Pitiscus, Bartholomeo | Encyclopedia.com

(*b*. Grünberg, Silesia [now Zielona Góra, Poland], 24 August 1561; *d*. Heidelberg, Germany, 2 July 1613) *mathematics*.

Very little is known of Pitiscus' life. He was court chaplain at Breslau, pursued theological studies in Heidelberg, and for more than a score of the last years of his life he was court chaplain and court preacher for Elector Frederick IV of the Palatinate. Although Pitiscus worked much in the theological field, his proper abilities concerned mathematics, and particularly trigonometry. His achievements in this field are important in two respects: he revised the tables of Rheticus to make them more exact, and he wrote an excellent systematic textbook on trigonometry, in which he used all six of the trigonometric functions.

The word "trigonometry" is due to Pitiscus and was first printed in his *Trigonometria: sive de splutione triangulorum tractatus brevis et perspicuus,* which was published as the final part of A. Scultetus' *Sphaericorum libri tares methodié conscript et utilibus scholiis exposits* (Heidelberg, 1595). A revised edition, *Trigonometriae sive de dimensione triangulorm libri quinque,* was published at Augsburg in 1600. It consists of three of three sections, the first of which comprises five books on plane and spherical trigonometry. The second section, "Canon triangulorum sive tabulae sinuum, tangentium et secantium ad partes radij 100000 et ad scrupula prima quadrantis," contains tables for all six of the trigonometric functions to five or six decimal places for an interval of a minute, and a third section, "Problemata varia," containing ten books, treats of problems in geodesy, measuring of heights, geography, gnomometry, and astronomy. The second enlarged edition of the first and third section was published at Augsburg in 1609. The largely expanded tables in "Canon triangulorum emendatissimus" are separately paged at the end of the volume and have their own title page, dated 1608. The same arrangement as in the first edition occurs in the third edition of Frankfurt (1612). In this edition the "Problemata varia" are enlarged with one book on architecture.

Soon after its appearance on the Continent, the *Trigonometria* of Pitiscus was translated into English by R. Handson (1614); the second edition of this translation was published in 1630; the third edition is undated. Together with these editions were also published English editions of the "Canon" of 1600: "A Canon of Triangles: or the Tables, of Sines. Tangents and Secants, the Radius Assumed to be 100000." There exists also a French translation of the "Canon" of 1600 published by D. Henrion at Paris in 1619. Von Braunmühl remarks in his "Vorlesungen" that in the Dresden library there is a copy of a lecture of M. Jöstel entitled "Lectiones in trigonometriam (Bartholomaei) Pitisci. Wittenbergae 1597," which indicates that the *Trigonometria* was one of the sources for the lectures in trigonometry that were given in the universities of Germany at the close of the sixteenth century.

The first book of the *Trigonometria* considers definitions and theorems from plane and spherical geometry. The names "tangent" and "secant" that Pitiscus used proceeded from the *Geometria rotund* (Basel, 1583) by T. Finck; instead of "cosinus, Pitiscus wrote "sinus complementi.". The second book is concerned with the things that must be known in order to solve triangles by means of the tables of sines, tangents, and secants. This book includes the definitions of the trigonometric functions, a method for constructing the trigonometric tables, and the fundamental trigonometric identities. From the "sinus primarii," that is, the sines of 45°, 30°, and 18°; Pitiscus derived the remaining sines, the "sinus secundarii." Book III is devoted to plane trigonometry, which he consolidated under six "Axiomata proportion um," the first three of which he combined into one in his editions of 1609 and 1612. What other authors designated propositions or theorems, Pitiscus called axioms. The spherical triangle is considered in Book IV, which he drew together in four axioms, the third of which is the sine law; the fourth is the cosine theorem for which Pitiscus was the first to give a real proof (for the theorem relative to angles). By means of these four axioms Pitiscus solved right and oblique spherical triangles. He did not study the polar triangle in this book on spherical triangles but treated it briefly in Book I in much the same way as P. Van Lansberge did. Book V contains such propositions as: "The difference of the sine of two arcs which differ from sixty degrees by the same amount is equal to the sine of this amount." Pitiscus referred to T. Finck and Van Lansberge as also giving this theorem; his proof is the same as the one given by Clavius. After publication in Leipzig of his "Canon doctrinae triangulorum" in 1551, and for at least a dozen years before his death in 1576, Rheticus and a corps of calculators carried on colossal computations in preparing the manuscript for his *Opus Palatinum de triangulis* (Neustadt, 1596). Shortly after the *Opus Palatinum* was published, it was found that the tangents and secants near the end of the quadrant were very inaccurate. Pitiscus was engaged to correct the tables. Because Rheticus seems to have realized that a sine or cosine table to more than ten decimal places would be necessary for such correction, Pitiscus sought the manuscript and finally after the death of V. Otho, a pupil of Rheticus, he found that it contained (1) the ten-second canon of sines to fifteen decimal places; (2) sines for every second of the first and last degree of the quadrant to fifteen decimal places; (3) the commencement of a canon for every ten seconds of tangents and secants, to fifteen decimal places; and (4) a completer minute canon of sines, tangents, and secants, to fifteen decimal places. With the canon (1) in hand Pitiscus recomputed to eleven decimal places all of the tangents and secants of the *Opus Palatinum* in the defective region from 83° to the end of the quadrant. Then eighty-six pages were reprinted and joined to the remaining pages of the great table. In 1607 the whole was issued with a special title page. After his discovery of the new Rheticus tables, Pitiscus started to prepare a second work, *Thesaurus Mathematicus* which was finally published in 1613 and contained the

following four parts: (1) (Rheticus) canon of sines for every 10″ to fifteen decimal places; (2) (Rheticus) sines for 0 (1″) 1°, 89° (1″) 90°, to fifteen decimal places; (3) (Pitiscus) the fundamental series from which the rest were calculated to twenty-two decimal places ; and (4) (Pitiscus) the sines to twenty-two decimal places for every tenth, thirtieth, and fiftieth second in the first thirty-five minutes.

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