Princess Elizabeth of Bohemia and Descartes’ letters (1650–1665)

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Abstract

After Descartes’ death in 1650, Princess Elizabeth generously shared with others several letters she had received from the philosopher, which contained philosophically as well as mathematically exciting material. In this article I place the transmission of these copies in context, revealing that Elizabeth steadily became an intellectually inspiring figure, attracting international attention. In the 1650s she stayed at Heidelberg where she discussed Cartesian philosophy with professors and students alike, including the professor of philosophy and mathematics Johann von Leuneschlos. In the mid-1660s, an initiative was taken from the English side of the Channel (Pell, More) to obtain Descartes’ mathematical letters to Elizabeth that had not yet been published. One letter of Elizabeth herself on this very subject has been preserved. The letter, addressed to Theodore Haak, will be published here for the first time. It is of special interest, because the princess supplies a general outline of her solution to the mathematical problem Descartes gave her to solve in 1643. It substantiates the hypothesis regarding Elizabeth’s solution earlier proposed by Henk Bos.

Résumé

Après la mort de Descartes en 1650, la princesse Elisabeth partagea avec d’autres les lettres qu’elle avait reçues du philosophe et qui contenaient un matériel intéressant, aussi bien philosophique que mathématique. Dans cet article, je place la transmission de ces copies dans leur contexte, en révélant que Elisabeth devint une figure intellectuelle importante, source d’inspiration et d’une attention internationale. Dans les années 1650, elle demeurait à Heidelberg où elle discutait la philosophie cartésienne avec des professeurs et des étudiants, parmi lesquels on trouve le professeur de philosophie et de mathématiques Johann von Leuneschlos. Dans le milieu des années 1660, une initiative fut prise du côté anglais de la Manche (Pell, More) pour obtenir les lettres mathématiques de Descartes à Elisabeth qui n’avaient pas encore été publiées. Une lettre d’Elisabeth elle-même sur ce sujet a été conservée. Cette lettre, adressée à Theodore Haak, est publiée ici pour la première fois. Elle est d’interêt particulier parce que la princesse donne le contour général de sa solution au problème mathématique que Descartes lui donna à résoudre en 1643. Elle justifie l’hypothèse concernant la solution d’Elisabeth proposée auparavant par Henk Bos.

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René Descartes died in Stockholm on 11 February 1650. At the invitation of Queen Christina, Descartes had exchanged his quiet habitat in Holland for the Swedish royal court, and had taken up lodgings at the house of his friend Pierre Chanut, the French ambassador. Shortly after Descartes' death, Chanut went through Descartes’ papers and made a first inventory of them. A week later, on February 19, Chanut wrote to Elizabeth, Princess Palatine, to tell her the sad news of Descartes’ death [AT, V, 470–471]. He informed her that he had found her letters to Descartes and asked for instructions about them. Two months later Chanut returned the letters to Elizabeth, assuring her that he had not read them [AT, V, 472–473]. At the same time, he recalled Descartes’ own view that several of his letters to Elizabeth could hardly be understood without her side of the correspondence. Chanut told Elizabeth that he proposed to publish a selection of Descartes’ letters to her, to Queen Christina of Sweden, and to himself, together with several letters from her to Descartes. Elizabeth, however, refused.1 As a result, the three volume edition of Descartes’ correspondence published by Chanut’s brother-in-law, Claude Clerselier, went to press without any letters from Elizabeth.2

Although Elizabeth refused to have any of her letters to Descartes published, she generously shared with others several letters she had received from Descartes, before their publication by Clerselier. In this article I trace the history of these letters, focusing on the context in which these letters were transmitted. It sheds light on the scribal circulation of Descartes’ ideas, showing how the Princess Palatine and savants in Switzerland, the Low Countries, France, Germany and England shared information on Descartes’ philosophy and mathematics via manuscript circulation. The first part of this article considers the 1650s, when Elizabeth stayed at her family’s ancestral castle in Heidelberg. The reception of Cartesianism at the University of Heidelberg—still largely uncharted—is consequently a topic that will be addressed. The second part describes how, in the mid-1660s, an initiative was taken from the English side of the Channel to obtain Descartes’ two mathematical letters to Elizabeth that had not (yet) been published by Clerselier. One letter by Elizabeth herself on this very subject has been preserved. The letter, addressed to Theodore Haak, is published below for the first time. It is of particular interest because in it Elizabeth supplies a general outline of her own solution to a mathematical problem Descartes gave her to solve.3

1 The letters of Elizabeth to Chanut have not been preserved, but Adrien Baillet, who had access to these letters, reports her refusal [Baillet, 1691, v. 2, 428, 502, 515; AT, V, 474–475].
2 Descartes, 1657–1667; 31 letters to Elizabeth are found in v. 1, but the two “mathematical letters”, on which see below, were published in the third volume. The extant letters of Elizabeth to Descartes (26 in all) are known exclusively from a manuscript found in the library of Rosendael castle, near Arnhem. They were published for the first time by Auguste Foucher de Careil in 1879. The provenance of the manuscript is unknown, but it is possible that Chanut had Elizabeth’s letters copied before returning them to her. For further details, see Descartes [2003, xxxiii–xxxvi]. A possible candidate for acquiring the manuscript for the Rosendael library, omitted in Descartes [2003], is Johan van Arnhem (1636–1716). On him, see Bierens de Haan [1994, 23–26, 327].
3 In 2003 we published a pilot edition of Descartes’ correspondence, taking the year 1643 as a sample year [Descartes, 2003]. We were happy to have found in the British Library copies of the two mathematical letters to Elizabeth among the papers of the English mathematician John Pell. These letters were not copied from Clerselier’s edition but were apparently taken directly from Descartes’ autographs. At the time we could not properly investigate the provenance of these letters. Alan Gabbey was the first to bring Elizabeth’s letter to Haak to my attention, and I am most obliged to Noel Malcolm, who magnanimously sent me his transcription of the letter together with relevant correspondence from Rahn and Pell (see below). I am very grateful for his kind permission to use and publish this material.
1. Heidelberg

After the peace treaty of Westphalia had effected the return of the Lower Palatinate to the heir of Frederick V, Elizabeth joined her brother the Elector in Heidelberg in the summer of 1651 [Köcher, 1879, 48]. One of the Elector’s responsibilities was to reestablish the university that had been closed down during the Thirty Years’ War. The university was formally reopened in November 1652, and the Elector himself assumed the first rectorship—a clear signal of the Elector’s interest in the university as well as a sign of strong state control [Wolgast, 1986, 56]. The regular visits of members of the academy to the palace allowed the princess to get to know the various professors, and for their part, the professors took an interest in the person to whom Descartes had dedicated his *Principia philosophiae* (1644). Given the presence of the “Cartesian” princess and the close ties between the Palatine court and the university, the history of the reception of Cartesianism at the University of Heidelberg is of special interest. Unfortunately, there is as yet no study into the subject; in fact, literature on the reception of Cartesianism in Germany is limited.4 The observations below on four individual scholars, each with a connection either to Elizabeth or to the university, may serve as an outline of the situation at Heidelberg.

1.1. Joachim Jungius (1587–1657)

Joachim Jungius taught philosophy and mathematics at the Academic Gymnasium in Hamburg from 1629 till his death in 1657. His keen interest in Descartes and his works is apparent from his correspondence with his (former) students who pursued their studies in the United Provinces. He studied Descartes’ *Meteores* and *Geometrie* and kept a sharp eye on philosophical developments in Holland. Descartes from his side knew Jungius by reputation, and seems to have had a favorable impression of the Hamburg professor.5

A letter from Jungius of 1655 informs us that while Elizabeth lived in Heidelberg she stimulated a small circle of students to read Descartes.6 Jungius knew this because a former student of his had asked him to write a letter on Descartes’ *Principia*, which the circle was studying at that moment. According to Jungius, the student benefited from the conversa-

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4 With the noteworthy exception of Trevisani’s study of the reception of Cartesianism in Duisberg [Trevisani, 1992a, 1992b]. For Herborn and Wittenberg, see Menk [1985] and Verbeek [2005], respectively.

5 Jungius is nowhere mentioned in Descartes’ works or his correspondence, but Samuel Hartlib, in his notes, remarked that “Cartes calles Iungius hominem subtilis ingenii” [Ephemerides, 1640, Hartlib, 2002, 30/4/56A]. Hartlib’s source is not known.

6 Jungius to an unknown correspondent, 23 March [2 April] 1655. The letter was first published in Gehrner [1850, 284–286]; also in Risse [1977, 217–219]; and finally in the recent edition [Elsner and Rothkegel, 2005, 803–805]. According to Gehrner [1850, 317], followed by subsequent editors, the addressee was Reinhold Blomius, or Blome/Blum (1617–1690), who studied at Hamburg, Leiden, and Helmstädt and became Professor of Law at the University of Heidelberg. Blome entertained a lively correspondence with his former teacher. (Elsner and Rothkegel [2005] lists 65 letters to and from Blome, dating from 1639 till 1653.) However, as Blome was appointed professor at Heidelberg only in 1663, and his presence in Heidelberg in the 1650s is not attested, Gehrner’s attribution is probably wrong. On Blome in general, see *Neue Deutsche Biographie*, v. II, 321 (“Blum”), and [Drüll, 1991, 11–12].
tion and “quasi-teaching” on Cartesianism of the Princess Palatine. Later on in the letter Jungius even referred to Elizabeth as magistra tua [Elsner and Rothkegel, 2005, 805]. At the end Jungius asked his correspondent to send him copies of the two letters by Descartes that the Princess had communicated to him. The student seems to have complied, because an early inventory of the papers Jungius left after his death lists 11 letters by Descartes. Unfortunately, in 1691 the majority of Jungius’s papers were lost in a fire, including (the copies of) Descartes’ letters, and we can therefore not be certain of their addressee(s)—in any case, none were addressed to Jungius, who never had any direct contact with Descartes. From Jungius’s letter to the student it is not clear to whom the letters from Descartes and communicated by Elizabeth were addressed, but we may assume that they were letters to Elizabeth herself. Indeed, there is no indication that Descartes ever supplied the princess with copies of letters he wrote to others, nor that Elizabeth herself acquired any of Descartes’ correspondence after his death. We can only conjecture which letters the princess shared with her “students”, but given that they had been reading the first part of the Prin-
cipia, it is possible that they were the first two letters Descartes wrote to Elizabeth on the relation between body and soul.

1.2. Johann Hottinger (1620–1667)

Johann Heinrich Hottinger started his academic studies in his hometown of Zürich and completed his studies abroad, at Geneva, Groningen, Leiden, and finally in England. In 1642 he was called back to Zürich to become professor in church history and oriental languages. His reputation as an eminent scholar soon spread over Europe, as is shown by the numerous offers he received from universities, all of which he declined. However, at the personal request of Karl Ludwig, whom he had met in England, Hottinger agreed to stay temporarily in Heidelberg to set up the theological faculty there (from 1655 to 1661). Finally, Hottinger accepted an appointment at Leiden University in 1667. As he was making

7 “I have understood from your father how much you profit by the conversation and the teaching as it were on Cartesian philosophy by the most Serene Highness the Princess Palatine . . .” (“Intellexi ex clarissimo viro parente tuo, quandoquidem tibi obtigit conversatione et quasi institutione frui serenissimae Principis Palatinae in philosophia Cartesiana . . .” [Elsner and Rothkegel, 2005, 803], my italics).

8 “I ask you to send me the two transcribed letters of Descartes, which the Most Serene Princess has communicated to you, so I could thereby better advise and assist you and others in your studies.” (“Tu, quaeo, duas Cartesii epistolae, quas serenissima princeps tibi communicavit, descriptas mihi transmitte, ut eo melius studiis tuis et aliorum consulere et subvenire possim” [Elsner and Rothkegel, 2005, 805]). Risse [1977, 219], following Guhrauer, omits the word “duas,” thus leaving the number of letters undecided.

9 “11 Epistolae Cartesii cum re[spon]sione ad analyticam,” [Meinel, 1984, xxi]. Massimiliano Savini ventures that some of these letters were written to Woldeck Weland, a former student of Jungius, who would have supplied Jungius with copies of his correspondence with Descartes [Savini, 2006]. The same view is in Elsner [1988, 24–25] and Lüdtke-Altona [1937, 409]. However, Weland never corresponded with Descartes; the mistaken view that he did, is based upon a mistranslation of one of his letters to Jungius. Cf. [Elsner and Rothkegel, 2005, 299, lines 34–35].

10 Copies of Descartes’ first two letters to Elizabeth circulated in Holland and France before their publication in Clerselier’s edition (1657), but their provenance is unclear. See Descartes [2003, 67–70, 96–99].

11 On Hottinger in Heidelberg, see Mühling [2000], and Steiner [1886]. In what follows I am much indebted to the latter study.
a farewell boat trip together with family and friends in Zürich, the boat capsized, and in an
effort to rescue his family, Hottinger drowned together with three of his children.
On the day of his arrival in Heidelberg, in early August 1655, Hottinger dined with the
Elector, undoubtedly meeting Elizabeth as well. Greatly impressed by her—or had he met
her before in the Hague?—Hottinger dedicated the fifth volume of his *Historica ecclesiastica*
to her on 5 August. During the following years he became her confidant, discussing
church history, his work in oriental languages, and matters of a more personal nature as
well. After Elizabeth had left Heidelberg in 1658, they kept in touch by letter. In one of
these letters she congratulates Hottinger on the birth of a daughter, who was named after
her and whom she saw as her godchild.

The correspondence of Hottinger provides further evidence that Elizabeth was not reluc-
tant to impart some of the contents of Descartes’ letters to others. On 1/[11] March 1657
the Swiss mathematician Johann Heinrich Rahn (1622–1676) wrote to Hottinger, sending
him greetings from the English mathematician John Pell, who was on diplomatic service
in Zürich. Rahn wrote that he was receiving weekly lessons in mathematics from Pell
and that during one of the last sessions they had examined Descartes’ two letters to
Elizabeth on the three-circle problem. Previously, Elizabeth had had these letters copied
for Rahn at Hottinger’s request, but Rahn and Pell now concluded that an indispensable
diagram was missing. Rahn expressed his hope that this deficiency could be rectified,
and also suggested that Elizabeth might like to engage in mathematical correspondence
with Pell, but this suggestion seems not to have been taken up [Malcolm and Stedall,
2005, 164]. However, one of Elizabeth’s letters to Hottinger reveals that Elizabeth had at
least once discussed mathematics with Rahn. Through Hottinger she thanked Rahn for
sending her a copy of his *Teutsche Algebra* (1659), insisting that Rahn’s compliments to
her were undeserved:

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12 Hottinger, 1655–1667. In his letter of dedication he compares Elizabeth to Olympia Fulvia
Morata (1526–1555), who, according to Hottinger, gave private lectures in philosophy at the
University of Heidelberg [Hottinger, 1655–1667, v. 5, a5]. In fact, Olympia Morata gave private
lectures in Greek. Given the evidence supplied by Jungius, Hottinger’s comparison could be apt,
although it is still doubtful, if not unlikely, that the academic senate officially allowed the Princess to
give private lectures.

13 Steiner [1886] includes six letters by the Princess to Hottinger. On 20/30 May 1659 she wrote from
Krossen “because she [Hottinger’s newborn daughter] has my name, I will look upon her as my
godchild” (“weil sie meine namen hat, werde ich sie für meine pahte halten,” p. 55). On 29 October
1659 (OS?), she sends her greetings to the little Elizabeth, “whom I will show at the first opportunity,
that I look upon her as a godchild” (“der ich mit erster gelegenheit bezeugen will, dass ich sie für eine
pahte halte,” p. 56). Elizabeth Hottinger drowned with her father in 1667.

14 Rahn to Hottinger, 1/[11] March 1657, Zürich, Zentralbibliothek, MS F 71, fo. 235: “So hab Ich
Ihmme [sc. Pell] nachstin die 2 Schreyben So Ihre Fuerstlichen Die Schreyben Elisabetha mir gn[a]dig[st]
participiert, Von Cartesio an Sie abgegangen [in margin: gewiesen]: Inn welcher Schreyben
examinierung wir befunden das ein notwendiges Schema (ohne welches das
Innhalt nit Zue V[er]stehen ist) Von dem Copisten beizufüegen Vergessen worden wesshalbe mir
sehr lieb wenn solches auch Zuehaben.” I thank Noel Malcolm for allowing me to use his transcript
of the letter.
The German algebra of the governor Rahn is also a delightful piece [...] He adorns me with a title that I do not deserve, especially with regard to this subtle art, which is beneficial to all of mankind. The things I told the governor on that subject did not spring from my own ingenuity, but from my famous teacher, the late Mons. des Cartes.15

1.3. Johannes Freinsheim (1608–1660)

Elizabeth certainly discussed Descartes and Cartesian philosophy with Johannes Freinsheim, who was appointed honorary professor at Heidelberg in 1656. Between 1642 and 1651 he had been living in Sweden, first as Professor of Rhetoric at the University of Uppsala, and from 1647 as the librarian of Queen Christina. In 1648 the Queen ordered him to study Descartes’ *Principia* so that he could instruct her (AT, V, 253). Like Elizabeth, he had corresponded with Descartes, albeit on a limited scale, and he may have supplied her with details of Descartes’ stay in Sweden.

1.4. Johann von Leuneschlos (1620–1699)

Johann von Leuneschlos was the first appointed professor of mathematics and physics in Heidelberg when the university reopened in 1652. Although he held this position for over 40 years, till 1695, only a few works and disputations of his survive, which is presumably why he has remained an ignored figure in the history of philosophy.16 According to Jöcher’s *Allgemeines Gelehrten-Lexicon*, Leuneschlos was a pupil and an associate of both Pierre Gassendi and Descartes, living with the latter in the Netherlands and Sweden [Adelung and Rotermund, 1784–1813, v. 6, cclxiv]. Although these claims lack historical evidence, it would seem that Leuneschlos met Descartes once.

Leuneschlos was born the eldest son of a minister in Solingen [Thiele, 1970, 24]. He studied at various Dutch universities between 1639 and 1644, certainly at Groningen and Franeker, and probably at Utrecht and Leiden as well.17 He matriculated at Padua University in 1646, receiving his doctorate in philosophy and medicine there in October 1648 [Weigle, 1965, 357; Rosetti, 1986, 273]. In Padua he published his first work, *Thesaurus mathematicum reseratus per algebraem novam* (1646), which he dedicated to the Dutch

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15 “Des Herren Landvogt Rahn seine deutsche algebra ist auch ein herrlich stück [...]. Er gedenket meiner darinnen mit einem tittel, den ich nit verdiene, insonderheit in dieser subtilen kunst, die den gantsen menschen erfordert. Was ich dem Herren landvogt davon gesagt, kam nicht aus eigener wits, sondern von meinem hochberühmten lehrmeister, dem seligen Mons. des Cartes her.” Elizabeth to Hottinger, 21/31 May 1659, cited from Steiner [1886, 56]. Rahn’s work in question is *Teutsche Algebra, Oder Algebraische Rechenkunst*, Zürich: J. Bodmer, 1659. According to Steiner, the passage Elizabeth referred to reads: “Persons of high royalty could also be mentioned, whose virtue and high wisdom is known to all, who excell in this art and are therefore famously attracted by the afore mentioned Descartes” (“Es könten auch hochfürstliche Personen genannt werden, dero tugend und hohes wissen in aller welt berühmt ist, die in diser Kunst fürtrefflich informirt, und hierum von dem vernamten Cartesio selbs rühmlich angezogen werden”).

16 Überweg’s *Grundriss der Geschichte der Philosophie* pays little attention to Heidelberg, focusing on Keckermann only. Leuneschlos and his *Tractatus de corpore* (1659) are listed but not discussed [Überweg, 1988–2001, v. 4, 407].

17 According to Schwab [1786–1790, v. 2, 12], Leuneschlos studied at all four universities, but his name appears in the matriculation records of the universities of Groningen (May 1639, *ASG*, 39) and Franeker (September 1644, *ASF*, 131) only.
merchant Lodewijk de Geer, who was apparently his patron. The Thesaurus is an exhaustive overview of the whole of mathematics according to an original classification system [Folkerts, Knobloch, and Reich, 1989, 23–25]. Descartes’ Geometrie is among the numerous works referred to. Having established his reputation as a mathematician, Leunesclos was proposed, albeit unsuccessfully, as a candidate for the chair in mathematics at Utrecht University in 1650. Before his appointment at Heidelberg, he spent some time in Sweden as an advisor to De Geer’s mining enterprises. According to a brief account of him written in 1681, he had once been “a companion of Descartes in his travels.” It was thought that this might perhaps refer to Descartes’ voyage to Sweden, but that is impossible because Leunesclos was already in Stockholm in July/August 1649, several weeks before Descartes embarked from Amsterdam.

In 1659 Leunesclos published a treatise on natural philosophy, Tractatus de corpore, which, in the context of the reception of Cartesianism in Heidelberg, is worthy of attention. The Tractatus, which appears to be a textbook for Leunesclos’s students, consists of over a thousand short propositions, dealing primarily, after a general outline of the physical world, with mechanics and astronomy. Even though Leunesclos starts by defining substance, attributes, modes, and qualities, his natural philosophy is strongly Cartesian. Indeed, the eighth proposition states that substance is either intellectual or material, that is, corporeal. Matter is subsequently identified with extension in three dimensions, leaving no difference between celestial and terrestrial bodies. Body in general is the same as space; space is the internal place, whereas the superficies are labeled external place. As far as the vacuum is concerned, it can exist vulgo dicitur, when space contains no sensible bodies, but absolutely empty space is impossible: indeed, were God to remove from a vessel all the bodies contained in it, the sides of the vessel would collapse onto each other, leaving no space in between. Furthermore, all bodies are porous, their insensible pores being filled with subtle matter.

In the Tractatus de corpore Leunesclos closely follows and faithfully summarizes the second and third part of Descartes’ Principia philosophiae (1644). Surprisingly, Descartes is nowhere mentioned. However, in his preface Leunesclos makes his philosophical

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18 [Kernkamp, 1936–1940, v. 1, 253]. Preference was given to John Pell, who however declined. For Pell’s negative judgement of Leunesclos’s works, see Malcolm and Stedall [2005, 168, 519].


20 Leunesclos wrote a poem, dated Stockholm, 29 July [8 August] 1649, on the occasion of the marriage of Petrus Figulus to the daughter of Comenius. See Blekastad [1980, 26, 60–61]. As well as in the literature mentioned above, further details on Leunesclos can be found in Parnassus Heidelbergensis, Heidelberg: Berger, 1660 (not seen by me), and Drüll [1991, 93–94]; Pufendorf [1995, 405–407]; Döring [2006, 320–321].

21 Heidelberg: Adrianus Wyngaerden, 1659. The Dutch printer and bookseller Wyngaerden (active between 1644 and 1668) was first working only in Leiden, but subsequently started printing shops at Duisburg and Heidelberg, where he became the university printer for the newly established or reopened universities. Among his authors were the Cartesians Johannes Clauberg and Christoph Wittich. Unfortunately, the copy of the Tractatus de corpore I consulted at the Staats- und Universitätśbibliothek Göttingen appears to be incomplete. This copy is available on line at the library’s Web site. Noel Malcolm has already noted that the Tractatus de corpore is strongly Cartesian [Malcolm, 2002, 85].


23 Leunesclos offers a more detailed astronomy than Descartes, and it needs to be investigated whether or not he dissents anywhere from Descartes. The copy at Göttingen breaks off after Proposition 1003, just when Leunesclos is about to discuss the earth, probably offering an account of Descartes’ Principia Part 4.
denomination clear. There he distinguishes philosophy from other disciplines such as grammar, logic, and theology. Philosophy knows four branches: metaphysics, mathematics, physics, and moral philosophy. Mathematics is the most eminent and the first among all human sciences, because of its certain and evident conclusions and demonstrations. It considers in abstracto those objects which physics considers in concreto (abstract solids as opposed to concrete bodies). Therefore, physics is a branch of mathematics. With approval Leuneschlos cites, not Descartes, but the unknown author of the two letters to Descartes added by way of preface to Descartes’ *Passions de l’âme*. The unknown correspondent writes that “the true physics is a part of mathematics,” as Descartes would have shown in his *Principia*; moreover, “it is only by mathematics that knowledge of the true physics can be obtained.” Mathematics as the key to the understanding of the universe seems to have been Leuneschlos’s main academic theme. Indeed, the title of his inaugural lecture was *De Deo geometrizante*, which, for that matter, has a strong Platonic ring. Leuneschlos is without doubt the key figure in the reception of Cartesianism at Heidelberg University. We have, as yet, no clear idea of his professional connections, but he certainly corresponded with the well-known Cartesian philosopher Johannes Clauberg, also born in Solingen (two years after Leuneschlos) [Henninius, 1691, 12]. As to the contacts between Leuneschlos and Elizabeth we can only speculate. They must have met, but we lack any indication of the nature and extent of their relationship.

1.5. The letters on the passions

In the second half of 1645 Descartes and Elizabeth engaged in a philosophically interesting correspondence. On July 21, Descartes suggested to Elizabeth that they should read and discuss Seneca’s *De vita beata*. However, they both felt disappointed in the material, and soon they moved from Seneca to the theory of passions. After seven letters (from Descartes’ side) the discussion came more or less to a close, but in the spring of the following year Descartes was able to offer the princess a first version of his *Passions de l’âme* (published in 1649), the fruit of their correspondence. Descartes was the first to divulge this correspondence when he sent copies of six of the letters to Chanut, hoping that Queen Christina would enjoy reading them. The library in Marburg holds a manuscript copy of Descartes’ seven letters to Elizabeth which gives us strong reasons to presume that Elizabeth also communicated these letters to others. The Marburg manuscript originates from Johann Caspar von Dörnberg (1616–1680), a diplomat in the service of the house of Hesse-Kassel, who in the 1660s acted on behalf of

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24 *Tractatus de corpore*, Praeludium, [2].
25 Descartes, *Passions de l’âme*, AT XI, 315, 316. Leuneschlos quotes that part of the letter that runs from AT XI, 314, l. 21 to 315, l. 5 and from 315, l. 29 to 316, l. 29. For the relevant passage in Descartes’ *Principia*, see *Principia*, Pt. 2, art. 68 (AT, VII, 78–79).
26 The oration appears to be lost; its title is found in Schwab [1786–1790, v. 2, 4].
27 Descartes to Chanut, 20 November 1647, AT V, 87. In his letter to Chanut, Descartes remarked that copies of Elizabeth’s letters would certainly have added to the interest of the compilation, but that it would take too long to get her approval. This sparked Chanut’s idea that these letters would make an attractive publication.
28 Hessische Staatsarchiv, Marburg. The letters in question are 21 July, 4 and 18 August, 1 and 15 September, 6 October, and 3 November 1645.
Charlotte-Elizabeth of Hesse-Kassel in the conflict with her husband the Elector Palatine Karl Lukwig, Elizabeth’s brother. In this conflict—the Elector repudiated his wife and morganatically married one of her ladies in waiting—Elizabeth chose the side of her sister-in-law and in 1658 left Heidelberg for Kassel [Finke, 1974, 172–178; Morrah, 1976, 294, 302]. Since Von Dörnberg was a cultivated man, interested in religious affairs, it is easy to understand how he came into contact with Elizabeth, although there is no certainty that she was his immediate source; he may have copied another manuscript already in circulation. Indeed, copies of the same letters are found in the Leibniz archives in Hanover, and fragments of four of the letters in Munich. 29 These manuscripts are not copied from Clercier’s edition because they are all dated, whereas Clercier’s are not. There are, moreover, several textual variants from the Clercier versions. We may therefore safely assume that Elizabeth herself imparted copies of Descartes’ letters to those genuinely interested in the French philosopher, such as Rahn, the addressee of Jungius’s letter, and presumably to Von Dörnberg as well.

2. England

Descartes’ mathematical letters to Elizabeth of 1643 were not included in the first or second volume of Descartes’ correspondence edited by Clercier. Elizabeth herself was surprised by this, as the English divine John Worthington observed in a letter to his friend Samuel Hartlib:

I suppose you have seen or heard of Descartes’ his second volume of letters, wherein many or most of them are about matters betwixt him and Mersennus. They are all in French that are in this second volume; no letters to the Princess Elizabeth. I did much rejoice when I heard of Mr. Dury’s journey into Germany, for this (among other) reasons, that possibly he might visit that excellent princess. I have read in some of your papers an extract of a letter of hers, wherein she mentions some letters of Descartes to herself, which are not in the first volume of his letters, and are more worthy to be printed than several others in that volume. 30 She also thought that the methodizing and placing of the letters might have been to better advantage. If those letters unprinted might be imparted to the public, they would be a great ornament to the second edition of these epistles . . .

29 Cf. AT, IV, 666–667. Leibniz met Elizabeth for the first time in 1678, wrote her a letter on Descartes’ ontological proof for the existence of God, and visited her on her deathbed in 1680 [Aiton, 1985, 90–91, 100]. It is unknown how and when Leibniz came into the possession of Descartes’ letters. The fragments in Munich are from Descartes’ letters dated 4 August, 18 August, 6 October and 3 November 1645. Bayerische Staatsbibliothek, Munich, “Extraits des lettres de Mr Descartes à la Princesse de Bohème,” Collectio Camerariana, v. 57, no. 246 (Clm 10407, fos. 485r–486r). Cf. Catalogus codicum manu scriptorum Bibliothecae Regiae Monacensis, IV, pars I (Munich, 1874), 332.

30 This extract of Elizabeth’s letter appears to be missing from the surviving Hartlib papers. The letter itself, presumably addressed to a member of the Hartlib circle, seems to be lost as well.
Hartlib replied that he would write accordingly to John Dury in Germany. However, it was not before 1665 that copies of the letters were obtained, through the intermediary Theodore Haak. This information can be gathered from a letter of Elizabeth to Haak, dated Berlin 9/19 May 1665, in which she wrote that she had “recently” sent him copies of the two letters. The princess furthermore revealed some details of her own solution to the mathematical problem Descartes gave her to solve. Before turning our attention to the letter, which is published in extenso below, we will first outline the text and the context of the two mathematical letters.

On 21 October 1643 Descartes wrote to his friend Alphonse Pollot that he had recently proposed a mathematical problem to Elizabeth, but now feared it was too difficult. The problem in question was the problem of three circles, also known as Apollonius’ problem: given three circles in a plane, find a fourth circle that touches each of them. Descartes furthermore assumed that the required circle is located in the space between the three circles (Fig. 1). Barely a month later, on 17 November, Descartes sent Pollot a letter for Elizabeth that contained his solution to the problem. On 21 November, Elizabeth sent her own solution to Descartes with a covering letter. Although Elizabeth’s solution is lost, Henk Bos has reconstructed it from Descartes’ reply of 29 November. As we shall see, Bos’s reconstruction is now corroborated by first-hand evidence. According to Bos, Elizabeth’s solution is especially interesting, because, in the light of her efforts to solve the problem, Descartes changed or at least adjusted his opinions on the best way to approach geometrical problems.

![Fig. 1. The problem of the three circles: given A, B, C, find D.](image)

31 Worthington to Hartlib, 7 October 1661, [Crossley, 1847–1886, v. 2, pt. 1, 48–49]; Hartlib to Worthington, [October 1661], ibid., 57. The extract of Elizabeth’s letter referred to appears not to be in the Hartlib Papers, leaving it impossible to establish its addressee. I will investigate a possible relation between the copies of the mathematical letters sent to England and their publication in Clerselier’s third volume elsewhere.

32 For Haak’s long-standing connections with the Palatine court, see Barnett [1962]. Barnett discusses Elizabeth’s letter to Haak of 9/19 May 1665 on pages 133–135.

33 Henk Bos, “Descartes, Elizabeth and Apollonius’ Problem”, in Descartes [2003, 202–211]. My next paragraph is an abstract of this essay in which I adopt Bos’s own wording. The figures are also borrowed from Bos’s essay with minor modifications.
In the first letter, of 17 November, Descartes explained his reasons for using several unknowns in solving the problem. In that way, he claimed, one needs only the simplest geometrical theorems to translate a geometrical problem into algebraic terms, after which all but one of the unknowns can be eliminated by straightforward algebraic techniques. The constructability of the problem is then determined. In the second letter Descartes reacted positively to Elizabeth’s approach. Contrary to his expectations, he did not find her much hampered by her choice of only one unknown, namely the radius \( x \) of the required tangent circle. As indeterminates she chose the sides \( a = AB, b = BC, c = AC \) of the triangle \( ABC \), and the radii \( d, e, f \) (Fig. 2). Then she tried to derive an equation for the radius \( x \) in terms of these indeterminates, in the hope that this equation could be expressed geometrically as a theorem about the tangent circle. Although she failed in her aim due to the complexity of the calculation, Descartes realized an important advantage of her choice of indeterminates, namely that the resulting formulas are symmetric in \( a, b, c \) and in \( d, e, f \). He acknowledged the superiority of Elizabeth’s approach in this respect. Descartes then introduces a simpler case of the problem, in which the three given circles touch each other (Fig. 3). He applied Elizabeth’s approach to it, and concluded the solution of this special case by formulating a theorem. At the end of the letter Descartes presented both approaches as equivalent. Bos concludes that the discussion with the princess “contributed positively to Descartes’ own understanding of the relation between the aims and the techniques of solving geometrical problems by algebra.”

2.1. Elizabeth, Haak, and Pell (again)

It is not clear at whose instigation Haak wrote to Elizabeth toward the end of 1664, or in early 1665, with the request for copies of Descartes’ unpublished mathematical letters. Elizabeth had the impression that they were intended for Henry More (see the letter below), but in a letter of 23 May 2 June 1665 More wrote to Pell “I understood from D’ Worthington a whyle ago that you had two Algebraicall letters of Des Cartes sent to you out of Germany.” So Haak had communicated the letters to Pell but not (yet) to More; moreover, it is clear from the

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34 Ibid., 211.
35 Henry More to John Pell, from Christ’s College, Cambridge, 23 May 2 June 1665. British Library, MS Add. 4279, fo. 156r. Transcription by Noel Malcolm (see Note 3).
remainder of More’s letter that he had no personal interest in the copies. Pell, by contrast, did have an interest in them: no fewer than two different sets of copies of the letters are among Pell’s papers in the British Library, together with his English translation of both letters. As we saw above, he had studied the letters with Rahn in 1657, and they had lamented the fact that a necessary diagram had been omitted. If Pell had any hopes that the new copies would be more complete, he was disappointed. After having received the copies from Haak, Pell replied:

I have received the coppies of two letters which Monsieur Des Cartes wrote to the Princess Elizabeth Anno 1643. In the former of them, there are two Diagrams rudely drawne, and therefore her Highness is pleased to promise me fairer ones, if I desire it. But it is needless. I can by them see how to make such as Des Cartes intended. But it is Hard, if not Impossible, to conjecture what Diagrams doe belong to the second Epistle; which makes mention of H & K, which are not in the Diagrams of the first letter.

Though those letters were written 22 yeares agoe, I am willing to hope that her Highness hath them by her & will finde leisure to send me not onely those Diagrams, but also her owne solution of that Probleme. Of which in the beginning of that second Epistle Des Cartes saith, It is Si juste qu’il ne s’y peut rien desirer d’avantage etc. And againe about the middle of the same letter – par le mesme chemin qu’a pris V.A. Car il est meilleur pour cela que celuy que j’avois proposê.36

Neither of Pell’s copies of Descartes’ second letter has a diagram, and it is easy to understand why it made the correct interpretation of the text very difficult. Descartes used the letters $H$ and $K$ in solving the simpler version of the problem according to Elizabeth’s approach, so the diagrams in the first letter are useless (cf. Figs. 1 and 3). Haak conveyed

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36 John Pell to Haak, [early April 1665]. British Library, MS Add. 4365, fo. 198r. Note that Pell’s wording suggests that Elizabeth knew that the copies would be transmitted to him. The transcription, again by Malcolm, is not from the actual letter, but from the minutes in Pell’s hand, headed by the following remark: “The substance of that which I advised M’ Haak to write to his friend in the Low Countries to be transmitted to the Princess Elizabeth about y’ beginning of April 1665.” On Pell and Haak, see Barnett [1962], and Malcolm and Stedall [2005].

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Fig. 3. The special case where $A$, $B$, $C$ touch.
Pell’s wishes to Elizabeth, but in her reply of 9/19 May she appears to have supplied improved diagrams for the first letter only. Nevertheless, Pell eventually seems to have been able to construct the missing diagrams himself.37

In addition to the diagrams, Pell was also interested in Elizabeth’s solution, probably because Descartes himself thought highly of it. Again, Elizabeth was unable to comply, as she did not have her papers with her at that moment, and she assumed moreover that she had not kept the solution. But despite the fact that she had worked on it over 20 years ago, she was still able to give a general description of her solution in her letter to Haak. She claimed that she had solved the problem right up to the construction, using one unknown (the radius $x$ of the fourth circle), and then applying a theorem that gives the area of a triangle if the lengths of the sides are known. Elizabeth further remarked that “with three letters one actually facilitates the calculation, but that they also cause more difficulties if you have to reduce their number so as to make the construction and formulate a theorem.” Here she commented on her choice of the indeterminates $a$, $b$, $c$ and $d$, $e$, $f$, of which, because they are symmetrical, one only needs $d$, $e$, and $f$, thereby simplifying the calculation. Nevertheless, given the geometrical complexity of the problem, she could not see how to arrive at a theorem. Henk Bos, whose reconstruction accords with Elizabeth’s own description, adds that “the resulting equation from Elizabeth’s line of reasoning is slightly simpler than the one Descartes’ approach would yield (78 instead of 87 terms) but the intermediate calculations are somewhat more extensive” [Bos, 2003, 207].

2.2. The Princess and Descartes’ letters

In the spring of 1649 Descartes promised Elizabeth that he would be the royal Swedish philosopher for only one winter, and, if possible, return via Germany to visit her (AT, V, 331). Regrettably, Descartes died less than a year later. After her move to Heidelberg in 1651, Elizabeth found solace for the unfulfilled promise in intelligent men with whom she could discourse on religion, science, and, most of all, Cartesian philosophy. She had had no such company since 1646, when she had suddenly had to leave the Dutch Republic. In her letters to Descartes from those years she wrote that she greatly enjoyed (re-) reading his works, but she lamented the small number of people interested in the new philosophy. By contrast, the reopening of the University of Heidelberg brought the arrival of international scholars and students. The Elector’s strong connection to the university assured Elizabeth of easy contacts with members of the academic community. Descartes himself could no longer come to Heidelberg but Elizabeth attempted to revive his spirit there, and not without success or so it seems. She discussed Cartesian philosophy with various professors and with students too—if the addressee of Jungius’s letter was indeed a student. Many details remain uncertain but the overall picture is clear: Elizabeth, the Princess Palatine, was an intellectually inspiring figure, attracting international attention. Descartes’ letters, which she generously communicated to others, contained (at the time) unpublished material that was

37 “Upon a larger half-sheet of paper I have made three Diagrammes, such as I conceive are meant in the second letter of Monsieur Des Cartes to the Princess Elizabeth […] dated May 29, 1643.” British Library, MS Add. 4423, fo. 380r; fair copy in Pell’s hand (of extract of letter sent by Pell to Haak?). Transcription and description of the material by Malcolm. Note the mistaken date “May 29, 1643,” which is also found in Pell’s translation of the second letter. Date and place are accidentally cut off in the first of Pell’s copies; the second copy supplies the correct dating “Du Hoef, le 29 Nov. 1643.”
philosophically as well as mathematically exciting. Her readiness to share a considerable part of the correspondence shows that through the years she remained Descartes’ *tres affectionnée amie à vous servir*.

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**Appendix A. Princess Elizabeth to Theodore Haak, Berlin, 9/19 May 1665**

British Library, MS Add. 4365, fos. 196–197.

Transcription by Noel Malcolm (see Note 3 above); English translation EJB.

[196r] Monsieur Haak

Je vous envoyay dernièrement, pour cest Excellent personnage Mr Moor,38 deux Lettres de feu Des Cartes, dont les figures sont malpeintes, pource que celuy qui les a transcrit, n’entend point la Geometrie, et dans tout le païs de Westfalie on n’en trouve point qui l’entende; Vous verrez icy la faute corrigée, et pour esclaircir ce qui reste d’obscur en la seconde lettre; scachez que la premiere a esté escrit, com[me] Je com[me]ençois d’apprendre la Geometrie par le Conseil de ce grand hom[me]. La Question des trois Cercles est la premiere que j’entrepris à soudre par le Calcul de l’Algebre sans l’aide de mon Maistre.39 Le Sieur de Polot en donna avis à Monsieur desCartes, qui pour m’espargner la peine du Calcul, m’envoya ce moyen à soudre toute sorte de Problemes en supposant plusieurs lettres incogneues40: Cependant j’avois achevé mon Probleme jusqües à la Construction, par le moyen d’une proposition d’Euclide, qui monstre l’aire du Triangle,41 en ne posant qu’une seule lettre incognue, que Je luy envoyay,42 monstrant qu’en effect les trois lettres donnent

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39 “Mon Maistre” presumably refers to Descartes, and not to Johan Jansz Stampioen (1610–1653), who actually tutored Elizabeth in mathematics in 1643 (cf. Elizabeth’s letter to Hottinger of 21/31 May 1659, cited above). To Pollot Descartes wrote that not even an angel could solve the three circle problem aided only by Stampioen’s instructions. Ironically, Elizabeth’s approach, which Descartes did admire, may in fact have been influenced by Stampioen’s training. Cf. Descartes [2003, 133, 203]; for Stampioen in general, see Descartes [2003, 299–303].

40 On 17 November 1643 Descartes sent his solution to Alphonse Pollot, the intermediary between himself and Elizabeth, with the request to Pollot to hand it over to Elizabeth when needed [Descartes, 2003, 154; AT, IV, 43].

41 Elizabeth may be referring to proposition II.13 of Euclid’s *Elements*. I thank Sébastien Maronne for pointing this out to me. According to Bos, Descartes, in his first letter to Elizabeth, assumed that Elizabeth would use Heron’s theorem (“un Theoreme qui enseigne à trouver l’aire d’un triangle par ses trois costez”); see Descartes [2003, 156 (cf. 207, 210); AT, IV, 39].

42 Elizabeth’s covering letter of 21 November 1643 is extant [Descartes, 2003, 159–160; AT, IV, 92–94]. In her letter to Haak she mentions that she does not believe that she has kept her own solution, which may explain why it is not among her letters to Descartes in the Rosendael manuscript (see Note 2).
de la facilité au calcul, Mais qu’elles causent aussi plus de difficulté, quand il les faut reduire en nombre pour faire la Construction et en former un Theoreme, à quoy il respond que le chemin, q[ue] j’ay pris, [196v] est meilleur pour ce dessein que celuy qu’il m’a proposé, et monstre en suite, com[m]ent on peut encore reduire en nombre les trois lettres incogneues: il n’est pas besoin ce me semble d’avoir ma solution pour l’intelligence de cecy; il ne faut entendre qu’un peu de la Geometrie et du Calcul de l’Algebre pour en faire une pareille avec plus de plaisir qu’il n’y auront à voir la miene. Je ne crois pas l’avoir conservée, et ne m’en puis esclaircir icy, ou je n’ay pas mes papiers. Je vous rends graces de la peine que vous avez prise de m’envoyer les impremées Transactions philosophiques, et vous prie d’y adjouster les Effets du nouveau Microscope et les Observations de Mř Boiles touchant le Froid, quand ils seront imprimez.43 Vous obligerez par la celle qui sera tousjours

Monsieur Haak

Vře affectionnée amye
Elisabeth
Berlin 19/9 May 1665.

A.1. Translation

Dear Mr. Haak,

Recently I sent you two letters from the late Descartes to be handed over to that excellent person Mr. More.38 The figures in these letters are badly drawn, because the person who copied them has no knowledge of geometry, and in the whole country of Westphalia there is no one to be found who has. Herewith you will find the fault corrected, and in order to clear up what remains obscure in the second letter, note that the first letter was written when I had only just taken up geometry on the advice of that great man. The problem of the three circles is the first one that I tried to solve by algebraic calculation without the help of my master.39 Mr. Pollot informed Mr. Descartes of it, who, to spare me the efforts of the calculation, sent me that method of solving all sorts of problems in supposing many letters to be unknown.40 Meanwhile, I had completed my problem right up to the construction using a proposition of Euclid, which gives the area of a triangle,41 using just a single letter as unknown. I sent him my work,42 showing indeed that with three letters one actually facilitates the calculation, but that they also cause more difficulties if you have to reduce their number so as to make the construction and formulate a theorem. He replied that the method I had used was much better than the one he had proposed to me, and he then showed how to reduce the number of the three letters unknown. I do not think that you need my solution to understand this; one only needs some understanding of geometry

43 Given the works referred to, Haak must have sent Elizabeth the first two issues of the Philosophical Transactions (issued on 9 March and 3 April 1665, respectively). The references are to Robert Hooke, Micrographia: Or Some Physiological Descriptions of Minute Bodies Made by Magnifying Glasses (London, 1665), discussed in the Philosophical Transactions, No. 2 (1665), 27–32, and to Robert Boyle, New Experiments and Observations Touching Cold (London, 1665). The publication of the latter work was announced in the Philosophical Transactions, No. 1 (1665), 8–9. Elizabeth’s interest in Hooke’s Micrographia is especially interesting since Descartes had presented her with a gilded silver microscope which he had had made under his own direction. Eventually she offered the microscope to Benjamin Furly (1636–1714); see the sales catalogue of Furly’s library, Bibliotheca Furliana (Rotterdam, 1714), 328. I am grateful to Sarah Hutton for this reference.
and of the algebraic calculus to make a similar solution with much more pleasure than one
would have from seeing mine. I do not believe that I kept it, and I cannot check it here,
where I do not have my papers. I thank you for the trouble you have taken to send me
the Philosophical Transactions, and I beg you to add the effects of the new microscope
and the observations of Mr. Boyle on cold when they will be printed.43 You will then oblige
her, who will always remain,

Mr. Haak,

your affectionate friend,

Elizabeth.

Berlin, 19/9 May 1665.

References

For texts in which the page numbers are not printed, the page numbers are given in square
brackets.

Adelung, J.Chr., Rotermund, H.W., 1784–1813. Fortsetzung und Ergänzungen zu Christian Gottlieb
ASF, 1968. Fockema Andreae, S.J., Meijer, T.J. (Eds.), Album studiosorum Academiae Franeker-
ensis. Wever, Franeker.
AT, 1964–1974. Adam, Ch., Tannery, P. (Eds.), Œuvres de Descartes, nouvelle édition, vols. 11, Vrin,
Paris.
Baillet, A., 1691. La vie de Mr Des-Cartes. Horthemels, Paris, vols. 2. Reprinted by Slatkine, Geneva,
1970.
sedert 1579. Walburg pers, Zutphen.
Bochum.
Crossley, J. (Ed.), 1847–1886. The Diary and Correspondence of Dr. John Worthington (2 vols. in 3
pts.). Remains Historical and Literary Connected with the Palatine Countries of Lancaster and
Descartes, R., 1657–1667. Clerselier, Cl. (Ed.), Lettres de Monsieur Descartes, vols. 3. Ch. Angot
et al., Paris.
Descartes, R., 2003. Verbeeck, T., Bos, E.-J., van de Ven, J. (Eds.), The Correspondence of Descartes,
1643. Zeno Institute, Utrecht.
Jahrhunderts. In: Strohm, Chr., Freedman, J.S., Selderhuis, H.J. (Eds.), Späthumanismus und
reformierte Konfession. Theologie, Jurisprudenz und Philosophie in Heidelberg an der Wende
von Perga durch Joachim Jungius, Woldeck Weland und Johannes Müller. Vandenhoeck &
Ruprecht, Göttingen.
Ruprecht, Göttingen.


Steiner, H., 1886. Der Zürcher Professor Johann Heinrich Hottinger in Heidelberg 1655–1661. F. Schulthess, Zürich.

