shuen-i-6.pdf 20190511

A6 B147(142) C52062(1.5) D13 ~~金鉛~~ 鉛 Vol I. 頁 6

黃金：gold; lit. yellow metal
白金：silver; lit. white metal
玉：jade
銅：copper, also ~~or~~ brass
鉛：lead
石：stone; or rock

黃	白	玉	銅	鐵	石
金	金	方	方	方	方
方	方	寸	寸	寸	寸
寸	寸	重	重	重	重
重	重	一	七	九	六	三
一	十	兩	兩	兩	兩	兩
兩	兩	半	半	二	十	斤
		兩	四	兩		
			兩			

B has
「白銀」 for 「白金」
「玉方寸重一十兩」
「鐵方寸重七兩」

~~A gold~~
~~A cube~~
~~A one 寸 cube of gold weigheth one 斤.~~
~~A one 寸 cube of silver weigheth one fourteen 兩.~~
~~A one 寸 cube of jade weigheth twelve 兩.~~
~~A one 寸 cube of copper weigheth seven 兩 and a half.~~
~~A one 寸 cube of~~

~~A gold one 寸 cube~~ of

A gold cubic 寸 weigheth one 斤.
A silver cubic 寸 weigheth fourteen 兩.
A jade cubic 寸 weigheth twelve 兩.
A copper cubic 寸 weigheth seven 兩 and a half.
A lead cubic 寸 weigheth nine 兩 and a half.
A ~~iron~~ cubic 寸 of iron weigheth six 兩.
A cubic 寸 of stone weigheth three 兩.

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Let us do a quick comparison.

Material	《孫子算經》 ρ/(兩 寸$^{-3}$)	Modern value ρ/(g cm^{-3})
金 Gold	16	19.29 [1]
銀 Silver	14	10.5 [1]
玉 Jade	12	~3 [2][3]
銅 Copper	7.5	8.79 [1] (brass 8.48)[1]
鉛 Lead	9.5	11.35 [1]
鐵 Cast iron	6	7.2 [1] (iron 7.87)[1]
(石 Stone (too broad)	3	~2 [1])

[1] https://www.engineeringtoolbox.com/density-solids-d_1265.html
[2] https://en.wikipedia.org/wiki/Jadeite
[3] https://en.wikipedia.org/wiki/Nephrite

For brevity, let $\rho_s = \rho$(《孫子算經》)
$\rho_m = \rho$(modern).

	ρ_m/(g cm^{-3})	ρ_s/(兩 寸$^{-3}$)	$\frac{\rho_m}{\rho_s}$/(兩 寸$^{-3}$ g^{-1} cm^3)
金	19.29	16	0.83
銀	10.5	14	1.33
玉	3	12	4.
銅	8.79	7.5	0.85
鉛	11.35	9.5	0.84
鐵	7.2	6	0.83

Apart from silver and jade, the others seem to fit pretty well.
~~Silver~~ 孫子 fluked 金銅鉛鐵 or bungered up 銀 and 玉.
either

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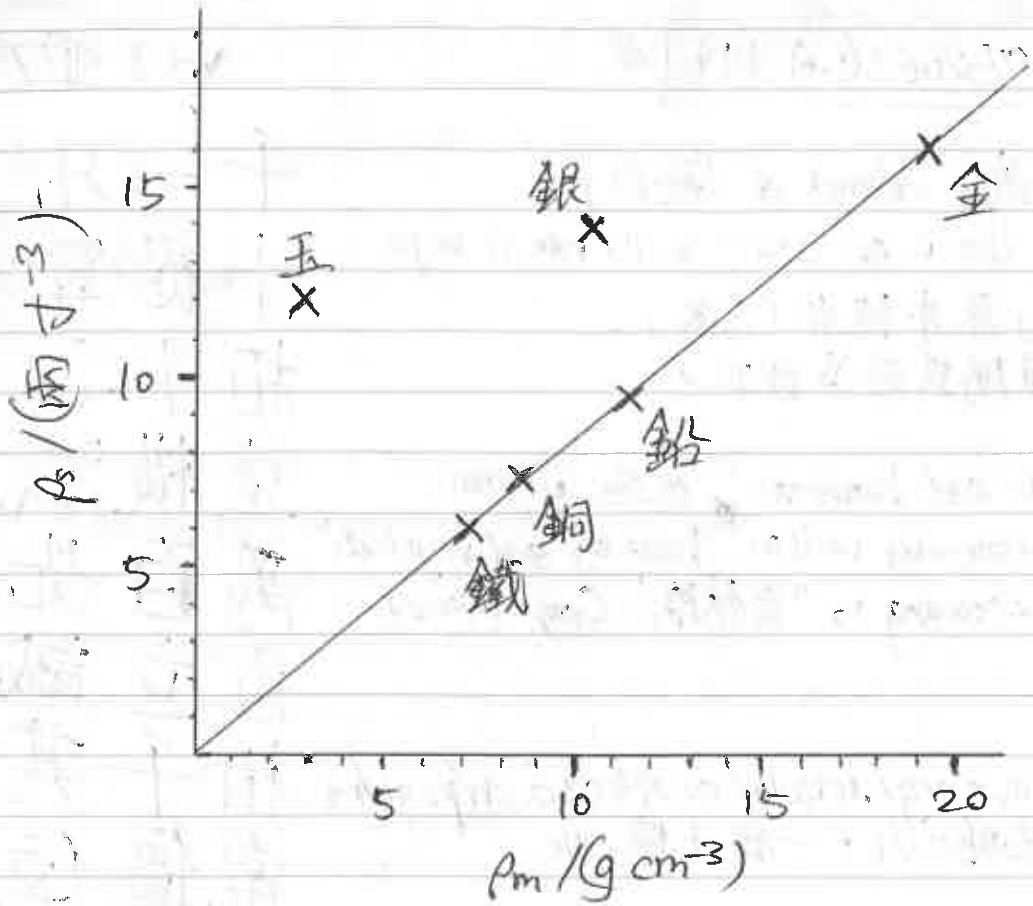

Discarding the outliers 銀 (silver) and 玉 (jade), we get least squares fit

$$\frac{\rho_s}{兩\ 寸^{-3}} = 0.182 + 0.821\ \frac{\rho_m}{g\ cm^{-3}}$$

with $R^2 = 0.999669$.

If the fit is forced through the origin, then

$$\frac{\rho_s}{兩\ 寸^{-3}} = 0.834\ \frac{\rho_m}{g\ cm^{-3}}$$

with $R^2 = 0.99995$.

The slope has standard error 0.0044539 (t-Stat. 187.337, p-Val. 3.35×10^{-7}).

So we have $g/cm^3 = (0.8342 \pm 0.0045)$ 兩/寸^3.

Damn, should've done it the other way around;

in that case we get

兩/寸^3 $= (1.1986 \pm 0.0064)\ g/cm^3$ END 9.6