe schien ihm ebensowohl Bedürfniß als ein Act der Pietät gegen die Manen Keplers. Vielfache Besprechungen mit Pfaff und andern Freunden in Erlangen über Kepler und seine Arbeiten machten immer mehr vertraut mit Keplers Schriften, und vielfach aufgefordert das von Pfaff aufgegebene Unternehmen wieder zu beginnen, unterzog sich der Unterzeichnete der schwierigen Arbeit, dem Versprechen treulicher Unterstützung von Seite mehrerer kenntnißreichen Freunde vertrauend. Leider wurde ihm diese Unterstützung nur kurze Zeit von Seiten Pfaffs und des gelehrten Philologen Professors Kopp zu Theil, welche beide ein zu früher Tod hinwegraffte. Hingegen entzogen ihm andere ihre Hülfe nicht welche sie versprochen hatten, die Gefälligkeit der Bibliothekare in Stuttgart und Tübingen gewährte die zur Vorbereitung auf das Unternehmen nöthigen Mittel, von besonderm Nutzen war auch die Bibliothek der Stadt Reutlingen, welche eine beinahe vollständige Sammlung mathematischer Werke aus dem 16ten Jahrhundert enthält. Bei diesen Vorbereitungen mußte natürlich der Wunsch rege werden die in Petersburg befindlichen Manuskripte benutzen zu können' (Ueber die Schriften des Astronomen Kepler', supplement to *Augsburger Allgemeine Zeitung*, nr. 157, 6 June 1845, pp.1249–1250, reprinted in Ziche/Rezvykh, *Sygkepleriazein*, pp.249–250).

were close connections between both families. The interest in Kepler shifted from Tübingen to Erlangen, via Kopp, and again via Pfaff, who had been working as a professor of mathematics in Erlangen since 1818 and also dealt there with philological topics falling within Kopp's field of expertise. When Frisch explicitly tied in with Pfaff's plan to deal with Kepler⁶⁵, the research contacts to Tübingen remained intact (also on a very practical level, as Frisch used the library there for his editorial activities). In a biographical paper Frisch dissociated Kepler from astrology and estimated his astrological occupations as a mere bread-and-butter job:

Only in a few words do we touch upon his views on astrology, the practise of which was one of his most important official duties. Here, too, we can see his honesty and masculine attitude towards the superstition of his time. He cast nativities and rendered the required prophecies in his calendars, but explained openly that such things were not to be read in the stars, and that a correct insight into given circumstances would easily lead to future changes of the same. He explained that the impertinence and stupidity of men forced the astronomer to turn to astrology, and that it was this which nourished the astronomer. 'Astronomy is the mother of astrology, and despite the mistakes of the latter, the mother must feed on her daughter'. Only the influence of the position of the stars on the weather was of importance to him, and in this respect he made meteorological observations for many years, to which he often refers.⁶⁶

⁶⁵ Frisch's personnel file contains notes of 1840, which refer to an occupation with Kepler that already had existed for several years. Thus the connection to Pfaff's older plans seems even more likely (Ludwigsburg, State Archive: E 203 I Bü. 463, fol. 11).

⁶⁶ *'Nur mit einigen Worten berühren wir hier noch seine Ansichten über Astrologie, deren Betreibung eines seiner hauptsächlichsten Amtsgeschäfte war. Auch hier zeigt sich seine Redlichkeit und männliche Gesinnung gegenüber von dem Aberglauben seiner Zeit. Er stellte Nativitäten und gab in seinen Kalendern die verlangten Prophezeiungen, erklärte aber offen, daß Solches nicht in den Sternen zu lesen sey, und daß eine richtige Einsicht in gegebene Verhältnisse leicht auch auf künftige Aenderungen derselben führe. Er erklärte, daß der Vorwitz und die Dummheit der Menschen den Astronomen zwingt, sich der Astrologie zu zuwenden, und daß diese es sey, welche den Astronomen ernähre. 'Die Astronomie ist die Mutter der Astrologie, und trotz der Fehler der letzteren muß sich die Mutter von der Tochter ernähren'. Von Bedeutung war ihm nur der Einfluß der Stellung der Gestirne auf die Witterung, und in dieser Beziehung machte er langjährige meteorologische Beobachtungen, auf welche er sich öfters*

This perception became common in the 19th century, and – notwithstanding all research work done since then – can even be heard today.

Schelling conducted negotiations with Sergej Uvarov (1786–1855), President of the Imperial Academy of Sciences in St. Petersburg and Secretary of National Education, and the volumes of Kepler's manuscripts were transferred successively from Pulkovo Observatory to Germany.⁶⁷ Making Kepler's works available became Frisch's main purpose and, although he frequently complained about a lack of interest and support, between 1858 and 1871 – the year of Kepler's 300th anniversary – eight volumes appeared in Frankfurt and Erlangen. Strange to say, in the preface Frisch did not say anything about the origins of the edition and his early co-workers.

But overall the first critical edition of Kepler's works was not a real success: Choosing Latin for the accompanying texts and commentary made it rather inaccessible, and notwithstanding Frisch's competent and diligent work lacunae and shortcomings became apparent over the years.⁶⁸ In 1914 Walther v. Dyck (1856–1934), rector of the Technical University in Munich, encouraged a new edition, now amply underscored with nationalistic pathos.⁶⁹

Finally, in addition to Schelling and Pfaff, a third name must be mentioned in connection with Kepler's 'resurrection': Ernst Friedrich

beruft'; Christian Frisch, 'Mathematiker und Astronomen Württembergs, besonders Kepler, der erste derselben', in: *Schwaben, wie es war und ist: Dargestellt in einer freien Folge von Aufsätzen in Schwaben geborener oder doch einheimisch gewordener Schriftsteller*, ed Ludwig Bauer (Karlsruhe: C. Macklot, 1842), pp.433–434.

⁶⁷ On the details see Ziche/Rezvykh, *Sygkepleriazein*, pp.154–169.

⁶⁸ Martha List, *Der handschriftliche Nachlaß des Astronomen Johannes Kepler und Tycho Brahe* (Munich: C. H. Beck, 1961), p.0.

⁶⁹ Peter Michael Schenkel, 'Der Pulkowoer Kepler-Nachlaß und die deutsch-russischen Wissenschaftsbeziehungen', in: *Naturgesetzlichkeit und Kosmologie in der Geschichte: Festschrift für Ulrich Grigull*, ed. Volker Bialas (Stuttgart: Steiner, 1992), pp.67–68; Volker Bialas, 'Zur Kepler-Gesamtausgabe bei der Bayerischen Akademie der Wissenschaften: Geschichte und voraussichtlicher Abschluß der Edition', in Wolfgang R. Dick and Jürgen Hamel, eds, *Beiträge zur Astronomiegeschichte 2* (Frankfurt a. M.: Harri Deutsch, 1999), pp.60–61; Ulf Hashagen, *Walther von Dyck (1856–1934): Mathematik, Technik und Wissenschaftsorganisation an der TH München* (Stuttgart: Steiner 2003), pp.369–373, 610–617.

Apelt (1812–1859), who came from a very different intellectual background.⁷⁰

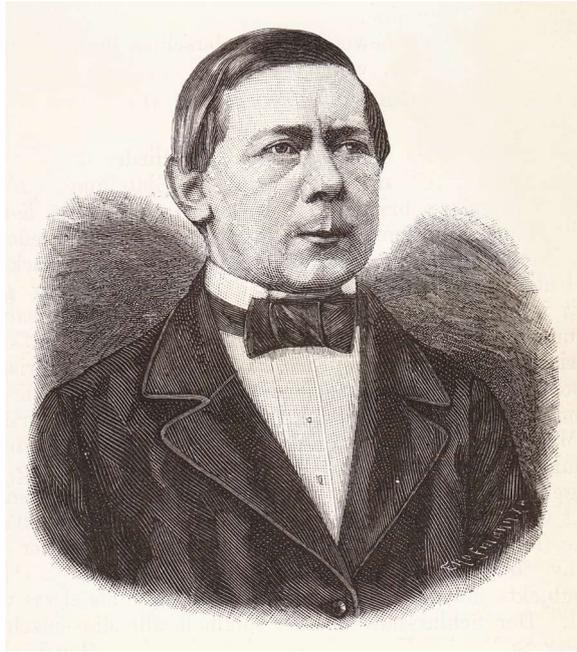


Fig. 5. Portrait of Ernst Friedrich Apelt.⁷¹

⁷⁰ For biographical details see *Erinnerungsblätter der Mathematischen Gesellschaft zu Jena*, II. Sammlung, Jena 1862, pp.19–31; Otto Apelt, 'Erinnerungen an Ernst Friedrich Apelt', *Abhandlungen der Fries'schen Schule*, new series, II (Göttingen: Vandenhoeck & Ruprecht, 1907), pp.361–411, on Apelt's philosophy: Walter Gresky, *Die Ausgangspunkte der Philosophie Ernst Friedrich Apelts: Ein Beitrag zur deutschen Geistesgeschichte des neunzehnten Jahrhunderts. Mit neuen Veröffentlichungen aus dem Nachlaß Apelts* (Würzburg: Triltsch, 1936); Stefan Groß, 'Ernst Friedrich Apelt', in Thomas Bach and Olaf Breidbach, eds, *Naturphilosophie nach Schelling* (Stuttgart-Bad Cannstatt: Frommann-Holzboog, 2005), pp.1–17. For a bibliography, see Thomas Glasmacher, *Fries–Apelt–Schleiden: Verzeichnis der Primär- und Sekundärliteratur 1798–1988* (Cologne: Dinter, 1989), pp.87–102.

⁷¹ Ernst Hallier, *Kulturgeschichte des neunzehnten Jahrhunderts in ihren Beziehungen zu der Entwicklung der Naturwissenschaften*, [Stuttgart: Ferdinand Enke, 1889], p.179.

Apelt was a pupil of Jakob Friedrich Fries (1773–1843) in Jena, who advocated a criticalism that emanated from experience and sharply differentiated between knowledge and faith. He advised philosophers to rely on mathematical theories of a mechanistically understood nature rather than on philosophical constructions. He became the most important representative of the so-called 'Fries School', which adhered to Kant's criticism of reason and opposed the idealistic speculation of Schelling and Hegel. In Jena, Apelt read mathematics, astronomy, physical geography and, from 1839 until his death, philosophy (from 1856 as professor). In addition, he devoted himself to the management and further development of his father's enterprises, a coal mine and a spa bath in Oppelsdorf, where he also founded a vitriol factory.

Apelt studied the life and work of Kepler extensively, identified him as a key to the 'Revolution of the sciences', and saw his mathematics, aesthetic sensibility, physical ideas, and theology as part of a unified system of thought. He published valuable works on the history of astronomy: in 1849 a slender book of 116 pages on Kepler's world view appeared, which contains a succinct and very clear account of his astronomical works and the *Harmonice mundi*.⁷² Three years later, Apelt published a history of astronomy.⁷³ The first part spans the period from Nicolaus de Cusa to Kepler 'in connection with the life and culture of the German nation', the second part deals with Kepler and David Fabricius (1564–1617), the learned East Frisian pastor, accompanied by an edition of their mutual correspondence. Both books are still valuable contributions and worth reading. Apelt admired what he called Kepler's almost divinatory ingenuity.⁷⁴ He also believed that the full extent of his greatness could only be appreciated from what the English philosopher and historian of science William Whewell (1794–1866) called the 'mystical part of his work.'⁷⁵

When Book I of the *Principia* was presented to the Royal Society in 1686, it was described as a treatise in which Newton gave 'a mathematical

⁷² *Johann Kepler's astronomische Weltansicht* (Leipzig: T. O. Weigel, 1849).

⁷³ *Die Reformation der Sternkunde: Ein Beitrag zur deutschen Culturgeschichte* (Jena: Friedrich Mauke, 1852).

⁷⁴ Apelt, *Weltansicht*, pp.4–5.

⁷⁵ William Whewell, *History of the Inductive Sciences, Founded upon their History* (London/Cambridge: John W. Parker and J. J. Deighton, 1837), I:414.

demonstration of the Copernican hypothesis as proposed by Kepler.⁷⁶ It was Newton, who had derived the three laws of planetary motion from a force-based theory of universal gravitation, and in the perspective of the 'Age of Enlightenment' Kepler was considered as a pathfinder only. Simultaneously his metaphysical and religious arguments met with skepticism and disapproval. This constricted reception and partial disregard was augmented in the Romantic Era, when Johannes Kepler reappeared 'completely'. This was largely due to a professor of mathematics and astronomy, who certainly cannot be ranked among the most distinguished scientists of his period who and is not very well-known today. But Pfaff's romantic attempt to lead astrology back into the circle of the legitimate sciences deserves attention.

⁷⁶ I. Bernard Cohen, 'Kepler's Century: Prelude to Newton's', *Vistas in Astronomy* 18 (1975): p.15.