

## **There is something *fenny* (糞) about warfare in the Song (960-1279) and Ming (1368-1644): Bio-chemical weapons of Imperial China**

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The importance of excrement as fertiliser in Chinese history has been widely recognized by economic historians and environmental scientists researching sustainable agriculture. Kenneth Pomeranz among others has argued that fertiliser, including so-called nightsoil, was the requisite environmental 'pressure' valve for maintaining soil fertility in Chinese agricultural regimes (in northern and southern China), and thus parity with Europe (specifically Northern England and the Netherlands) until the divergences of the 1800s. Other scholars, such as Ruth Rogaski, Yongmin Xu, and Amy Zhang, have explored how Chinese officials and hygienists in late imperial and republican China grappled with the urban sanitation problems posed by excrement.

But what of possible links between human waste and other industries? David Cressy's work on the saltpeter men of England suggests the diverse applications possible for excrement, both urine and feces, including its use as a feedstock to produce potassium nitrate—a key ingredient of gunpowder. Daoist texts suggest similar industries existed in Tang China (618-907 AD). Taking as my case study a recipe recorded in the Northern Song (960-1127 AD) for a *fenpao* (糞砲), literally a "shit bomb," and a late Ming (1628-44) treatise that instructs how to put the excreta of soldiers to use during a siege, I build on the work of Francesca Bray and Jacob Eyferth identifying texts as a fraught locus between tacit and intellectual knowledge to propose a more capacious approach to the study of excreta in Chinese history—one that includes bio-chemical warfare of the middle period (900-1400).

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Columbia University in the City of New York | 2020-2027  
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Johns Hopkins University (SAIS)-Nanjing University | 2018-2020  
Master of Arts: Chinese Studies (*with distinction*)  
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### **Publications**

2020. "Revisiting the Dazu "Bombard" and the World's Earliest Representation of a Gun." *Journal of Chinese Military History* 9.1, 99-113.

2019. "Notes on the Invention of the First Gun: Conflict and Innovation in the Song Warring States Period (960-1279)." *Journal of Chinese Military History* 8.1, 1-

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