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Mirrors of the Sea and Jade: Chinese Mathematics in the Song and Yuan Dynasties. Preliminary report.

Although the traditional "Ten Classics" of ancient Chinese mathematics included remarkable algorithmic procedures for solving simultaneous equations, the full power and generality of such methods were not appreciated nor achieved until new innovations were made by a quartet of mathematicians who flourished during the Song and Yuan dynasties: Qin Jiushao, Li Ye (Li Zhi), Yang Hui, and Zhu Shijie. The crowning achievements of their contributions, the "celestial element method" as it was applied in Li Ye's *Ceyuan haijing* (Sea Mirror of Circle Measurements, 1248 CE), and Zhu Shijie's procedures for solving simultaneous equations in as many as four unknowns, as described in his *Siyuan yujian* (Jade Mirror of the Four Elements, 1303 CE), are especially noteworthy. These reflect a natural evolution of ideas that can be traced back to the Nine Chapters, and perhaps even earlier to the Suanshushu, where certain problems show affinities to methods that were deftly explored and exploited by Song and Yuan dynasty mathematicians, and reflect more than a millennium of outstanding developments in the history of mathematics in China. (Received September 19, 2006)