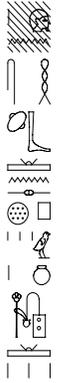


# UC 32162

<photo>

The fragment contains four columns of text, a vertically written title column followed by 3 columns that hold two problems.

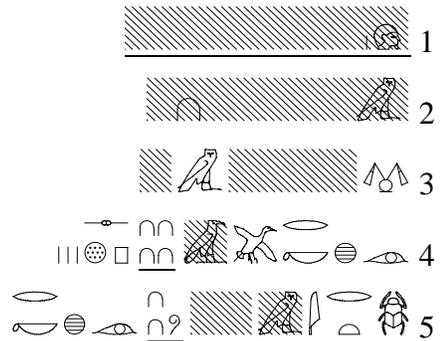
## *Title*

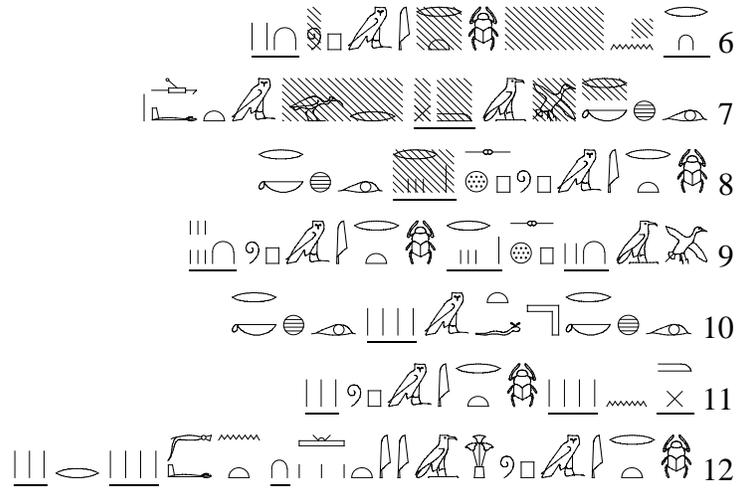


The title “Method of calculating the matters of writing”, written in red ink, is one of only two preserved titles of mathematical texts. The other one is the title of the Rhind mathematical papyrus.

## *First Problem*

The second column originally held 12 lines of text. The first lines are now almost completely destroyed. However, it can still be seen that the first line was written in red ink and, therefore, most probably named the title of the problem. The last extant line of this column names the result of the problem and was probably the end of the column. The problem, as well as the following one on this fragment uses red ink for almost all numbers that appear. In the instructions the *sdm.hr=f* is uniformly used with the verb *jrj*, and the announcing of intermediate results is uniformly given as “*hpr.t jm pw*”.





The problem itself – although the title and the given data are missing – can be restored from the instructions for its solution: An area of 40 *mḥ* by 3 *mḥ* shall be divided in 10 areas, each of which shall have a width that is  $\bar{2}\bar{4}$  of their length.

The solution is given as follows:

First the area of the given (big) rectangle is calculated by multiplying its dimensions (40 \* 3 = 120). Then the area of one small rectangle (of which there shall be 10) is determined by dividing the area of the big rectangle by 10 (120 : 10 = 12).

The given data also included the proportion of the sides (in modern notation a,b) of the small rectangle (a : b =  $\bar{2}\bar{4}$  with a as the shorter side).

The multiplication of this datum with the area of the small rectangle results in the area of a square with the length of one side equal to the smaller side of the rectangle that is searched.

[In our modern algebraic notation this can easily be seen from the following equation:

$\frac{a}{b}$	*	(a * b)	= a <sup>2</sup>
proportion of sides a,b		area of rectangle with sides a,b	

It must be emphasized that this notation and reasoning cannot be found in the algorithmic notation of the Egyptian text. It is meant only to be an aid for modern readers to follow.]

The side of this square, being likewise the shorter side of the rectangle we are looking for, is then determined as its square root  $a = \sqrt{a^2}$ , and then the other side by multiplication with the inverse of the given proportion.

Similar problems can be found in pMoscow, No. 6, 7, and 17.

### *Second Problem*

photograph

The second problem is written on the remaining two columns of this fragment. Unfortunately, the upper half of the first column and the second column are badly damaged, which enables only a partial restoration of the problem.

From the extant text it can be established that it is a *b3kw*-problem, that is, a problem concerned with the work-rate (= the amount of produce that has to be delivered by the worker in a certain time). There are only three other examples of *b3kw*-problems extant: pRhind, No. 67 (the calculation of the *b3kw* of a herdsman), pMoscow, No. 11 (probably the calculation of the *b3kw* of a carpenter), and pMoscow, No. 23 (the calculation of the *b3kw* of a cobbler).

What is left of the text of this problem indicates that it is the *b3kw* of someone who catches or raises fowl. The text is too incomplete to reconstruct the procedure for the solution of the problem. However, it suffices to get an idea of it: Given is the amount of ducks that shall be delivered (100), followed by a list of other birds and their value in relation to the ducks.

The following two lines, in which one is subtracted and the result 11 is obtained have been interpreted by Maspero (*Journal des Savants*, Avril 1897, pp. 217 et sqq) as follows: The numbers of delivered fowl above referred to the first month of a year, the remaining fowl (value: 100 ducks minus what has been delivered so far) shall be delivered during the rest of the year. The amount of fowl per month is determined by dividing this number by 11 (= the number of the remaining months)

The calculations of the second column of this problem (i.e. the third column of the fragment) cannot be restored. Possibly a verification is carried out – the problem ends with the number that is given as *b3kw* in the beginning.