

A64 B160 (155) C5253 (3.13) D76

Vol. III 113

Now there be grain, three hundred and sixty-nine thousand, nine hundred and eighty  $\text{斛}$  and seven  $\text{斗}$ , stored nine years in a granary. Each year, <sup>for</sup> each  $\text{斛}$  ~~there~~ <sup>there be expended</sup> ~~consumed~~ three  $\text{升}$ . We ask: how much be <sup>expended</sup> ~~consumed~~ for each of one year and nine years?

今有粟九萬九千九百八十九斛，在千九百八十九年，各耗三斗九升。問：倉中九萬九千九百八十九斛，在千九百八十九年，各耗三斗九升。

$\text{倉}$  = granary; or warehouse

$\text{耗}$  = ~~consumed~~ <sup>expended</sup>; or consumed

Answer saith:

for one year <sup>there be expended</sup> ~~consumed~~ eleven thousand and ninety-nine  $\text{斛}$ , four  $\text{斗}$ , two  $\text{升}$  and one  $\text{合}$ ;

for nine years <sup>there be expended</sup> ~~consumed~~ ninety-nine thousand, eight hundred and ninety-four  $\text{斛}$ , seven  $\text{斗}$ , eight  $\text{升}$  and nine  $\text{合}$ .

答曰：一萬九千九百八十九斛，一萬九千九百八十九年，各耗三斗九升。一萬九千九百八十九年，各耗三斗九升。一萬九千九百八十九年，各耗三斗九升。

Method saith: put down the three hundred and sixty-nine thousand, nine hundred and eighty  $\text{斛}$  and seven  $\text{斗}$ . Multiplying it by the three  $\text{升}$ , resulteth in the <sup>expense</sup> ~~consumption~~ of one year. Also multiply it by nine, it <sup>is</sup> the <sup>expense</sup> ~~consumption~~ of nine years.

$$369980.7 \text{ 斛} \times \frac{3 \text{ 升}}{\text{斛}} \times (1 \text{ yr}, 9 \text{ yr})$$

$$= (11099.421 \text{ 斛}, 99894.789 \text{ 斛})$$

Note that the consumption is computed from the principal value, rather than compounded ( $369980.7 \text{ 斛} \times [1 - (1 - \frac{3 \text{ 升}}{\text{斛}})^9] = 88709.881 \text{ 斛}$ ).

END 113