though they did not influence the subsequent development can be refound in projective geometry. One would have expected that the Dutch mathematicians Stevin, van Schooten, and 's Gravesande would also have a place in Laurent's story, but it contains only brief mentions of Stevin and 's Gravesande.

In placing Lambert's contribution to perspective in a historical context it would be very interesting to know whether he found inspiration in Taylor's work. Laurent is not too specific on this problem noting that Lambert without doubt read Taylor (p. 62). It is indeed certain that Lambert knew Taylor's *New Principles of Linear Perspective* when he wrote his *Additions & Notes,* but whether he did it before he composed *La perspective affranchie* remains uncertain.

Some sections of the book (for instance III.1 and III.8) are completely devoted to mathematics; they introduce various concepts as for instance a complete quadrangle, pole and polar, the projective plane. Further they present Desargues's theorem, and they show how the choice of a particular projection mapping a given line into the line at infinity simplifies a proof. Mathematically this is all very beautiful, but its relations to the history of perspective and Lambert's place in it are unclear.

Lambert's own work is described generally by Laurent in praising terms; he is especially enthusiastic about Lambert's investigations of constructions with ruler alone, apparently considering these one of the main geometrical results of Lambert's work on perspective. Lambert himself strongly emphasized another aspect of his work, namely that by performing all constructions directly in the perspective plane he had created a new geometry – which he termed *perspective geometry.* Thus Lambert introduced the concept of perspectively parallel and the concept of a perspective equality for line segments and angles, furthermore he studied how some of the usual Euclidean constructions have to be performed in the perspective plane. In a book on Lambert's contributions to the theory of perspective it would have been natural to discuss this aspect of Lambert's work in more detail. An investigation of the connection to Monge's descriptive geometry would also have been worth attempting, but Laurent does not seem to find Lambert's perspective geometry particularly interesting or relevant.

Much inspiration can be drawn from Laurent's comments and no work on Lambert's perspective work should be written without taking these into account, but not everything has been told.

Kirsti Andersen

David Pingre, *The Astronomical Works of Gregory Chioniades.* Volume 1: *The Zīj al-'Ala'ī.* Part 1: Text, Translation, Commentary. Part 2: Tables. Amsterdam (J. C. Gieben) 1985 & 1986, 412 + 235 pp., Hfl. 150 (Corpus des Astronomes Byzantins, vol. II). ISBN 90-70265-6.

This is the first of three volumes intended to appear in the *Corpus des Astronomes Byzantins* and which will comprise a body of Greek translations made between about 1293 and 1302 of Arabic or Persian astronomical texts. The translator, unnamed in the several extant manuscripts, was identified by Pingree [1964] as a certain Gregory – or George – Chioniades, who is reported by the mid-14th-century writer George Chrysococces as having translated into Greek various astronomical treatises that he brought back from a sojourn in Persia. The cogency of Pingree's argument has in the last few years become the subject of a contention with polemical overtones; A. Tihon [1987] has recently given a fair and cautious account of the problems involved. For the purpose of this review I admit the premiss that the translator's name was Chioniades.

The present first volume consists of two

parts. Part 1 contains critical editions and English translations of three works: the *Persian Composition of Astronomy*, *On the Genethlialogic Computation*, and the *Revised Canons*. The *Persian Composition* was written by Chioniades in 1295 and 1296, apparently from the dictation of his teacher Shams al-Dīn al-Bukhārī, although its present form is a revision dating from about 1302. It describes and explains the use of the *Zīj al-'Ala'ī*, a composition of astronomical tables by 'Abd al-Karīm al-Fahhād which was written in Arabic about 1176 and is no longer extant. The *Revised Canons*, which to some extent duplicate the contents of the *Persian Composition*, were written also in 1296 and evidently revised later. Whereas these works are therefore in some degree original writings by Chioniades and Shams, the *Genethlialogic Computation*, as Pingree shows, preserves part of al-Fahhād's own instructions for computing a horoscope. The actual tables of the *Zīj al-'Ala'ī* as translated by Chioniades are edited (in Greek only) in Part 2.

Arabic astronomical texts and parameters were being studied in Byzantium from the early 11th century on, but the translations of Chioniades initiated a new stage in this transmission by making entire treatises and sets of tables available in Greek, apparently for the first time. This labour bore fruit half a century later in the great treatises by Chrysococces and Theodore Meliteniotes on the "Persian Tables". Chioniades's translations are significant documents, however, not only to the handful of present-day students of Byzantine astronomy, but also to their Arabic-Islamic colleagues; for al-Fahhād's *Zīj*, though now lost, was influential in the 13th and 14th centuries, and the Byzantine material is obviously of paramount value for reconstructing its contents.

Pingree has sensibly restricted his task to making the materials available for subsequent research, and his annotation is therefore concise, consisting mostly of recomputations of the examples in the texts. The introduction usefully presents collateral evidence for the *Zīj al-'Ala'ī*, and some biographical data concerning Shams and Chioniades. A fuller appraisal of the whole corpus of translations is promised for the last volume of the edition. The discussion of manuscripts and editorial practice is brief, but sufficient in most respects, since only one source exists for the texts, and two for the tables. At the end of Part 1 Pingree gives a trilingual glossary of technical terms, and indices of personal names, titles of works, and peoples and places.

The two volumes are reproduced very clearly (from typescript) and well made. The table of contents (for Part 1 only!) is inadequate: it does not list where each of the three texts begins, let alone their chapters. The decision not to translate the many numerical tables is reasonable, since the Greek notation is easy to learn; but one might wish to have translations of the titles and headings of the tables. These are slight obstacles which, one hopes, will not discourage historians from making full use of this valuable publication.

References

Pingree [1964]: D. E. Pingree, "Gregory Chioniades and Palaeologan Astronomy", *Dumbarton Oaks Papers* 18 (1964), 135–60.

Tihon [1987]: A. Tihon, "Les tables astronomiques persanes à Constantinople dans la première moitié du XIV^{e} siècle", *Byzantion* 57 (1987), 471–87.

Alexander Jones

David B. Wilson, *Kelvin and Stokes. A comparative study in Victorian physics*. Bristol (Adam Hilger) 1987. pp. 253, £35. ISBN 0-85274-526-5.

"I always consult my great authority, Stokes, whenever I get a chance", explained Sir William Thomson (later Lord Kelvin) in the