4.9   LA THEORIE ASTRONOMIQUE SELON JABIR IBN AFLAH
         (English Abstract)

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         Ptolemy's Almagest has been criticized by Islamic astronomers
in two different ways: criticisms of Ptolemaic parameters and critici-
sms, like those of the Maragha school, of the geometrical models used
as they contradicted certain basic principles like the principle of
uniform motion.

Jabir ibn Aflah's Islah al-Majisti seems to be outside the two aforemen-
tioned ways of criticizing the Almagest for he gives an excellent and
faithful qualitative account of his kinematical models. He pretends, on
one side, to give a complement to the mathematical basis of the Almagest
and, on the other, he seems to consider this work as having, in his
time, only a theoretical value; due to the modifications of parameters
introduced by Islamic astronomers, the Almagest itself has lost, in
Jabir's opinion, all practical value for computation. He also gives a
list of mistakes he thinks Ptolemy made, but I will limit myself here
to analyse what Jabir seems to consider a methodological lack of which
I will give only one example: Jabir criticizes Ptolemy's determination
of the relative positions of the centre of the equant, the centre of
the deferent and the centre of the universe in the case of the models
for the superior planets, for he considers that Ptolemy did not give
any proof of the fact that the centre of the deferent is the midpoint
between the two others.

Let us remember that, for the superior planets, Ptolemy uses an iterat-
ion method in which his starting point is to consider that the centre
of the equant and the centre of the deferent are the same point. Jabir
criticizes strongly this method and compares Ptolemy to a man who cannot
see well and walks backwards and forwards in the middle of a forest.
Our author proposes a new method which starts by the determination of
the position of the planet's apogee: for that purpose he takes two pairs
of positions of the planet on each side of the apsidal line, separated
by the same interval of time. These positions are, of course, in
opposition to the mean sun. Given the symmetrical character of the
planet's movement in respect to the apsidal line, one can obtain imme-
diately the direction of the apogee halving the arc between two symme-
trical positions taken from each of the two pairs of oppositions. Once
he has determined the position of the apogee, he shows the way to find,
independently, the value of the two eccentricities, that is to say, on
one part, the distance between the centre of the equant and the centre

of the world and, on the other, the distance between the centre of the world and the centre of the deferent.

Ptolemy's method is a remarkable example of the procedure consisting in "saving the phenomena", and is considered by Jabir as being purely approximate whilst he thinks his own method is demonstrative. He is probably referring, in an implicit way, to Aristotle's theory of demonstration when he rejects Ptolemy's approach because it is based on the postulate of the bisection of eccentricity, on one side, and on the false supposition that the centre of the deferent and the centre of the equant are the same point, on the other. We should finally say that Jabir's method, even if it is methodologically correct, becomes difficult when put into practice for we cannot observe easily two pairs of oppositions satisfying Jabir's conditions. The necessary time to find these four observations might imply a change in the position of the apogee.