

THE RHIND MATHEMATICAL PAPYRUS

BRITISH MUSEUM 10057 AND 10058

PHOTOGRAPHIC FACSIMILE, HIEROGLYPHIC TRANSCRIPTION,
TRANSLITERATION, LITERAL TRANSLATION, FREE
TRANSLATION, MATHEMATICAL COMMENTARY,
AND BIBLIOGRAPHY

IN TWO VOLUMES

MATHEMATICAL ASSOCIATION OF AMERICA
OBERLIN, OHIO, U. S. A.

1929

THE RHIND MATHEMATICAL PAPYRUS

VOLUME II

PHOTOGRAPHS, TRANSCRIPTION TRANSLITERATION, LITERAL TRANSLATION

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BIBLIOGRAPHY OF EGYPTIAN AND BABYLONIAN MATHEMATICS
(SUPPLEMENT)

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THE MATHEMATICAL LEATHER ROLL IN THE BRITISH MUSEUM

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MATHEMATICAL ASSOCIATION OF AMERICA

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1929

WHEN the manuscript of this treatise approached completion, Doctor Chace requested the Mathematical Association of America to undertake its publication, generously providing the means necessary to assure its appearance in a form commensurate with its importance. Upon learning of the desire of the Trustees to contribute to the success of the undertaking in every way possible, Doctor Chace made the further offer to donate to the Association a certain number of copies, adding the suggestion that these should then be sold at a price considerably below the cost of publication. This was done with the desire not merely to assist financially an organization of which he was a charter member and to which he has always contributed with great liberality, but to make it possible for the individual and institutional members to purchase the work much more reasonably than would have been possible had it been simply a commercial product. The proceeds from its sale are to constitute an endowment of the Association known as the ARNOLD BUFFUM CHACE FUND.

The Association takes pleasure in making these facts known, and at the same time in expressing its high appreciation of this notable work of a well-trained scholar in mathematics, of the interest which he has always shown in the cultivation of the science in this country, and of his generosity in connection with this publication.

RAYMOND CLARE ARCHIBALD
DAVID EUGENE SMITH

Publication Committee

on behalf of

THE MATHEMATICAL ASSOCIATION OF AMERICA

PREFACE

THE greater part of this second volume of a work intended primarily for mathematicians and the general reader consists of 109 plates containing the original hieratic text of the Rhind Mathematical Papyrus, a hieroglyphic transcription, and the transliteration from right to left, each plate being faced with a page on which the transliteration has been repeated in the usual form, from left to right, together with a strictly literal English translation,¹ and various notes concerning philological questions and the mistakes of the scribe.

From the free translation of the first volume to the original hieratic writing four steps are thus provided, and those portions of the original which were written in red ink appear in red in each of these steps. We know of no Egyptologist who has ever written transliteration from right to left as on our plates; this method was introduced simply as a matter of convenience to assist the reader who knows nothing of hieroglyphic or hieratic writing. There should be little danger of confusion in reading the transliteration on the plates for all the letters and digits are consistently in reverse order throughout, while letters and digits appear in the normal order on the opposite pages. In the hieroglyphic transcription we have employed for the most part characters belonging to a period close to that of the papyrus.

Of the numbers which correspond to fractions with numerator 1, all after $\frac{1}{4}$ are designated in hieratic by a dot placed over the first figure. We have written these numbers in the transliteration with a dot over the first figure, and we have written in the same way $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$. For the fraction $\frac{1}{3}$ the symbol $\bar{3}$ has been employed.²

When the denominator of a fraction contains more than one figure the dot in hieratic is placed over the first, the others following as if it were a whole number. What the hieroglyphic practice was we cannot tell, for so far as we are aware the only examples of fractions in hieroglyphic occur in texts written in vertical col-

umns. Sethe says³ (1916, page 87) that when a number contains tens and units the fraction sign stands over the tens only, when there are also hundreds over the hundreds only, and when the number contains thousands over the thousands only, and he gives illustrations on a preceding page, but even in the same article he writes a fraction with the entire number under the \curvearrowright and both forms appear in the works of others. Since Sethe's rule expresses the practice of the hieratic we have followed it on our plates.

In the original papyrus the problems are not numbered, nor is there any separation into chapters or divisions of any kind; even the first part, which is usually spoken of as a "table," is not separated from the rest nor distinguished in any way. The first words of a problem are usually in red, but this is not always the case, and red is often used also in subheadings and for purposes of contrast or emphasis. Eisenlohr has supplied numbers for all of the problems that come after the first "table," and this numbering has generally been adopted by writers on the papyrus, so that it is convenient, and even necessary, to use it for purposes of reference. In a few cases problems of one kind are separated from each other by problems of another kind and Eisenlohr has so arranged his order of numbering as to bring those of a kind together. Thus a few of the problems as numbered by Eisenlohr seem to be placed somewhat irregularly in the papyrus. But as we are presenting them separately, even on the plates, this irregularity of arrangement will not be noticed by the reader unless he refers to the photographs.

Besides numbering the problems Eisenlohr has numbered the lines, and when the solution of a problem is arranged in several groups of lines he has indicated these groups by the letters a, b, c, etc. Eisenlohr is not always consistent, nor does he carry out his scheme completely, but his plan makes a convenient system of refer-

¹ The numerical operations are placed on these pages only once and are to be regarded as a part of the transliteration.

² "It is a curious fact that the dot is occasionally found in modern times as a fraction symbol, as in the case of 2 and 4 for $\frac{1}{2}$ and $\frac{1}{4}$ in English copy-books of the 18th century." D. E. Smith, *History of Mathematics*, Boston, 1925, volume 2, page 210. Hultsch writes the Egyptian fractions in this way (1895, page 16).

³ In referring to a publication listed in the Bibliography, we shall generally give with the name the year of publication, and if there is more than one publication listed under the same name in a given year, a second number will indicate the one referred to. But all references to Peet will be to his edition of the Rhind Papyrus and all references to Gunn to his review of Peet, both listed under Peet, 1923, 2, and only the number of the page or plate will be given. Nearly all references to Griffith will be to the series of articles listed under 1891 and 1892, and in these references only the numbers of the volume and page will be given.

Erman and Grapow, 1925, is occasionally referred to simply as *Wörterbuch*.

ence and we have therefore put Eisenlohr's line-numbers on the plates and the letters a, b, c, etc., over the groups to which he has applied them, and have used these letters and numbers in making references.

The excellence of the drawing of the hieratic facsimile and of part of the transcription and transliteration on the plates is due to the skill of Miss Lillian V. M. Helander of Providence, Rhode Island. The hieratic was originally copied from the British Museum Facsimile but it has been collated with the photographs and most of the discrepancies have been corrected. Most of the drawing for the hieroglyphic transcription, and for the transliteration, was done by Mr. L. F. Hall of the Egyptian Department of the Metropolitan Museum.

When Peet was engaged in placing the New York fragments he had only tracings of the originals and perhaps an indistinct photograph of all the fragments taken together. Having the advantage of working with the originals we have been able to place a dozen more of these fragments.

We are also able to publish Problem 9 correctly for the first time, all previous investigators having been led astray by the omission of certain signs in the British Museum Facsimile. We believe that we have also established the significance of certain phrases in Problems 4 and 5.

The hieroglyphic transcription is of course based on that of Peet, and we are naturally very greatly indebted to Peet's translation and to his discussions of doubtful points. We also owe much to Gunn's full and masterly review of Peet's edition. Our debt to these scholars is acknowledged many times in footnotes.

The first publication of a photographic reproduction of the Rhind Mathematical Papyrus is presented in this volume. Since the Mathematical Leather Roll, B.M. 10250, is a document of the same period, it was decided that our volume should contain an official account of that document and a photograph. We are much indebted to Mr. Glanville of the Museum's staff for his contribution in this connection, and to Mr. E. C. Padgram of the British Museum Laboratory for the photograph of the Leather Roll which is here reproduced. But especially great are our obligations to Doctor H. R. H. Hall, keeper of Egyptian and Assyrian Antiquities in the British Museum, and to the Museum's Trustees, for permission to publish the reproductions of the Papyrus and of the Roll.

Finally, we wish to express our thanks to the Metropolitan Museum for permitting the free use of type for the alphabetic signs on page xiii.

Since the first volume of this work was printed more than two years ago, it appeared desirable for Professor Archibald to provide a supplement to his survey of mathematical literature given in the first volume, especially in view of the recent remarkable discoveries in the field of Babylonian mathematics.

The index of selected Egyptian words enables the reader to refer to all occurrences of these words and phrases in the papyrus and thence to discussions of them in the footnotes and in other works.

A. B. C.

L. B.

H. P. M.

CONTENTS

PREFACE

INTRODUCTION

Egyptian Writing: Phonetic Signs, Non-phonetic Signs, Hieratic and Hieroglyphic, Direction of Writing

Egyptian Grammar: Gender and Number, Verbs, Adjectives, Demonstratives, Prepositions

Numbers: Signs for Whole Numbers, Fractions, Special Signs for numbers of *hekat* and *setat*

Transliteration and Translation

The Alphabetic Signs, Pronunciation

RHIND MATHEMATICAL PAPYRUS, PHOTOGRAPHS

RHIND MATHEMATICAL PAPYRUS, TRANSCRIPTION, TRANSLITERATION, LITERAL TRANSLATION

BIBLIOGRAPHY OF EGYPTIAN AND BABYLONIAN MATHEMATICS (SUPPLEMENT)

THE MATHEMATICAL LEATHER ROLL

INDEX OF SELECTED EGYPTIAN WORDS

GENERAL INDEX TO VOLUME II

ADDITIONS AND CORRECTIONS FOR VOLUMES I AND II

INTRODUCTION

FOR readers who have no knowledge of Egyptian a few general observations on the language may here be made.¹

EGYPTIAN WRITING

Phonetic signs.—While the Egyptian system of written communication undoubtedly began as picture-writing, it had ceased to be such before the historic period and had become phonetic, most signs standing for one, two, or three consonants, and the form of the signs which represented a word-stem having no necessary relation to the meaning of the stem. In Egyptian writing the vowels were not indicated, as was originally the case also in most Semitic languages, and the vocalization of any Egyptian word of the time of the Rhind papyrus can only be guessed at from that of Coptic (Egyptian written with Greek letters including vowels), which has no inscriptions earlier than the Christian era, and from the few renderings of Egyptian names and words in Babylonian, Assyrian, and Greek documents, none of which is earlier than 1400 B.C. (Babylonian), the Greek renderings not beginning until the fifth century B.C.

There were twenty-four consonants in the Egyptian alphabet and the signs for these are given later, but most of the Egyptian signs stood for combinations of two or three consonants. These signs, however, were often accompanied by some or all of the alphabetic signs for the same consonants, signs which we shall call *alphabetic complements*. Thus an alphabetic sign accompanying a bi- or tri-literal sign which includes the same consonant does not have the effect of doubling that consonant; if doubling is actually involved the alphabetic sign appears twice.² An example of the use of alphabetic complements is seen in the word št:t, Title-page, line 1. The third sign of the word has the value t: while the second is a complementary t and the fourth a complementary :. An alphabetic sign may also be used in a tri-literal stem along with a bi-literal sign (as is the sign for š in the

¹ Those desirous of investigating these matters more in detail are referred to Gardiner's Grammar, 1927.

² There are exceptions to this rule. See Problem 66, footnote 6 (*irr*), and Problem 67, footnote 9 (perhaps *inn*).

word št:t just mentioned). At the time of the Rhind not many word-stems were habitually written with alphabetic signs alone.

Non-phonetic signs.—There are two classes of signs, however, which in certain uses may be said to be relics of the ancient picture-writing. These are the determinatives and certain of the ideograms.

Some of the ideograms especially recall the picture-writing stage of the language. They are those which are actual pictures of the objects or ideas for which they stand. An example of this type of word is the first word of the papyrus, tp. Such word-signs, unaccompanied by alphabetic complements or by determinatives, are generally followed by a stroke, as is the case with tp, and the stroke is sometimes present even when alphabetic and other signs are used, as in šfdw and snn, Title-page, line 2 and end of line 3. This stroke has no phonetic value. The phonetic values of words written with a single sign are known chiefly through variant writings in which alphabetic signs are employed.

The so-called determinatives, originally ideograms, are signs which are placed at the end of most words to aid in determining their meanings. Examples are the papyrus-roll which is used with the word ḥšb, *reckoning*, and the word ḥ-t, *things*, and with other words on the Title-page of the Rhind papyrus, and the pair of legs which occurs at the end of the word h:t on the same page. The papyrus-roll follows many abstract words, and the legs are regularly used with verbs of motion. When signs are used strictly as determinatives they have no phonetic value.

The reader will notice that some signs occur both as determinatives and also, in other words, as ideograms or as phonetic signs. Thus the human legs are determinative in the word h:t in the first line of the Title-page while they are an ideogram in the words iw, *return*, Problem 35, line 1, and 'k, *go in*, Problem 28, line 1. Certain signs also have more than one phonetic value, this fact being due to their early use as ideograms with words having different stems. Attention is called to these in footnotes. On the other hand, at a given period the same word might be written with a number of different combinations of signs.

We may note that there is not complete agreement among scholars as to the

reading of certain words. For example, some scholars believe that the consonant *t* is not present in the word *t*: *bread, loaf*, *r*: *a part* (fractional sign), used also as the name of a measure, and *r*: *goose* (Gardiner 1927, pages 515, 198, 548). We have retained the consonant in these words in our transliteration.

Hieratic and hieroglyphic.—In general hieratic bears the same relation to hieroglyphic that the ordinary informal writing with ink in any script bears to carved monumental inscriptions, carefully made manuscripts, and printed books. That is to say, all necessary signs are present, but they are made so cursively and are so often joined together that their forms frequently have little resemblance at first sight to those of the more formal hieroglyphic. In most cases the hieroglyphic transcription on our plates follows the original hieratic exactly without regard to certain differences in the use and arrangement of signs which normally obtain between the two methods of writing. We may note also that there are a number of signs that are made in hieratic in more than one way, even by the same scribe.

Direction of writing.—The normal method of writing in Egyptian (as also in Hebrew and Arabic) is from right to left as in the Rhind papyrus. Vertical lines are occasionally employed in hieratic and frequently in hieroglyphic inscriptions. Writing from left to right was used in decorative balanced inscriptions. In any inscription, signs which face to the right or left always face the direction from which the writing proceeds. When hieroglyphic writing is required in modern books the direction left to right is employed unless there is some particular reason for doing otherwise. The type used in the alphabetic sign-list below shows the signs facing as in inscriptions that read from left to right.

EGYPTIAN GRAMMAR

Gender and number.—There are two genders in Egyptian, masculine and feminine, the sign of the latter, as in the Semitic languages, being the letter *t* added at the end of the word-stem. This *t* precedes determinatives and also precedes plural strokes (see below) if they are present.

Number may be singular, dual, or plural. The plural ending is *w* for masculine, *wt* for feminine. The *w* of the plural was rarely written at the time of our papyrus, but the plural was regularly indicated by the use of three vertical strokes at the end of the word, generally placed side by side, but occasionally one above another. In hieratic these strokes were often joined together, and if they were also joined

to a preceding sign they frequently became a horizontal line. The three strokes were often used also with collective nouns and abstract words, and their presence does not necessarily require the plural in translating. With adjectives the plural strokes were more often omitted than not.

Verbs.—The reader will notice that all finite forms of the verb, except one, precede their subjects, whether the latter be noun or pronoun. The one exception is the so-called pseudo-participle (Erman) or old perfective (Gardiner); see Problem 28, footnote 2. Among the forms with subject following are those which show only the stem of the verb, including those with reduplication of a consonant in verbs of certain classes, and forms in which the particles *n* or *hr* are inserted after the verb-stem. Of the last two the *n*-form generally indicates past time and the *hr*-form has a hortatory sense. The imperative in Egyptian, as in other languages, does not employ pronouns. The infinitive of certain classes of verbs is feminine.

Adjectives.—Adjectives follow their nouns and theoretically agree with them in gender and number, but by the time of the Rhind papyrus there was often no indication of the plural in the writing of modifying adjectives, and sometimes the feminine *t* was omitted.

Demonstratives.—The pronoun *pw*, originally demonstrative, is rendered by *this* throughout our literal translation. In the use in which it is found in the Rhind papyrus it has often been compared to the French *ce* (itself a demonstrative) in the phrase *c'est*, and most writers in English translate the phrase *X pw, it is X*. But, in view of the demonstrative origin of the word and the fact that other words require to be translated by *it*, we have preferred to use *this* for *pw*.

The weak demonstrative *p*ⁱ, feminine *t*ⁱ, plural *n*ⁱ, already at the time of the Rhind scarcely more than a definite article, we have consistently translated *the* except in the phrase *p*ⁱ *pw*, *n*ⁱ *pw*, occurring in Problems 57, 58, 60, and 67. *Pect* sometimes renders it by *this* (Problems 30, 32, 34, and 62) and sometimes by *the* (Problems 36, 52, 65, 66, 71, 74-77). *p*ⁱ precedes the noun while the demonstrative *pn*, *this*, follows it.

Prepositions.—The preposition *m* represents several meanings in English (see Gardiner 1927, page 124, §162) as will be seen in reading the problems. For the so-called "m of equivalence" we have often used a colon in the literal translation. The *m* in the oft-recurring phrase *w*^h-*tp m* was doubtless originally the *m* of

instrumentality or perhaps that of place, since the phrase appears to have meant *nod the head with*, or *at*, or *count with*, a certain number, but the sense of the phrase is often simply *multiply* and we have used the colon in a number of such cases. The other prepositions occurring in the papyrus do not need special mention here.

NUMBERS

Signs for whole numbers.—The reader will quickly become familiar with the hieratic and hieroglyphic signs for the numbers. He will learn that a horizontal stroke in hieratic may stand for the four unit strokes of the number 4 in hieroglyphic, and that other special signs in hieratic are used for 5, 6,¹ 7, 8, and 9. All of these latter, however, were evolved from the groups of unit strokes used in hieroglyphic. Similarly the hieratic signs for the various multiples of 10 under 100 have some relation to their hieroglyphic counterparts. Readers interested in the development of these signs may consult Möller 1909, Numbers 614–655. For the names of the numbers see Gardiner 1927, pages 191–192.

Fractions.—The method of writing fractions is explained in volume 1 at page 4. The hieroglyphic sign *r* placed above the numbers stands for the word *r*, *part* (Erman and Grapow, 1926, volume 2, page 392. Gardiner and others read *r* alone, without the *˙*. See above page ix). The sign for $\frac{2}{3}$ probably means *two parts* (out of three). In the hieratic sign the curved top must stand for the *r* and the vertical and diagonal strokes for the two original vertical strokes. These latter were of the same length in the hieroglyphic sign as late as the time of the Rhind papyrus and it would have been more accurate to have so represented them on the plates in this book. Compare volume 1, page 7. The sign for $\frac{1}{2}$ is possibly an animal's rib. It is read *gs*, which means *side* in the sense of one of the two sides, and hence *half*. The hieratic sign for $\frac{1}{2}$ was originally a ligature including the *r* and a horizontal line below representing three short vertical strokes. In the sign used by the Rhind scribe scarcely anything is left of the *r* and the line at the base is little more than a dot. The principal part of the sign as we find it here was originally merely the oblique flourish connecting the upper and lower elements. The hieratic sign for $\frac{1}{4}$ as explained by Griffith (volume 16, page 169) is a special form which indicates *four parts* very clearly. It must have been invented to avoid confusion with 40, because if $\frac{1}{4}$ had been written in hieratic after the analogy of other fractions the sign would have been the same as that for 40, a horizontal stroke with a dot above.

¹ On the signs for 6 see Problem 61, footnote 4.

In numerical expressions in the papyrus the dot placed over a number to indicate that it is used as a fraction is very often omitted, either through carelessness or because the context would show that the number was a fraction and the writer did not consider the dot to be very important. We do not need to regard the omission of the dot as necessarily an error (see Sethe 1916, page 87, footnote 1). Where the scribe has omitted the dot the number appears in the Literal Translation as a whole number, but in the Free Translation in volume 1 as a fraction.

Special signs for numbers of hekat and setat.—On the special Horus eye notation for fractions of the volume-measure *hekat* see volume 1, pages 31 and 175, and Peet, page 25, or Gardiner 1927, page 197. There were also special signs in hieratic for 5, 6, 7, 8, and 9 *hekat*, the existence of the sign for 9 (Problem 84) being recognized for the first time, so far as we are aware, by Gunn (page 126). These signs are presumably ligatures for groups of small circles, each representing a *hekat*, just as there are other ligatures for the abstract numbers 4–9, which represent groups of short vertical strokes.

On the special signs for certain fractions of the area-measure *setat* see volume 1, page 33. There are also special signs in hieratic for 5¹, 6, 7, and 9 *setat*, of which 6, 7, and 9 appear in the Rhind. Gunn, so far as we know, was the first to call attention (page 126) to the existence of the signs for 5 and 6 *setat* and to notice that the signs of the *setat* series are the same as the corresponding signs for numbers of *hekat*. In the Rhind 5 and 8 *setat* are written with the abstract numbers.

TRANSLITERATION AND TRANSLATION

We have made a few restorations in the literal translation where these are practically certain and are necessary to the continuity of the text. Restorations in the transliteration are confined to a few individual words here and there. All restorations are in square brackets. Phrases, words, and letters, which have crept into the text through error, are for the most part placed in parentheses in the transliteration and have not been translated.

In the literal translation the reader will notice that certain words, such as parts of the verb *to be*, which are necessary in English, are regularly omitted in Egyptian. In such cases, of course, there is no Egyptian word over the English word.

In a number of places in the papyrus a sign like the letter *r*, and in many places dots, are used exactly as we use ditto marks, and in the translation we have used

¹ Gunn, page 126. We have no reference for an occurrence of the special sign for 5 *setat*.

ditto marks in such places. Dots are also used in many places by the scribe as mere separation marks, or as punctuation marks, and often they are placed with numbers without any apparent significance.

In the transliteration we have used dots in the following cases: before the *t* of the feminine termination, before the suffix pronouns, before the endings of the pseudo-participle (old perfective) and the so-called "verbal adjective" (Problem 61B), before the particles *n* and *hr* placed after verb-stems in certain forms, before the plural ending (masculine *w*, feminine *wt*), and before the indefinite pronoun *tw* when used as subject of a verb or as passive particle. Hyphens are used in compound words and, as in English, where a word is divided between two lines.

THE ALPHABETIC SIGNS, PRONUNCIATION

It would not be practicable to include in this book a complete sign-list of the Rhind with explanations of the signs and their phonetic values. For this information readers are referred to Gardiner's Grammar, pages 432-531. It is hoped that readers may be able to arrive at the values of many of the bi- or tri-literal signs through the transliteration and the list of alphabetic signs.

In the second column of the sign-list are the symbols used in transliterating Egyptian. In most cases they are, of course, English consonants, but there are several consonants in Egyptian which have no parallel in English and for these consonants symbols have been adopted which are now in general use by scholars.










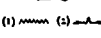















The second consonant of the list perhaps originally had only the value of the consonantal *y* (with possibly also a use for a long *i*-vowel). In time, however, especially at the beginning of words, it tended to change in many cases to a mere glottal stop like the first consonant of the list. For this reason we have followed others in transliterating it at the beginning of words by the letter *i* topped with

a mark like the Greek smooth breathing. For the sake of regularity we have used this letter even in words like *i'ḥ* (in *I'ḥ-mšw*, Title-page, line 3) or *it*, *barley* (for example, Problem 64, line 1) where the initial consonant retained its original value down into Coptic times. We have departed from the usage of some scholars by using *y* regularly for the first person singular of the suffix pronoun in order to avoid suggesting that the consonant might be a glottal stop in that position. One can say fairly confidently that in this word it was consonantal *y* or long vocalic *i*.

The sign representing a man seated on the ground with one knee raised and one hand forward (not to be confused with the similar man with hand to mouth), is not really an alphabetic sign, but is an ideogram for the suffix pronoun, first person singular, *y*, and therefore in a sense "stands for" *y*. It is also an ideogram or determinative in the first person singular ending *kwy* of the pseudo-participle (old perfective) where also it stands for *y* since *y* is not written alphabetically when the man is present in this form of the verb.

The alternative form of *w*, resembling a coil, was developed from the abbreviated form of the bird. The hieroglyphic version had not come into common use until after the time of the Rhind papyrus, but, following others, we have employed it in transcription to preserve the distinction between the two hieratic forms.

It may be said at this point that for purposes of instruction, and for convenient oral reference in general, most scholars pronounce Egyptian words by using a short *e* with each consonant of a word except the last, but before and after the two consonants *'* and *'* a short *a* is apt to be used because in the Semitic languages the two corresponding consonants, especially the one corresponding to *'*, are more often associated with *a* than are other consonants. Thus the first words of the Rhind papyrus might be conventionally pronounced *tep-heseb en ha'at em ḥet*. Individuals, of course, vary in many respects in their customs of pronunciation.

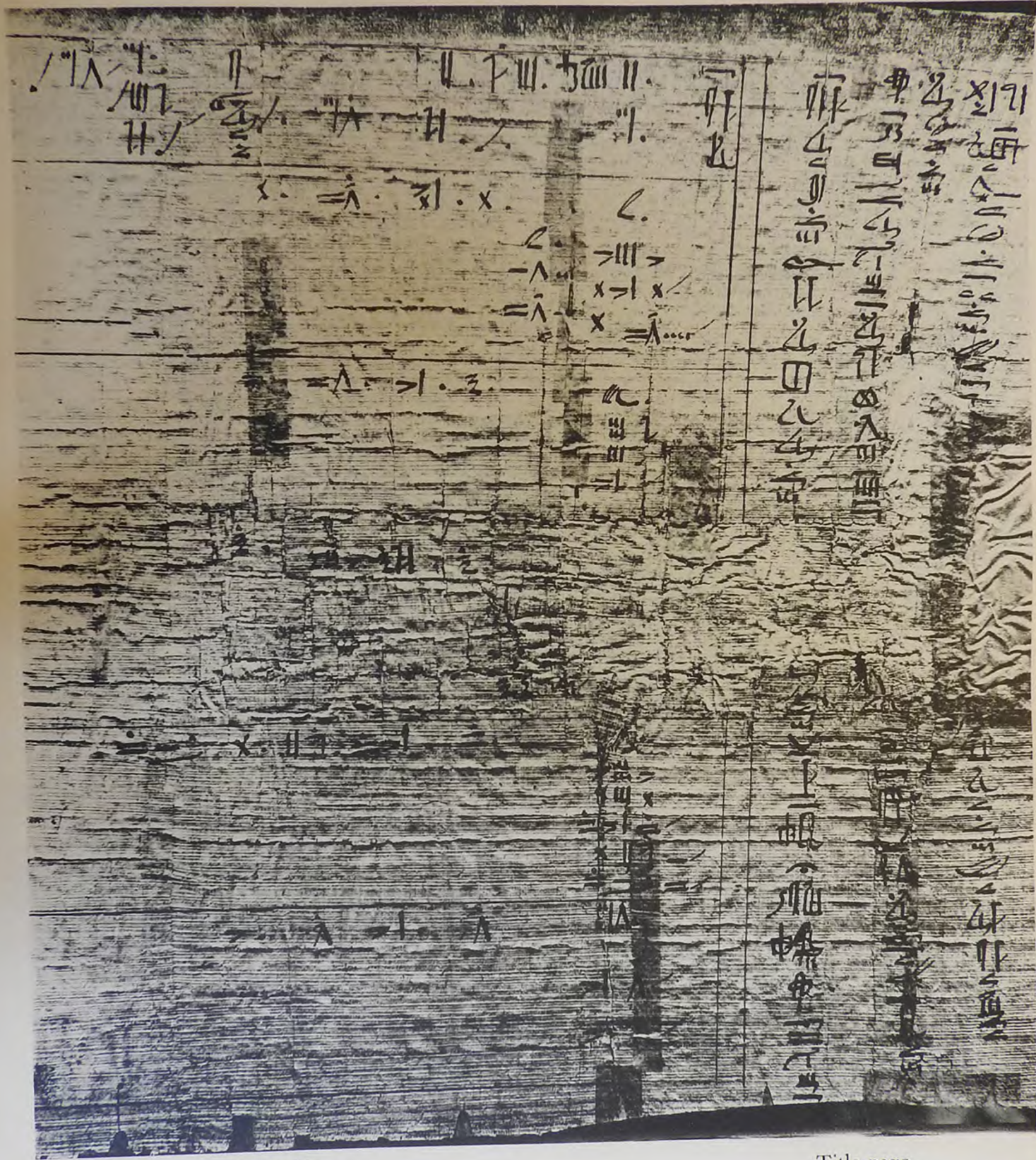
Sign	Trans- literation	Object Depicted	Probable Sound Value
	i	Egyptian vulture (<i>Neophron percnopterus</i>)	The glottal stop often replacing <i>t</i> between vowels in Scottish dialects, as in <i>le'er</i> for <i>letter</i> .
	i, y	Profile view, top of flowering reed rendered in outline	Originally <i>y</i> . At beginning of words often became <i>i</i> ; long vocalic <i>i</i> .
	y	For origin of (2) see Gardiner 1927, page 520	<i>y</i> and probably sometimes long vocalic <i>i</i> .
	ʿ ¹	Human arm	Found also in most Semitic languages. A corresponding consonant in use today is Arabic 'ain, a guttural voiced fricative produced by a strong contraction of the upper part of the windpipe (see remarks on <i>h</i> below).
	w	(1) quail chick; (2) from hieratic abbreviation of (1)	<i>w</i> . Perhaps also long vocalic <i>u</i> .
	b	Human lower leg and foot	<i>b</i>
	p	Rush mat or low rush-covered stool	<i>p</i>
	f	Horned viper	<i>f</i>
	m	Owl with body in profile and head turned front	<i>m</i>
	n	(1) water; (2) out-stretched arms, was also ideogram and determinative of negation.	<i>n</i>
	r	Human mouth	<i>r</i>
	h	Ground-plan of building	<i>h</i>
	ḥ	Hank of flax	The corresponding letter in Arabic is the unvoiced counterpart of 'ain above. It has been likened to a stage-whisper or a wheeze.
	ḥ	Placenta (?)	Corresponding letter in Arabic is pronounced like <i>ch</i> in Scottish <i>loch</i> , German <i>ach</i> .
	ḥ	Animal's belly with teats	Perhaps like German <i>ch</i> after <i>e</i> and <i>i</i> . The alphabetic sign does not appear in the Rhind but the consonant occurs in two bi-literal signs.
	s	Door-bolt	<i>s</i> at the time of the Rhind papyrus and after, and interchangeable in many words with <i>š</i> . Probably originally <i>z</i> .
	š	Strip of linen	<i>s</i>
	š	Artificial pool	<i>sh</i>
	k	Vertical section of hill-slope	Guttural <i>k</i> made far back in the throat.
	k	Basket with handle	<i>k</i>
	g	Circular jar-stand	<i>g</i>
	t	Loaf	<i>t</i>
	t	Rope with loops	Originally a combination, <i>ksh</i> and <i>tsh</i> . At the time of the Rhind it was already interchangeable with <i>t</i> in some words.
	d	Hand	<i>d</i>
	d	Snake	Originally <i>dj</i> . At the time of the Rhind it was already interchangeable with <i>d</i> in some words.

¹ In the type of this book this is represented by an inverted comma pointed towards the right.

THE RHIND MATHEMATICAL PAPYRUS

BRITISH MUSEUM 10057 AND 10058
PHOTOGRAPHS

PHOTOGRAPH I



2 divided by 3,
5, 7, 9, 11, 13, and 15

Title-page

Beginning B. M. 10058 recto

PHOTOGRAPH II

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100.

2 divided by 29,
31, 33, 35, 37, and 39

2 divided by 17,
19, 21, 23, 25, and 27

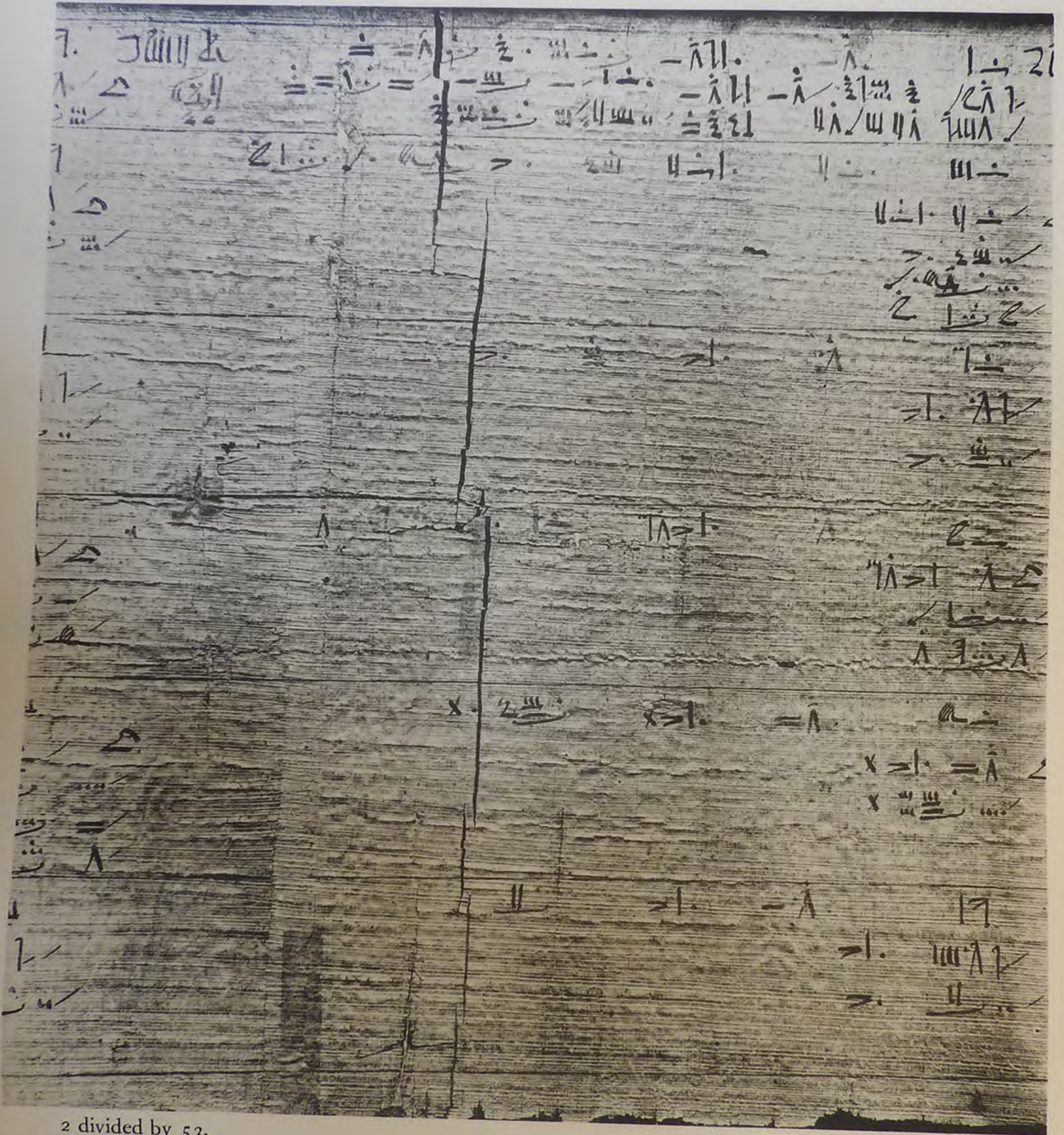
PHOTOGRAPH III

Handwritten mathematical or symbolic text on a textured surface, possibly a palm leaf manuscript. The text is arranged in approximately 12 horizontal lines. The symbols are complex, featuring various characters, dots, and lines, some resembling numbers and others resembling letters or specific mathematical notations. The writing is dark and somewhat faded against the light, textured background.

2 divided by 41,
43, 45, 47, 49, and 51

2 divided by 29, 31,
33, 35, 37, and 39 (concluded)

PHOTOGRAPH IV



2 divided by 53,
55, 57, 59, 61, and 63

2 divided by 41, 43,
45, 47, 49, and 51 (concluded)

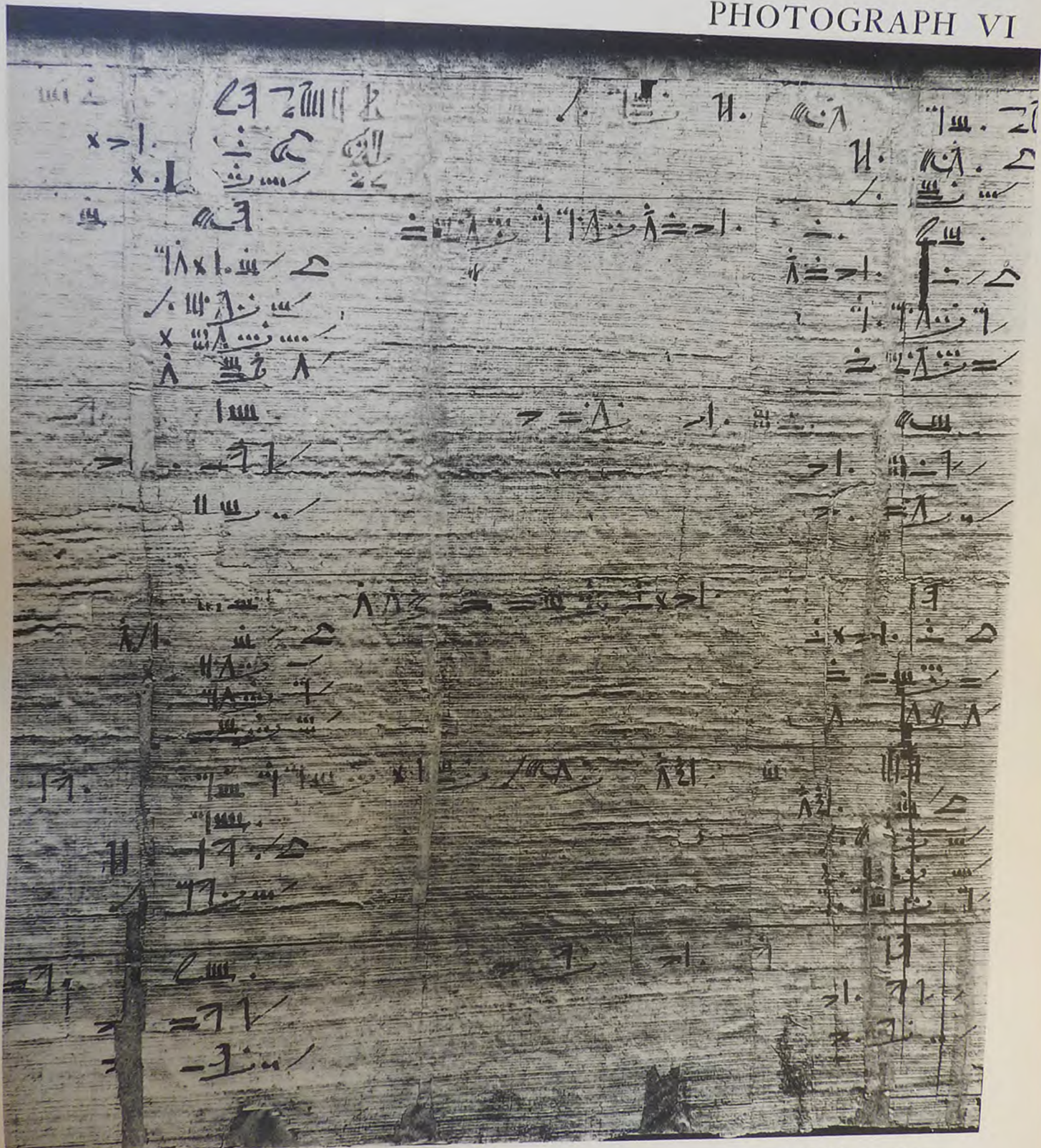
PHOTOGRAPH V



2 divided by 65,
67, 69, 71, 73, and 75

2 divided by 53, 55,
57, 59, 61, and 63 (concluded)

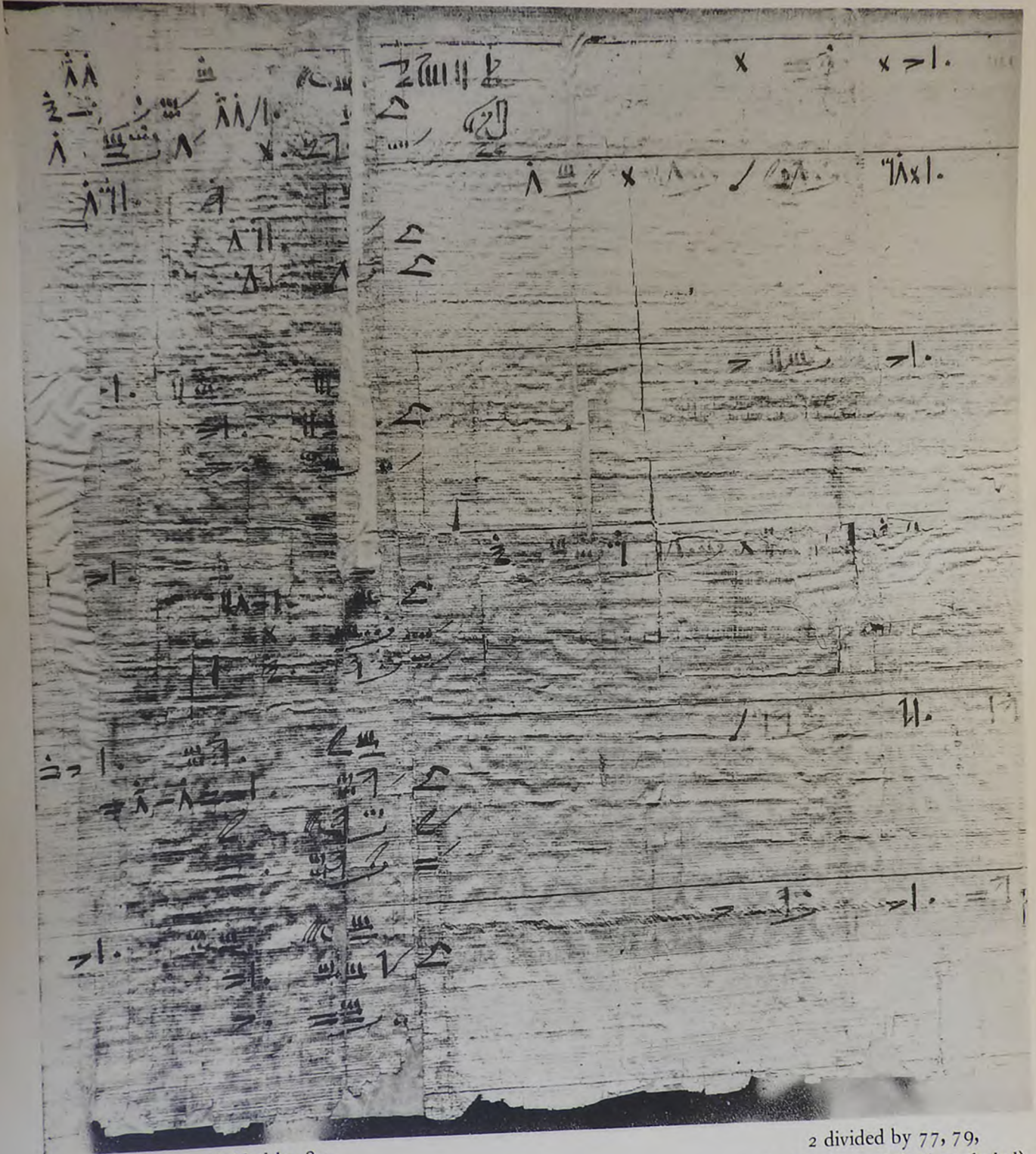
PHOTOGRAPH VI



2 divided by 77,
79, 81, 83, 85, and 87

2 divided by 65, 67,
69, 71, 73, and 75 (concluded)

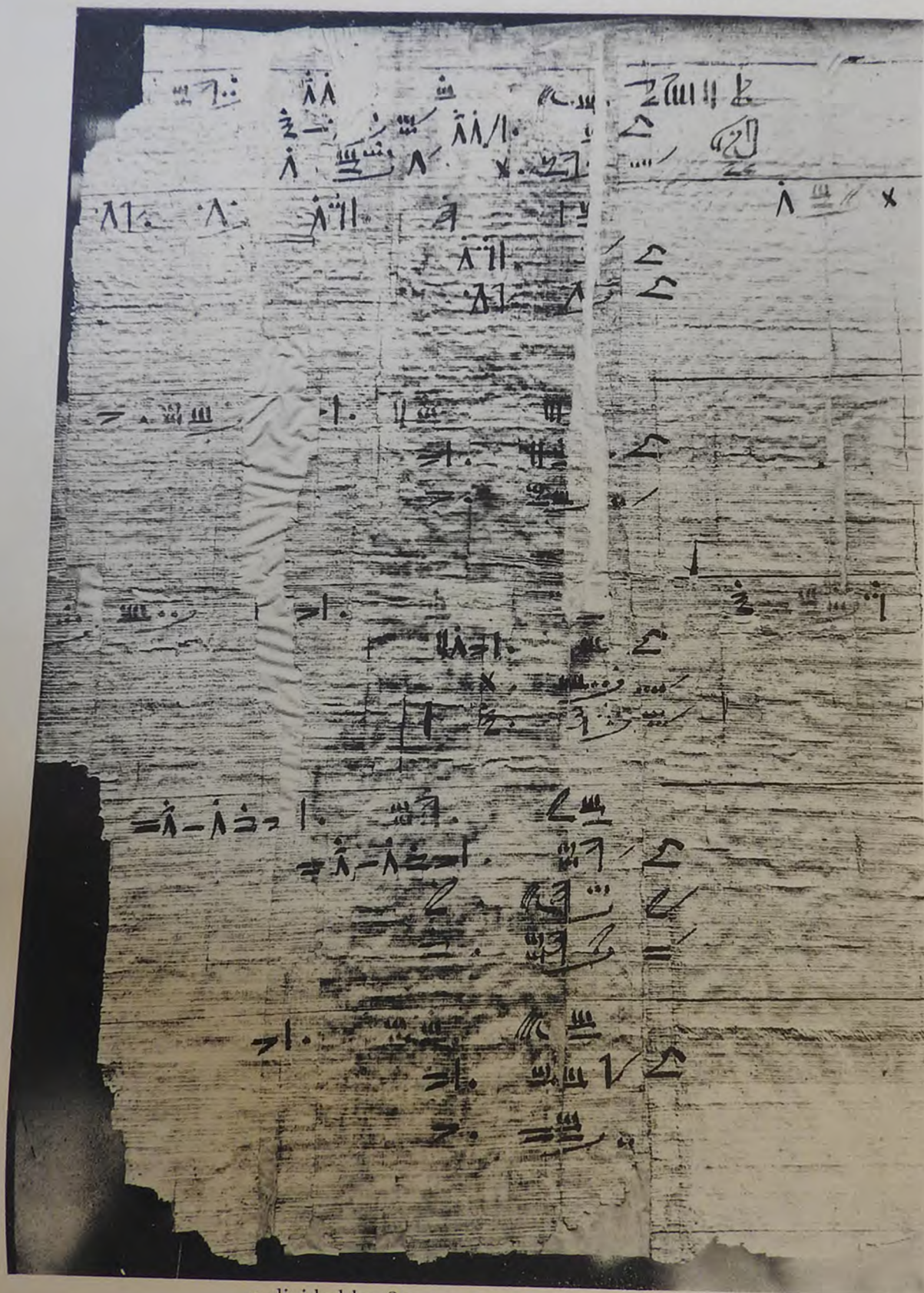
PHOTOGRAPH VII



2 divided by 89,
91, 93, 95, 97, and 99

2 divided by 77, 79,
81, 83, 85, and 87 (concluded)

PHOTOGRAPH VIII



2 divided by 89, 91, 93, 95, 97, and 99

End of B. M. 10058, *recto*. At the left in registers 3 and 4, respectively, are two fragments partly concealed by the frame in which the papyrus is mounted at present. The latter should be moved down to register 5 and the former probably belongs in register 4. See Plates 31 and 32 and the footnotes on the pages opposite these plates.

PHOTOGRAPH IX



2 divided by 101;
Problems 1, 2, 3, 4, and 5

Table of division by 10
(in register 2)

2 divided by 89, 91,
93, 95, 97, and 99 (concluded)

End of B. M. 10058, *recto*, New York fragments, and beginning of B. M. 10057, *recto*, brought together to show as nearly as possible the original appearance of this part of the papyrus. The first of the two fragments partly shown in Photograph VIII is omitted here and the visible portion of the second is placed in its proper position in register 5. On the left the outline of B. M. 10057 can make no claim to absolute accuracy because of the dark tone of the edge of Photograph X. We have lightened the background of the strip placed here in registers 5 and 6 and in the process parts of two signs have unfortunately been erased (see Plate 37).

6

-10

14

19

0

Handwritten cuneiform script on a tablet, showing various lines of text and mathematical or logical symbols. The script is arranged in columns and rows, with some lines starting with a vertical bar or other symbols. The text is dense and covers most of the tablet's surface.

3

Problems 6; 7 (in register 2); 8, 9, 7B, 10; 11, 12, 13, 14; 15, 16, 17, 18, 19; and 20

Problem 3 (concluded)

PHOTOGRAPH XI

21
22
23

Handwritten mathematical problems in Arabic script, including algebraic equations and numerical calculations. The text is arranged in horizontal lines across the page. The problems involve variables and numbers, typical of classical Islamic mathematics. The script is dense and includes various symbols and signs used in the original text.

Problems 21, 22, and 23

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30.

The page contains a series of mathematical problems, numbered 24 through 30, written in a cursive script. Each problem is presented as a set of equations or relationships between variables. The variables are represented by letters and numbers, often with subscripts or superscripts. The problems are arranged in a grid-like fashion, with each problem occupying a specific row and column.

Problem 24: $\lambda = \lambda =$
 $x / > >$
 $\dot{=} x x$
 C

Problem 25: $\lambda, \dot{=} \lambda \lambda \lambda \lambda$
 $\lambda \lambda \lambda \lambda$
 $\lambda \lambda \lambda \lambda$

Problem 26: $\lambda \lambda \lambda \lambda$
 $\lambda \lambda \lambda \lambda$
 $\lambda \lambda \lambda \lambda$
 $\lambda \lambda \lambda \lambda$

Problem 27: $\lambda \lambda \lambda \lambda$
 $\lambda \lambda \lambda \lambda$
 $\lambda \lambda \lambda \lambda$
 $\lambda \lambda \lambda \lambda$

Problem 28: $\lambda \lambda \lambda \lambda$
 $\lambda \lambda \lambda \lambda$
 $\lambda \lambda \lambda \lambda$
 $\lambda \lambda \lambda \lambda$

Problem 29: $\lambda \lambda \lambda \lambda$
 $\lambda \lambda \lambda \lambda$
 $\lambda \lambda \lambda \lambda$
 $\lambda \lambda \lambda \lambda$

Problem 30: $\lambda \lambda \lambda \lambda$
 $\lambda \lambda \lambda \lambda$
 $\lambda \lambda \lambda \lambda$
 $\lambda \lambda \lambda \lambda$

Problems 24, 25, 26, 27, 28, 29, and 30

PHOTOGRAPH XIII

Handwritten mathematical problems in an ancient script, likely Egyptian hieroglyphs, arranged in two columns. The text includes various symbols, numbers, and operations such as addition, subtraction, and multiplication. The script is densely packed and shows signs of being a working draft or a scribe's manuscript.

Problem 32

Problem 31

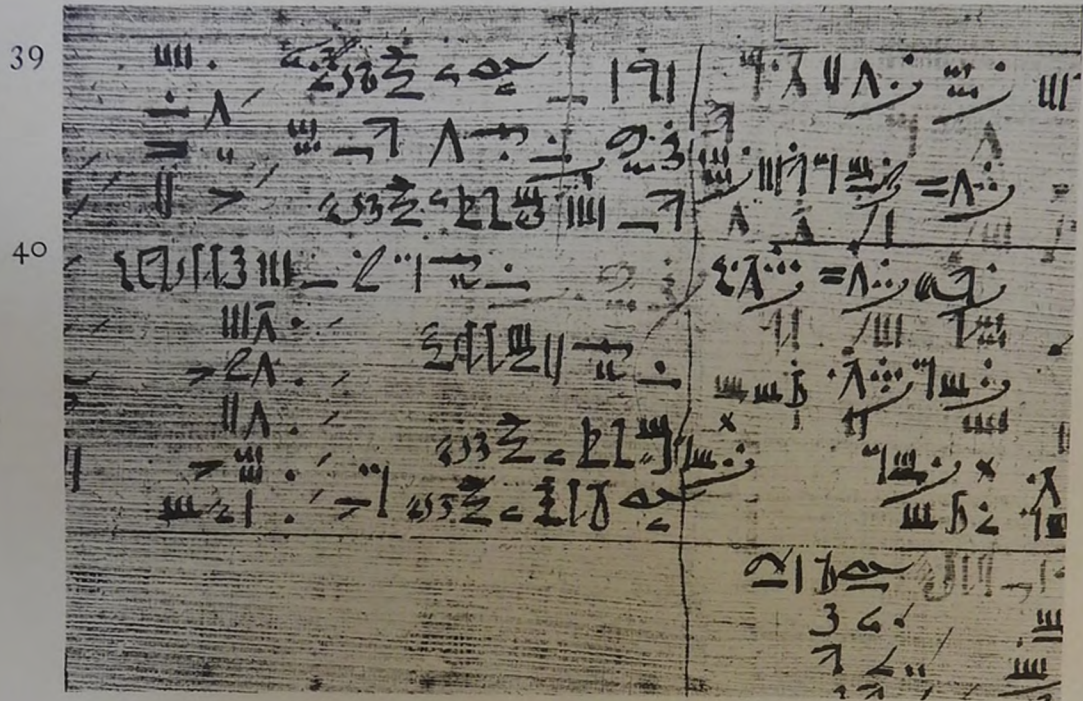
A computation was omitted by the scribe from Problem 31 and misplaced at the end of Problem 38. See Photograph XV, lines 1-4 of register 4 at the left.

35
 37
 38
 33

The image shows a fragment of a papyrus scroll with several lines of ancient Egyptian hieroglyphic text. The text is arranged in columns and rows, with some lines containing mathematical or logical symbols. The symbols include various hieroglyphs such as birds, snakes, and other animals, which were used to represent numbers and operations. The text is written in black ink on a light-colored background.

Problems 35 (in registers 1 and 2); 37, 38, and 33

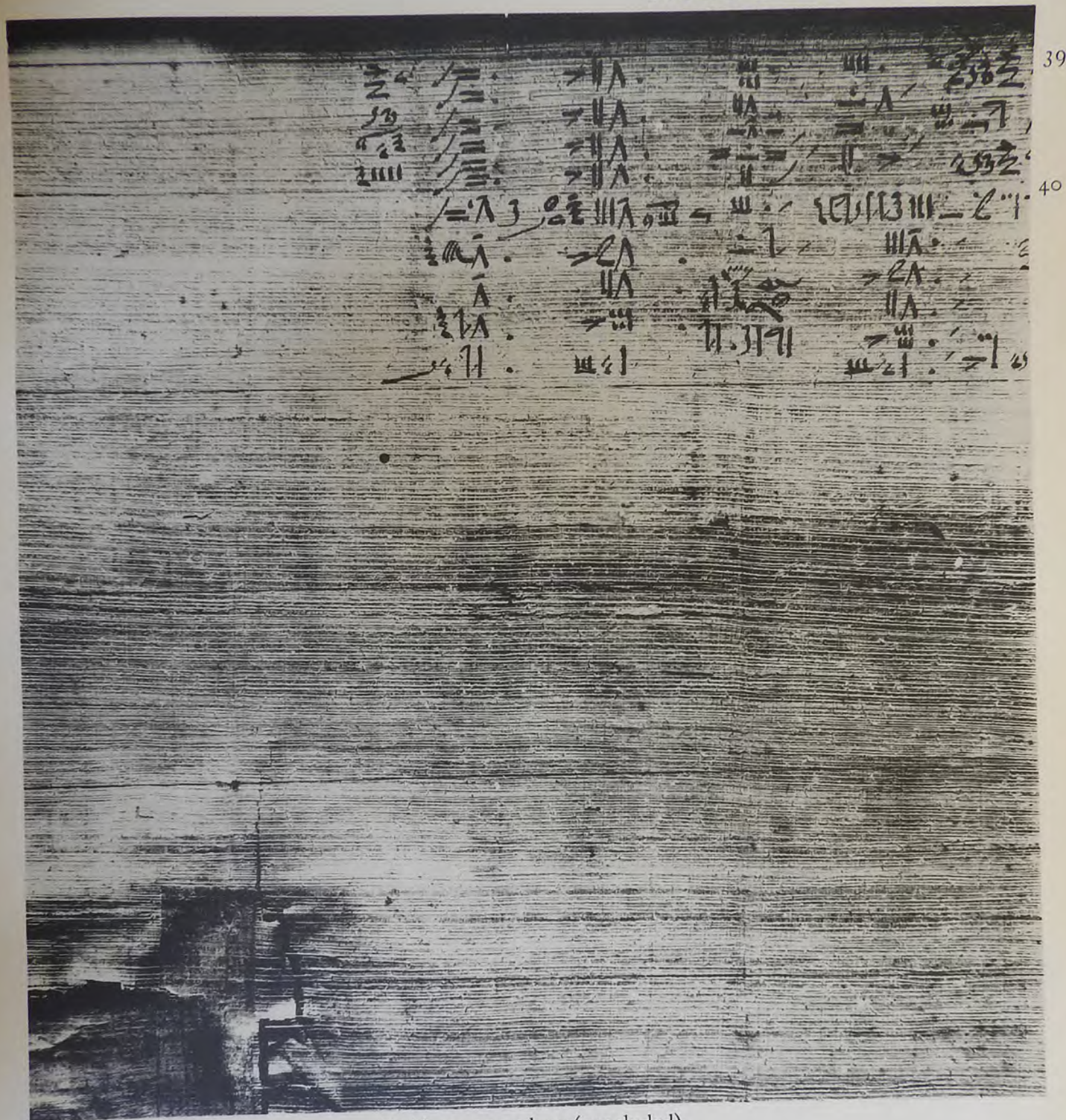
PHOTOGRAPH XVI



Problems 39 and 40

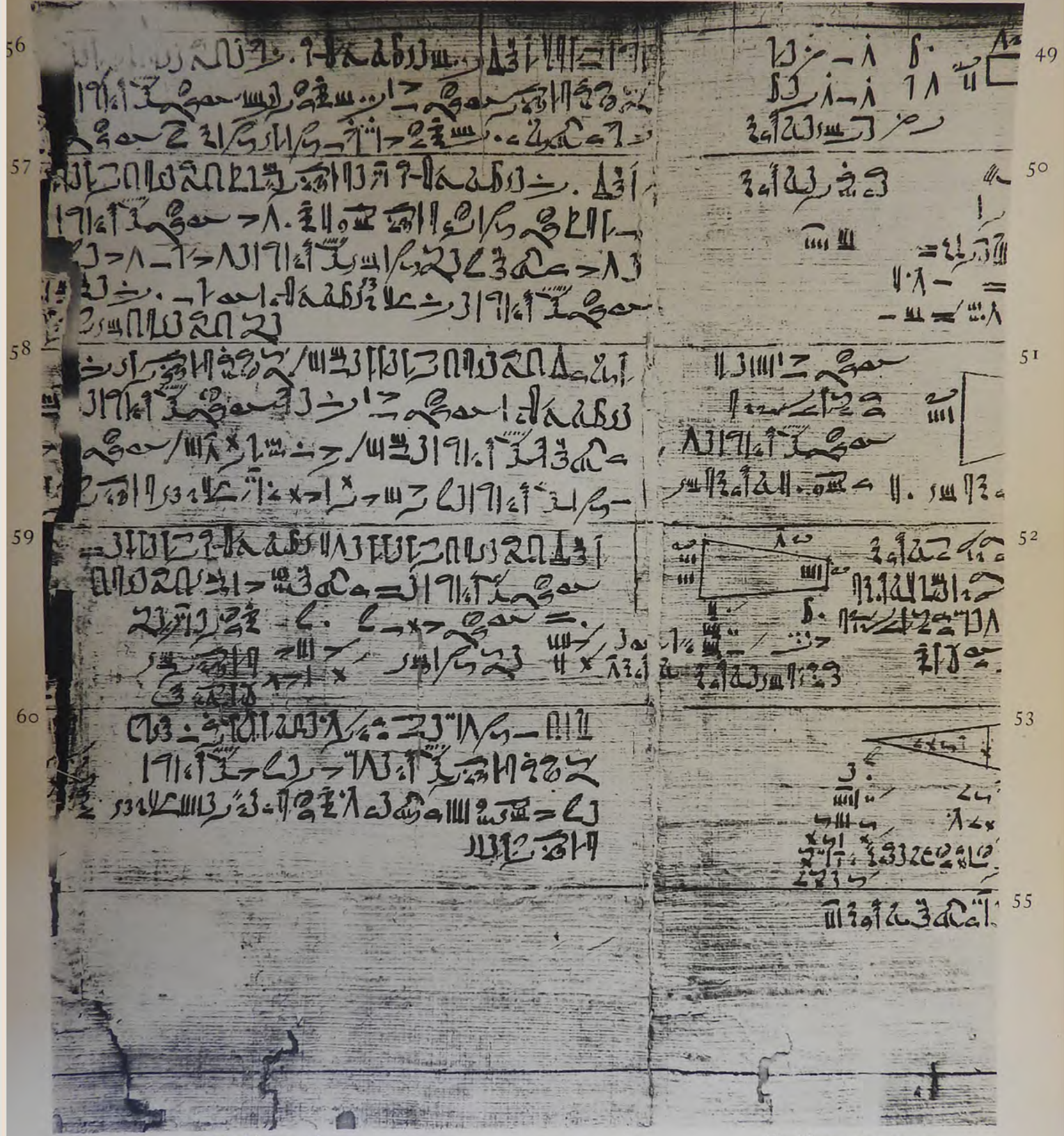
Photographs XV and XVII, instead of overlapping, do not quite come together, and this photograph was taken to supply a few missing signs.

PHOTOGRAPH XVII



Problems 39 and 40 (concluded)

Between these Problems and Problem 41 there is a blank space of about 55 cm. in length.



Problems 56, 57, 58, 59, and 60

Problems 49, 50, 51, 52, 53, and 55 (concluded)

59B



56

57

58

59

60

Problem 59B

Problems 56, 57, 58, 59, and 60 (concluded)

2
 3
 4
 5
 6
 7
 8
 9
 10
 11
 12
 13
 14
 15
 16
 17
 18
 19
 20
 21
 22
 23
 24
 25
 26
 27
 28
 29
 30
 31
 32
 33
 34
 35
 36
 37
 38
 39
 40
 41
 42
 43
 44
 45
 46
 47
 48
 49
 50
 51
 52
 53
 54
 55
 56
 57
 58
 59
 60
 61
 62
 63
 64

Problems 62, 63, and 64

Problem 61B

Problem 61

PHOTOGRAPH XXVII

84

Handwritten text in registers 1, 2, and 3, corresponding to problem 84. The text is arranged in columns and includes various symbols and numbers.

74

83

Handwritten text in registers 1, 2, and 3, corresponding to problem 83. The text is arranged in columns and includes various symbols and numbers.

75

82B

Handwritten text in registers 1, 2, and 3, corresponding to problem 82B. The text is arranged in columns and includes various symbols and numbers.

82B

83

Handwritten text in registers 1, 2, and 3, corresponding to problem 83. The text is arranged in columns and includes various symbols and numbers.

77

80

Handwritten text in registers 1, 2, and 3, corresponding to problem 80. The text is arranged in columns and includes various symbols and numbers.

81

Handwritten text in registers 1, 2, and 3, corresponding to problem 81. The text is arranged in columns and includes various symbols and numbers.

81

Problem 84
(in registers 1, 2, and 3)

Problems 82, 82B, and 83
Problem 81 (continued)

Problems 74, 75,
77, and 80 (concluded)

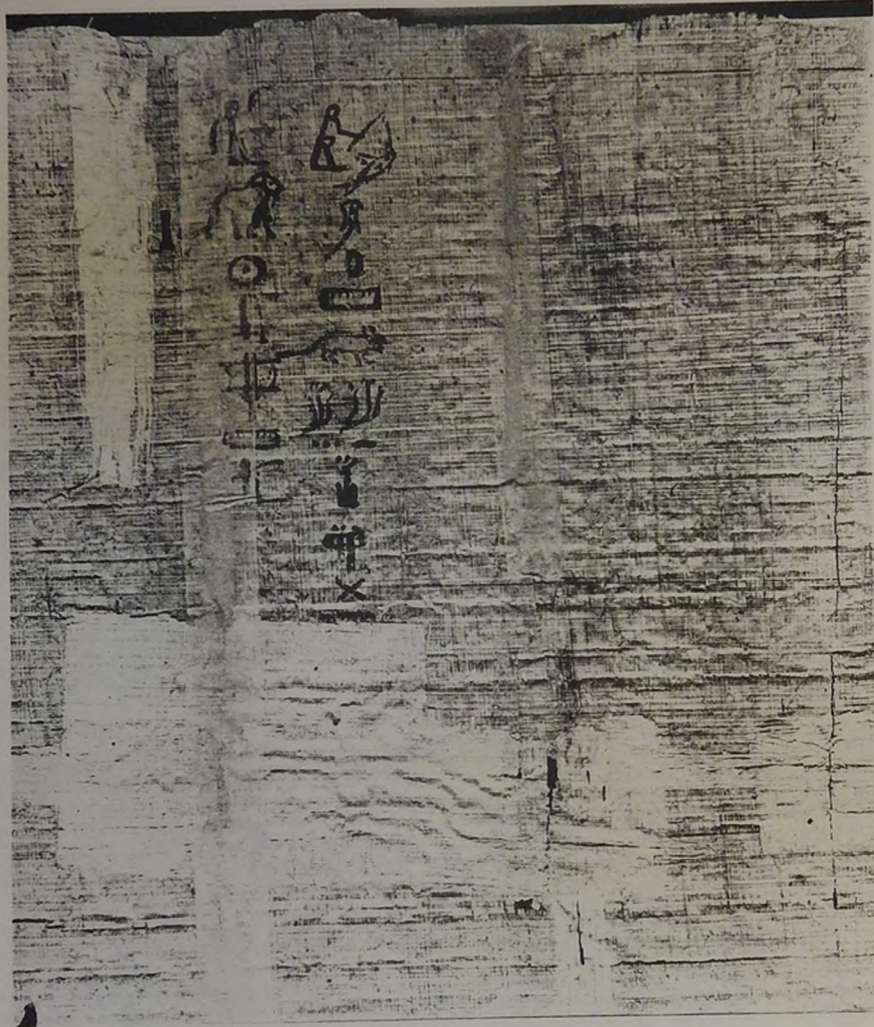
PHOTOGRAPH XXVIII



81

Problems 84 and 81 (concluded)

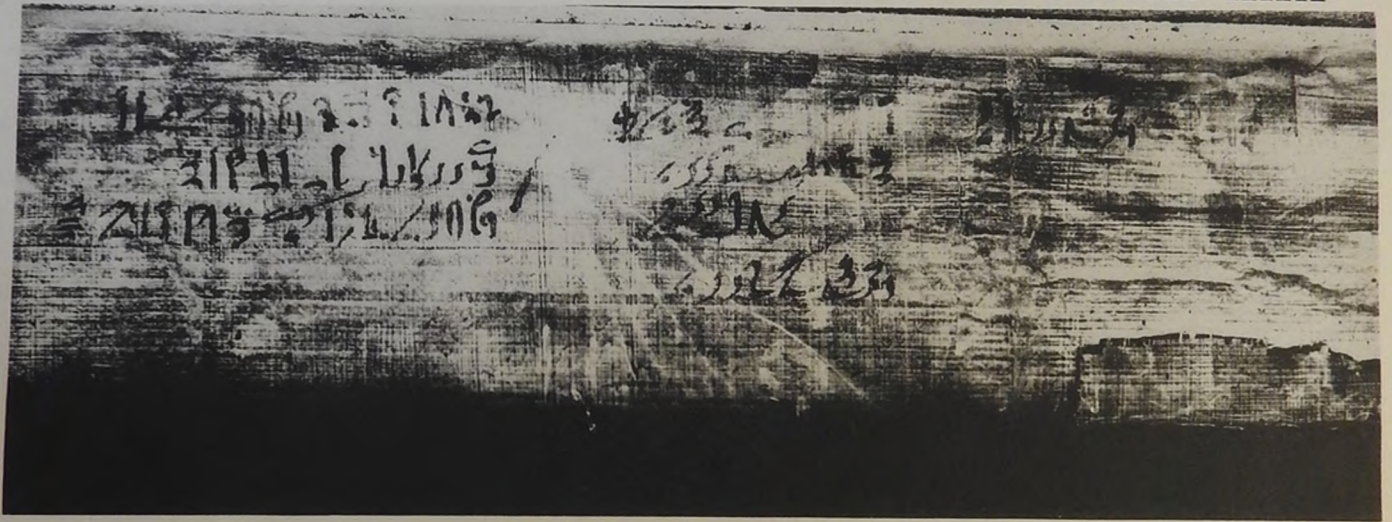
PHOTOGRAPH XXIX



Number 85

This text is inverted on the papyrus, the edge seen at the top of the photograph being the lower edge of the *verso*. This is the last piece of writing on B. M. 10058 *verso*.

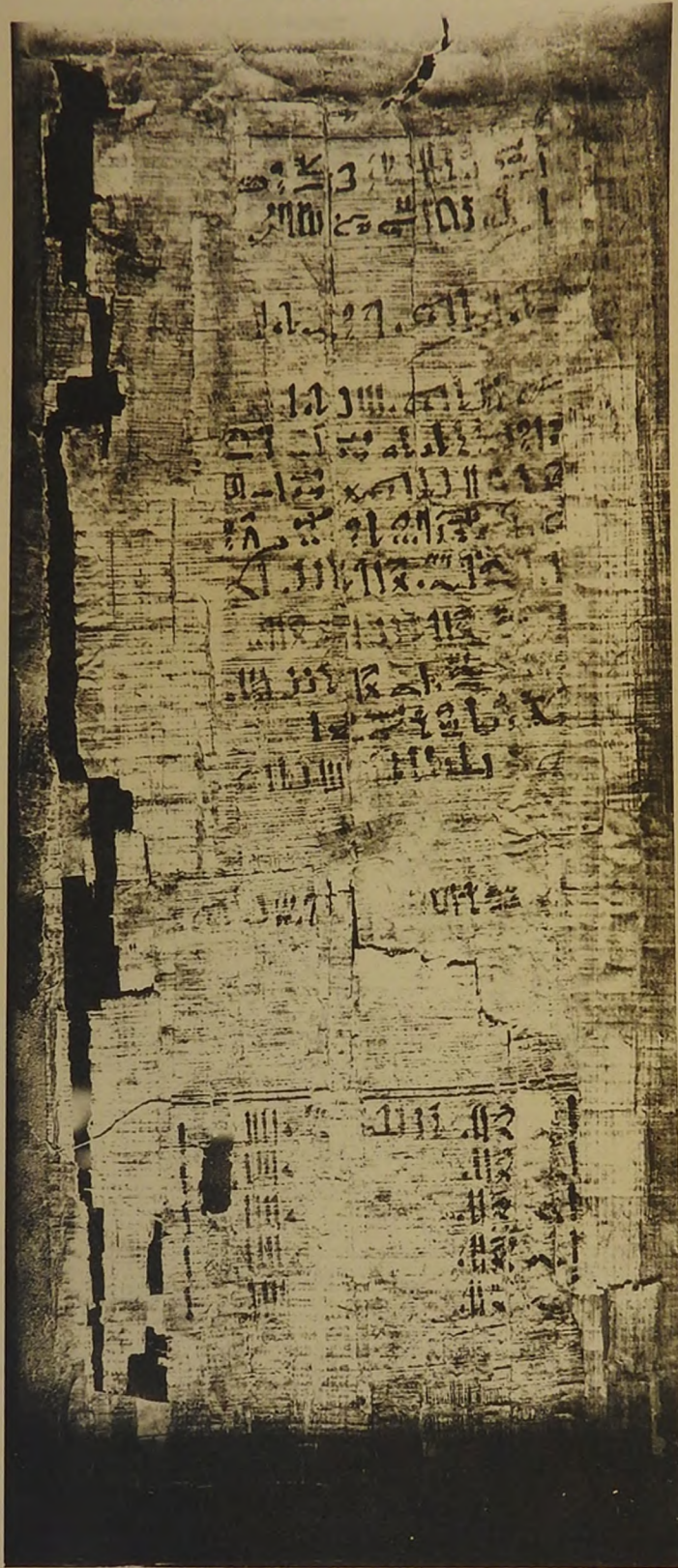
PHOTOGRAPH XXX



Number 87

B. M. 10057 *verso*, at upper edge

PHOTOGRAPH XXXI



Number 86

A patch near the left end of B. M. 10057 *verso*. This patch was so applied that the text, like that of Number 85, is inverted with respect to the rest of the writing on the *verso*.

THE RHIND MATHEMATICAL PAPYRUS

HIEROGLYPHIC TRANSCRIPTION, TRANSLITERATION,
AND LITERAL TRANSLATION

Title-page

tp-ḥšb n h'·t m ḥ·t rḥ nt·t nb·t snk·t šti·t nb·t iw² išt grt špḥr·n·tw
Accurate reckoning¹ of entering into things, knowledge of existing things all, mysteries . . . secrets all. Now was copied

šfdw pn m ḥ'·t·sp 33 ibd³ 4 ḥ·[t] by·ty 'i·wšr·R'⁵
book this in year 33, month four of the inundation⁴-season [under the majesty of the] King of [Upper and] Lower Egypt, 'A-user-Ré',

dy 'nh m snt r sš n išw·t iry m h'w [ny·]šw·t [Ny·m!]'t·[R']⁶ in
endowed with life, in likeness to writings of old made in the time of the King of Upper [and Lower] Egypt, [Ne-ma]'et-[Ré]. Lo

sš i'ḥ·mšw špḥr snn pn
the scribe A'h-mosè writes copy this.

¹ Literally: "head of reckoning," i.e. approved reckoning.

² This is a verb meaning "to be" which is sometimes used as a kind of auxiliary followed by the principal verb, in this case špḥr. It is best left untranslated here.

³ There is some evidence that the word for month is to be read ḥbd.

⁴ The *Akhet* is the first of the three seasons of the Egyptian year. It has been generally assumed that it was the season of inundation, partly because of the meaning of a word with a similar stem and partly because of the general belief that the Egyptian year originally began with the rise of the Nile. This view is set forth above, volume 1, page 44. However, the meanings of the names of the seasons are still uncertain, and it has been suggested that the New Year may originally have been placed in October, when the inundation begins to subside and the first quickly-growing crops are beginning to germinate, and that the *Shômu*, rather than the *Akhet*, was the season of the inundation.

⁵ In proper names compounded with divine names the divine name (in this case written with the sun-disk) is usually, as a mark of honor, placed first, whether it is to be read first or not. This name appears to mean "Great-of-strength-is-Ré," but the syntax of the phrases and sentences often used as names by the ancient Egyptians, is not always clear.

⁶ This name may perhaps be rendered, "He-who-belongs-to-the-truth-of-Ré." This is the so-called "praenomen" or "throne-name" of Amen-em-hêt III (see volume 1, page 1). The name of the scribe means, "A'h (the moon-god)-is-born."

TITLE-PAGE

n
s i
w
t
n i
f
m
r
3
w

· n h p s
· n
w t
š c
f d
w
p
n
m
- t · 3 h
p s
3 3
d b i
4
· h 3

m
· h
t

- p t
b s h

n
· 3 h
t

n
h
n
t t

· b n
t s
n
· k
t

Handwritten red text in a cursive script, likely a transcription of the hieroglyphs.

t
i
n
š s
- h c i
w s m
n h p s
s n
p n

q t · y b
(R
- 3 i
- n s w
h n c y d
m
s n
t
n
š s

š
t
· 3
t

· b n
t

w i
š i
t
g n t

Photograph 1, Columns 1-3 B. M. Facsimile, Plate 1

2 divided by 3

nyś 2 hnt 3
Call 2 out of 3¹

3̄ 2

2 divided by 5

ššm-t
Working-out:

1 5
3̄ 3 3̄
3̄ 1 3̄
15 3

5

3̄ 1 3̄ 15 3̄

2 divided by 7

1 7
2 3 2̄
4̄ 1 2 4̄
4 28 4̄

4̄ 1 2 4̄ 28 4̄

1 7
2 14
4 28

The "4 28 ¼" in the last line on the left is one of the expressions representing two multiplications explained in the Introduction, volume 1, page 17. In these expressions in the table of 2 divided by odd numbers, there are, besides some doubtful cases, about 50 in which the middle number is written with a dot and 30 in which it is written without a dot.

¹The meaning is: Get 2 by operating on 3, that is, by multiplying 3. See volume 1, page 5, footnote 3. This phrase is used with each of the numbers that comes at the top of a page in the papyrus.

2 DIVIDED BY 3, 5, AND 7

Handwritten mathematical diagrams illustrating the division of 2 by 3, 5, and 7. The diagrams use vertical bars and dots to represent numbers and their divisions. Red ink highlights specific parts of the calculations. On the right, there are two columns of symbols, with the second column labeled "syn".

Handwritten mathematical equations and symbols:

- $x = \lambda$ x/x L 1
- $L = III =$ 2
- $-\lambda$ $x = \lambda x$ 3
- $= \lambda + x$ $x = \lambda x$ 4

Handwritten mathematical diagrams illustrating the division of 4 by 8, 2, and 4. The diagrams use vertical bars and dots to represent numbers and their divisions. Red ink highlights specific parts of the calculations.

Photograph 1, Registers 1-2 B. M. Facsimile, Plate 1

2 divided by 9

$$\begin{array}{r}
 1 \quad 9 \\
 \bar{3} \quad 6 \\
 \bar{3} \quad 3 \\
 \sqrt{6} \quad 12 \\
 \sqrt{2} \quad 18 \quad 2
 \end{array}$$

The fractional dot is omitted in the first term of the answer written at the top, although this term is $\frac{1}{9}$ and not the whole number 6. There are about ninety places in the papyrus where a number used as a fraction is written without the dot.

2 divided by 11

$$\begin{array}{r}
 [1] \quad 11 \\
 \bar{3} \quad 7 \bar{3} \\
 \bar{3} \quad 3 \bar{3} \\
 \sqrt{6} \quad 1 \bar{3} \bar{6}
 \end{array}
 \qquad
 \begin{array}{r}
 \bar{6} \quad 1 \bar{3} \bar{6} \quad \bar{6} \bar{6} \quad \bar{6} \\
 [1] \quad 11 \\
 [2] \quad 2]2 \\
 [4] \quad 4]4 \\
 \sqrt{6} \quad 66 \quad 6^1
 \end{array}$$

¹The fractional dot is omitted with this 6 on the opposite plate, but there may have been a dot on the papyrus, obscured now by a crack or fold (see Photograph I).

2 divided by 13

$\dot{8} \quad 1 \dot{2} \dot{8} \quad \dot{5}2 \quad 4 \quad \dot{1}04 \quad \dot{8}$

| | | |
|---|-------|---|
| 1 | 1[3] | |
| 2 | 6 2 | |
| 4 | 3 4 | |
| 8 | 1 2 8 | |
| 4 | 52 | 4 |
| 8 | 104 | 8 |

2 divided by 15

$\dot{1}0 \quad 1 \dot{2} \quad \dot{3}0 \quad \dot{2}$

| | | |
|----|-----|--|
| 1 | 15 | |
| 10 | 1 2 | |
| 30 | 2 | |

2 DIVIDED BY 13 AND 15

2 divided by 17

nyš 2 hnt 17
Call 2 out of 17

ī2 1 3 ī2 51 3 68 4

ššm-t

Working out:

| | |
|----------------|-------|
| 1 | 17 |
| 3 | 11 3 |
| 3 | 5 3 |
| 6 ¹ | 2 2 3 |
| \ ī2 | 1 4 6 |
| \ d:t | 3 4 |

| | | |
|-----|----|---|
| 1 | ī7 | |
| 2 | 34 | |
| \ 3 | 51 | 3 |
| \ 4 | 68 | 4 |

Remainder

Two lines on the right contain expressions of the form referred to in the note to 2 divided by 7. Here the middle numbers are dotted, and then also the 17 and 34 from which they are derived. The same form of writing occurs in 2 divided by 19, but in most of the multiplications carried through for the purpose of obtaining fractional multipliers that will produce given fractions the partial products are written without dots. See 2 divided by 23, 37, 41, and 53.

¹ This number should be $\frac{1}{6}$ and not 6. See note to 2 divided by 9.

2 divided by 19

| | |
|------------------|----------|
| 1 | 19 |
| 3̇ | 12 3̇ |
| 3̇ | 6 3̇ |
| 6̇ | 3 6̇ |
| 12 | 1 2̇ 12̇ |
| ḋ:t | 4 6̇ |
| <i>Remainder</i> | |

| | | | |
|------------------|------|-----------------|----|
| | i2 | 1 2̇ 12̇ | |
| 1 | | 19 ¹ | |
| 2 | | 38 | |
| 4 | | 76 | 4 |
| | ḋ:t | | 6̇ |
| <i>Remainder</i> | | | |

| | | | | | |
|--------------|----|---|---|-----|-----------------|
| | 76 | 4 | | i14 | 6̇ |
| | | | 1 | | 19 ¹ |
| | | | 2 | | 38 |
| | | | 4 | | 76 |
| dmd | \ | 6 | | 114 | 6̇ |
| <i>Total</i> | | | | | |

The dot before the red fraction $\frac{1}{6}$ in line 1 on the plate seems to have been made in black and then corrected to red.

¹ See note to 2 divided by 17. In the second of these two multiplications the 76 is written without a dot although the first two partial products are dotted. Perhaps this is because the 76 has a slightly different use in the two multiplications.

2 divided by 21

$$\begin{array}{r}
 1 \quad 21 \\
 \backslash \dot{3} \quad \dot{1}4 \\
 \backslash 2 \quad 42
 \end{array}
 \quad
 \begin{array}{r}
 \dot{1}4 \quad 1 \dot{2} \\
 \dot{4}2 \quad \dot{2}
 \end{array}$$

The fractional dot is omitted in the second term of the answer as it is in the first term in the case of 2 divided by 9. The number here is 42, and the sign for 40 has already a dot, which makes it resemble a dotted number. The fractional dot is omitted with the sign for 40 in 2 divided by 35 (twice), 43 (twice), 63, 67, 69, and 71, and in Problems 32, 33, and 61 (twice).

2 divided by 23

$$\begin{array}{r}
 1 \quad 23 \\
 \dot{3} \quad 15 \dot{3} \\
 \dot{3} \quad 7 \dot{3} \\
 \dot{6} \quad 3 \dot{2} \dot{3} \\
 \backslash \dot{1}2 \quad 1 \dot{2} \dot{4} \dot{6} \\
 \dot{d}:t \quad \dot{1}2 \\
 \text{Remainder}
 \end{array}
 \quad
 \begin{array}{r}
 \dot{1}2 \quad 1 \dot{3} \dot{4} \\
 \dot{2}76 \quad \dot{1}2
 \end{array}$$

$$\begin{array}{r}
 1 \quad 23 \\
 \backslash 10 \quad 230 \\
 \backslash 2 \quad 46 \\
 dmd \quad \backslash 276 \quad \dot{1}2 \\
 \text{Total}
 \end{array}$$

2 divided by 25

$$\begin{array}{r} 1 \\ \backslash 15 \\ \backslash 3 \end{array} \quad \begin{array}{r} 25 \\ 13 \\ 75 \end{array} \quad \begin{array}{r} 15 \quad 13 \\ 75 \quad 3 \end{array}$$

2 divided by 27

$$\begin{array}{r} 1 \\ \backslash 3 \\ \backslash 2 \end{array} \quad \begin{array}{r} 27 \\ 18 \\ 54 \end{array} \quad \begin{array}{r} 18 \quad 12 \\ 54 \quad 2 \end{array}$$

2 DIVIDED BY 25 AND 27

✓. 𐎠.

𐎠.

𐎠.

𐎠. 𐎠. 1
 𐎠 𐎠. 2
 ✓ 𐎠. 3

𐎠. 3
 𐎠. 57

𐎠. 3 1

𐎠. 57

𐎠. 52 } 1
 𐎠. 57 } 2
 𐎠. 57 } 3

>. 𐎠.

>|. 𐎠.

=. 𐎠.

𐎠. 𐎠. 1
 >|. =. 𐎠. 2
 >. 𐎠. 3

𐎠. 2
 𐎠. 45

𐎠. 2 1

𐎠. 81

𐎠. 72 } 1
 𐎠. 81 } 2
 𐎠. 45 } 3

Photograph 11, Registers 5-6 B. M. Facsimile, Plate 11

2 divided by 29

nyš 2 hnt 29 24 1 6 24 58 2 174 6 232 8
 Call 2 out of 29

ššm-t
 Working-out:

| | | |
|----|-----|--------|
| \1 | 24 | 1 6 24 |
| \2 | 58 | 2 |
| \6 | 174 | 6 |
| \8 | 232 | 8 |

The scribe has been careless here. In the solution the first fraction is $\frac{1}{24}$. $\frac{1}{24}$ of 29 is $1\frac{1}{6}\frac{1}{24}$, leaving $\frac{1}{2}\frac{1}{6}\frac{1}{8}$ to make up 2, so that he finishes his solution by writing "2" (that is, "twice"), "6" and "8." With these three numerals before him at the beginning of the second, third and fourth lines it was natural to put "1" at the beginning of the first line as if the four lines formed a single multiplication.

2 divided by 31

31 20 1 2 20 124 4 155 5

| | | |
|----|-----|--------|
| 1 | 20 | 1 2 20 |
| \4 | 124 | 4 |
| \5 | 155 | 5 |

Here again the scribe has by mistake put "1" at the top of the first column, opposite $\frac{1}{20}$.

2 divided by 33

$$\begin{array}{r}
 33 \quad 22 \quad 1 \dot{2} \quad \dot{6}6 \quad \dot{2} \\
 \begin{array}{r}
 \dot{3} \quad 22 \quad 1 \dot{2} \\
 \backslash 2 \quad \dot{6}6 \quad \dot{2}
 \end{array}
 \end{array}$$

2 divided by 35

$$\begin{array}{r}
 35 \quad 30^1 \quad 1 \dot{6} \quad 42^2 \quad \dot{3} \dot{6} \\
 \quad \quad 6 \quad 7 \quad 5 \\
 \begin{array}{r}
 \backslash 30 \quad 1 \dot{6} \\
 \backslash 42^2 \quad \dot{3} \dot{6}
 \end{array}
 \end{array}$$

¹With this number 30 the dot is omitted on the opposite plate, but it is possible that a dot on the papyrus is concealed under the patch which covers part of the 30 (see Photograph III).

²See note to 2 divided by 21.

2 DIVIDED BY 33 AND 35

| | | | | |
|---------------|-------------------|--|-------------------|---|
| \Rightarrow | \Rightarrow . | | | 1 |
| | | | \Rightarrow - | 2 |
| | | | \Rightarrow . | 3 |
| \Rightarrow | \Rightarrow . | | | 1 |
| | | | \Rightarrow . | 2 |
| | | | \Rightarrow . | 3 |

| | | | | |
|--|--|--|--|---|
| | | | | 1 |
| | | | | 2 |
| | | | | 3 |
| | | | | 4 |
| | | | | 1 |
| | | | | 2 |
| | | | | 3 |
| | | | | 4 |

Photograph III, Registers 3-4 B. M. Facsimile, Plates II-III

2 divided by 37

| | |
|-----------|--------|
| 1 | 37 |
| <u>3</u> | 24 3 |
| 3 | 12 3 |
| 6 | 6 6 |
| 12 | 3 12 |
| <u>24</u> | 1 2 24 |
| d:t | 3 8 |
| Remainder | |

| | | | | | |
|----|-----------|-----|---|----------|-----|
| 24 | 1 2 24 | 111 | 3 | 296 | 8 |
| | 1 | 37 | | 1 | 37 |
| | 2 | 74 | | 2 | 74 |
| | <u>3</u> | 111 | 3 | 4 | 148 |
| | d:t | 8 | | <u>8</u> | 296 |
| | Remainder | | | | 8 |

2 divided by 39

| | | | | | |
|----------|----|-----|-----|----|---|
| | 39 | 26 | 1 2 | 78 | 2 |
| <u>3</u> | 26 | 1 2 | | | |
| 2 | 78 | 2 | | | |

2 divided by 41

nyš 2 hnt 41
Call 2 out of 41

24 1 3 24 246 6 328 8

ššm-t

Working-out:

3 27'3
3 13 3
6 6 3 6
12 3 3 12
24 1 3 24
d:t 6 8

Remainder

1 41
2 82
4 164
dmd 6 246 6
Total 8 328 8

The scribe has carelessly added a fractional dot to the 27.

2 divided by 43

| | | | | | | | | | |
|-------------|------|-----------------|-------------------|----|----|-----|----|-----|----|
| | 43 | 42 ¹ | 1 42 ¹ | 66 | 2̇ | 129 | 3̇ | 301 | 7̇ |
| gm | \ 42 | | 1 42 | | | | | | |
| <i>Find</i> | | | | | | | | | |
| \ 2 | 66 | | 2̇ | | | | | | |
| \ 3 | 129 | | 3̇ | | | | | | |
| \ 7 | 301 | | 7̇ | | | | | | |

The sign for 60 is used here twice in what was intended to be 86. This use of 60 for 80 occurs also in 2 divided by 83, and twice in 2 divided by 93.

The expressions in this table beginning with the word gm are in one respect like the expressions referred to in the note to 2 divided by 7. The number in the middle seems to be used in two ways, first as a whole number to be found, and then in its reciprocal form as a fractional multiplier. Thus it is written sometimes with a dot and sometimes without. By actual count the word gm occurs twenty-two times in this table. In eleven cases the number is written with a dot and in ten cases without, while in one case (2 divided by 99) the multiplier $\frac{2}{3}$ is put in with gm, making an expression of the form referred to in the note to 2 divided by 7. The process of "finding" this number, carried out in the examples which make up the first part of this table, gives a fraction at once, but when the author uses the word "Find" he seems to think of it as a whole number.

¹See note to 2 divided by 21.

DATA DISCLOSURE

2 divided by 45

| | | | | | |
|---|----|----|-----|----|---|
| | 45 | 30 | 1 2 | 90 | 2 |
| 3 | | 30 | 1 2 | | |
| 2 | | 90 | 2 | | |

2 divided by 47

| | | | | | | | |
|------|----|-----|--------|-----|---|-----|----|
| | 47 | 30 | 1 2 15 | 141 | 3 | 470 | 10 |
| gm | | 30 | 1 2 15 | | | | |
| Find | | | | | | | |
| 3 | | 141 | 3 | | | | |
| 10 | | 470 | 10 | | | | |

2 DIVIDED BY 45 AND 47

Handwritten examples of the number 2 divided by 45 and 47, showing various forms and their corresponding numerical values.

| | | | | | |
|----------------|----------------|----------------|----------------|----------------|---|
| $\frac{2}{45}$ | $\frac{2}{47}$ | $\frac{2}{45}$ | $\frac{2}{47}$ | $\frac{2}{45}$ | 1 |
| $\frac{2}{45}$ | $\frac{2}{47}$ | $\frac{2}{45}$ | $\frac{2}{47}$ | $\frac{2}{45}$ | 2 |
| $\frac{2}{45}$ | $\frac{2}{47}$ | $\frac{2}{45}$ | $\frac{2}{47}$ | $\frac{2}{45}$ | 3 |
| $\frac{2}{45}$ | $\frac{2}{47}$ | $\frac{2}{45}$ | $\frac{2}{47}$ | $\frac{2}{45}$ | 1 |
| $\frac{2}{45}$ | $\frac{2}{47}$ | $\frac{2}{45}$ | $\frac{2}{47}$ | $\frac{2}{45}$ | 2 |
| $\frac{2}{45}$ | $\frac{2}{47}$ | $\frac{2}{45}$ | $\frac{2}{47}$ | $\frac{2}{45}$ | 3 |

Handwritten examples of the number 2 divided by 45 and 47, showing various forms and their corresponding numerical values.

| | | | | | |
|----------------|----------------|----------------|----------------|----------------|---|
| $\frac{2}{45}$ | $\frac{2}{47}$ | $\frac{2}{45}$ | $\frac{2}{47}$ | $\frac{2}{45}$ | 1 |
| $\frac{2}{45}$ | $\frac{2}{47}$ | $\frac{2}{45}$ | $\frac{2}{47}$ | $\frac{2}{45}$ | 2 |
| $\frac{2}{45}$ | $\frac{2}{47}$ | $\frac{2}{45}$ | $\frac{2}{47}$ | $\frac{2}{45}$ | 3 |
| $\frac{2}{45}$ | $\frac{2}{47}$ | $\frac{2}{45}$ | $\frac{2}{47}$ | $\frac{2}{45}$ | 4 |

Handwritten examples of the number 2 divided by 45 and 47, showing various forms and their corresponding numerical values.

| | | | | | |
|----------------|----------------|----------------|----------------|----------------|---|
| $\frac{2}{45}$ | $\frac{2}{47}$ | $\frac{2}{45}$ | $\frac{2}{47}$ | $\frac{2}{45}$ | 1 |
| $\frac{2}{45}$ | $\frac{2}{47}$ | $\frac{2}{45}$ | $\frac{2}{47}$ | $\frac{2}{45}$ | 2 |
| $\frac{2}{45}$ | $\frac{2}{47}$ | $\frac{2}{45}$ | $\frac{2}{47}$ | $\frac{2}{45}$ | 3 |
| $\frac{2}{45}$ | $\frac{2}{47}$ | $\frac{2}{45}$ | $\frac{2}{47}$ | $\frac{2}{45}$ | 4 |

Photograph 14, Registers 3-4 B. M. Facsimile, Plates III-IV

2 divided by 49

| | | | | | |
|------|-----|----|-------|-----|---|
| | 49 | 28 | 1 2 4 | 196 | 4 |
| gm | | 28 | 1 2 4 | | |
| Find | | | | | |
| \4 | 196 | | 4 | | |

2 divided by 51

| | | | | | |
|----|-----|----|-----|-----|-----|
| | 51 | 34 | 1 2 | 102 | [2] |
| \3 | 34 | | 1 2 | | |
| \2 | 102 | | 2 | | |

2 DIVIDED BY 49 AND 51

x. 𐎠𐎡𐎢

x > 1. = 𐎠.

𐎠𐎡𐎢
x > 1. = 𐎠
x 𐎠𐎡𐎢

𐎠. 𐎠𐎡𐎢 9
4 2 1 69i

𐎠. 𐎠. 1.
4 2 1

𐎠. 𐎠. 2.
8 2

𐎠. 𐎠. 1.
4 2 1

𐎠. 𐎠. 4

𐎠. 𐎠. 8 2

𐎠. 𐎠. 9

𐎠. 𐎠. 𐎠. 9
4 69i

𐎠. 4

1
2
3
1
2
3

𐎠𐎡

> 1. - 𐎠

17
> 1. 𐎠𐎡𐎢
> 2. 𐎠

11 9
20i

𐎠. 1.
2 1

𐎠. 𐎠. 3
4 3

𐎠. 1.
2 1

𐎠. 𐎠. 4 3

𐎠. 3

𐎠. 2

11 9
20i

11 2

1
2
3
1
2
3

2 divided by 53

nyš 2 hnt 53 30 1 3 i0 318 6 795 i5
 Call 2 out of 53

ššm·t

Working-out:

| | | | | | | |
|------|-----------|--------|--|--------|-----------------|----|
| gm | 30 | 1 3 i0 | | 1 | 53 ¹ | |
| Find | | | | 10 | 530 | |
| 6 | | | | 5 | 265 | |
| | 318 | 6 | | dmd 15 | 795 | i5 |
| | d:t | i5 | | Total | | |
| | Remainder | | | | | |

2 divided by 55

55 30 1 3 6 330 6

| | | |
|------|-----|-------|
| gm | 30 | 1 3 6 |
| Find | | |
| 6 | | |
| | 330 | 6 |

¹ In this multiplication we should expect dots with all the numbers of the second column, or with only the last, or not at all (see note to 2 divided by 17).

2 divided by 57

| | | | | | |
|----|----|-----------------|-----|-----|---|
| | 57 | 38 ¹ | 1 2 | 114 | 2 |
| ∖3 | | 38 | 1 2 | | |
| ∖2 | | 114 | 2 | | |

2 divided by 59

| | | | | | | | |
|------|----|-----|-----------|-----|---|-----|---|
| | 59 | 36 | 1 2 i2 i8 | 226 | 4 | 531 | 9 |
| gm | | ∖36 | 1 2 i2 i8 | | | | |
| Find | | | | | | | |
| ∖4 | | 236 | 4 | | | | |
| ∖9 | | 531 | 9 | | | | |

¹Fractional dot omitted.

2 DIVIDED BY 57 AND 59

$\Rightarrow \cdot \quad \underline{-\Lambda \cdot} \quad \Rightarrow | \cdot \quad \underline{= \Lambda \cdot}$

$\begin{array}{l} \Rightarrow | \cdot = \Lambda \cdot \quad \checkmark \quad 1 \\ \Rightarrow \underline{-\Lambda \cdot} \quad \checkmark \quad 2 \\ \Rightarrow \underline{-\Lambda \cdot} \quad \checkmark \quad 3 \end{array}$

| | | | | | | |
|------------------------------|----------------------------|------------------------------|----------------------------|---------------------------|-----|-----|
| $\Rightarrow \cdot$
2 | $\overline{111109}$
411 | $\Rightarrow \cdot$
2 1 | $\overline{111109}$
83 | $\overline{111109}$
75 | } 1 | |
| $\Rightarrow \cdot$
2 1 | $\overline{111109}$
83 | $\Rightarrow \cdot$
2 | $\overline{111109}$
411 | $\Rightarrow \cdot$
2 | | } 2 |
| $\Rightarrow \cdot$
2 | $\overline{111109}$
411 | $\Rightarrow \cdot$
2 1 | $\overline{111109}$
83 | $\Rightarrow \cdot$
2 | | } 3 |

$\underline{\underline{1 \cdot \Lambda \cdot}} \times \cdot \underline{\underline{2 \cdot \Lambda \cdot}} = \Lambda \cup \Lambda \Rightarrow | \cdot$

$\begin{array}{l} \underline{\underline{2 \cdot \Lambda \cdot}} \\ = \Lambda \cup \Lambda \Rightarrow | \cdot \\ \times \cdot \underline{\underline{2 \cdot \Lambda \cdot}} \\ \underline{\underline{1 \cdot \Lambda \cdot}} \end{array}$

| | | | | | | | | | | |
|------------------------|----------------------------|---------------------------|----------------------------|------------------------------|---------------------------|------------------------------|---------------------------|---------------------------|-----|-----|
| $\overline{1111}$
4 | $\overline{111109}$
135 | $\overline{1111}$
4 | $\overline{111109}$
622 | $\overline{111109}$
81 | $\overline{111109}$
21 | $\Rightarrow \cdot$
2 1 | $\overline{111109}$
63 | $\overline{111109}$
95 | } 1 | |
| $\overline{1111}$
4 | $\overline{111109}$
135 | $\overline{111109}$
81 | $\overline{111109}$
21 | $\Rightarrow \cdot$
2 1 | $\overline{111109}$
63 | $\overline{111109}$
95 | $\overline{111109}$
63 | $\overline{111109}$
95 | | } 2 |
| $\overline{1111}$
4 | $\overline{111109}$
135 | $\overline{111109}$
81 | $\overline{111109}$
21 | $\Rightarrow \cdot$
2 1 | $\overline{111109}$
63 | $\overline{111109}$
95 | $\overline{111109}$
63 | $\overline{111109}$
95 | | } 3 |
| $\overline{1111}$
4 | $\overline{111109}$
135 | $\overline{111109}$
81 | $\overline{111109}$
21 | $\Rightarrow \cdot$
2 1 | $\overline{111109}$
63 | $\overline{111109}$
95 | $\overline{111109}$
63 | $\overline{111109}$
95 | | } 4 |

2 divided by 61

| | | | | | | | | | |
|------|-----|----|--------|-----|---|-----|---|-----|----|
| | 61 | 40 | 1 2 40 | 244 | 4 | 488 | 8 | 610 | 10 |
| gm | \40 | | 1 2 40 | | | | | | |
| Find | | | | | | | | | |
| \4 | 244 | | 4 | | | | | | |
| \8 | 488 | | 8 | | | | | | |
| \10 | 610 | | 10 | | | | | | |

2 DIVIDED BY 6I

oi oi6

8 884

4 442

04 2 1 04

16

04 2 1

04

mg

4

442

4

8

884

8

oi

oi6

oi

2 divided by 63

$$\begin{array}{r} 63 \\ \backslash 3 \quad 42 \\ \backslash 2 \quad 126 \end{array} \quad \begin{array}{r} 42^1 \quad 1 \dot{2} \\ 1 \dot{2} \\ 2 \end{array} \quad \begin{array}{r} i26 \quad \dot{2} \\ \end{array}$$

¹See note to 2 divided by 21.

2 DIVIDED BY 63

> . 𐎠𐎡𐎢

> | .

𐎠 𐎡

| | | |
|-------|-----|---|
| > . | 𐎠𐎡𐎢 | 1 |
| > . | 𐎠𐎡𐎢 | 2 |
| > . | 𐎠𐎡𐎢 | 3 |

𐎠𐎡 .

𐎠𐎡𐎢 9

𐎠 | .

𐎠𐎡

𐎠 | .

𐎠𐎡𐎢

} 1

𐎠𐎡𐎢

𐎠

} 2

𐎠𐎡 .

𐎠𐎡𐎢 9

𐎠

} 3

2 divided by 65

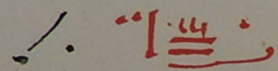

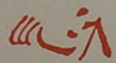
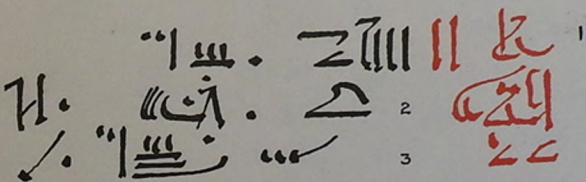
nyš 2 hnt 65 39 1 3 i95 3
Call 2 out of 65


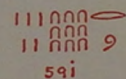


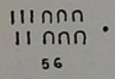
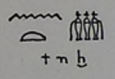
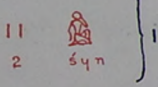


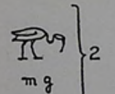

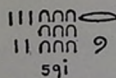

ššm-t

Working-out:

gm 39 1 3
Find
 \ 3 i95 3

2 DIVIDED BY 65

| | | | | | | |
|---|---|---|--|---|---|---|
|  |  |  |  |  |  |  |
| 3 | 59i | 3 1 | 93 | 56 | t n b | 2 64 n |
| | | | |  |  |  |
| | | | | 3 1 | 93 | 2 m š t |
| | | | |  |  |  |
| | | | | 3 | 59i | 3 |

2 divided by 67

| | | | | | | | |
|------|-----|-----------------|----------|-----|---|-----|---|
| | 67 | 40 ¹ | 1 2 8 20 | 335 | 5 | 536 | 8 |
| gm | \40 | | 1 2 8 20 | | | | |
| Find | | | | | | | |
| \5 | 335 | | 5 | | | | |
| \8 | 536 | | 8 | | | | |

2 divided by 69

| | | | | | |
|----|-----|-----------------|-----|-----|---|
| | 69 | 46 ¹ | 1 2 | 138 | 2 |
| \3 | 46 | | 1 2 | | |
| \2 | 138 | | 2 | | |

¹See note to 2 divided by 21.

2 divided by 71

| | | | | | | | |
|------|-----|-----------------|----------|-----|---|-----|----|
| | 71 | 40 ¹ | 1 2 4 40 | 568 | 8 | 710 | 10 |
| gm | 40 | | 1 2 4 40 | | | | |
| Find | | | | | | | |
| \ 8 | 568 | | 8 | | | | |
| \ 10 | 710 | | 10 | | | | |

¹See note to 2 divided by 21.

2 divided by 73

| | | | | | | | | | |
|------|----|------|----------------|-----|---|-----|---|-----|---|
| | 73 | 60 | 1 6 20 | 219 | 3 | 292 | 4 | 365 | 5 |
| gm | | \ 60 | 1 6 20 | | | | | | |
| Find | | | | | | | | | |
| \ 3 | | 219 | 3 | | | | | | |
| \ 4 | | 292 | 4 | | | | | | |
| \ 5 | | 365 | 5 ¹ | | | | | | |

¹ Photograph VI seems to show a crease or overlap in the papyrus here. It is possible that a fractional dot, now concealed, was written over this 5.

2 divided by 75

75

50

1 2

150

2

3

50

1 2

2

150

2

2 DIVIDED BY 75

\rightarrow 7. \rightarrow 1. 7
 \rightarrow 1. 7 7 / 2
 \rightarrow 7. 7 7 / 3

\equiv osi

\equiv 1. osi

| | | | |
|----------|----------|------------|-----|
| \equiv | \equiv | \equiv | } 1 |
| 2 | 1 | 57 | |
| | | | |
| \equiv | \equiv | \equiv / | } 2 |
| 2 | 1 | 05 3 | |
| \equiv | \equiv | \equiv / | } 3 |
| 2 | 1 | 05i 2 | |

2 divided by 77

nyš 2 hnt 77
Call 2 out of 77

44 1 2 4 308 4

ššm-t

Working-out:

gm 44 1 2 4

Find

\4 3[08] 4

2 DIVIDED BY 77

$x \equiv \text{𐎧} \mid x > | \cdot$ 𐎧 𐎠
 $x > | \cdot$ 𐎧 𐎠
 $x \cdot$

4 - 𐎠 3

4 2 1

4 4

77 t n b 2 𐎠 𐎠

4 2 1

44 m g } 2 . m š š t

4 [80] 3 4 } 3

2 divided by 79

| | | | | | | | | | | |
|------|-----|------------------|----|----|-----|---|-----|---|-----|----|
| | 79 | 60 | 14 | 15 | 237 | 3 | 316 | 4 | 790 | 10 |
| gm | \60 | | 14 | 15 | | | | | | |
| Find | | | | | | | | | | |
| \3 | | 233 ¹ | | 3 | | | | | | |
| \4 | | 416 ¹ | | 4 | | | | | | |
| \10 | | 790 | | 10 | | | | | | |

¹ These numbers should be 237 and 316 as in the line at the top.

2 DIVIDED BY 79

Handwritten symbols in red ink, including a lambda symbol, a cross, and various combinations of vertical bars and dots.

Handwritten symbols in black ink, including a lambda symbol, a cross, and various combinations of vertical bars and dots, arranged in a vertical list numbered 1 to 5.

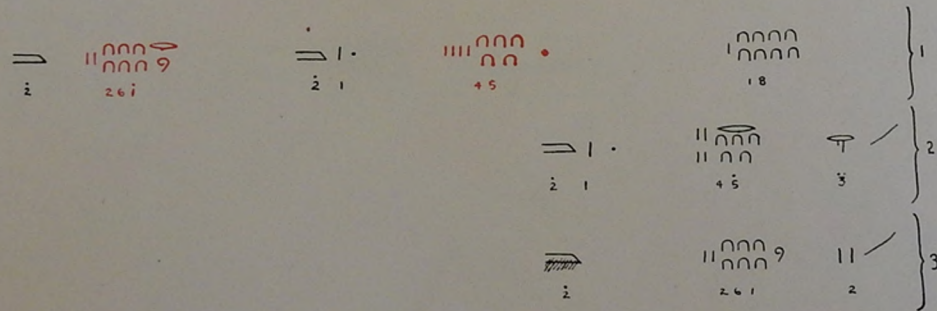
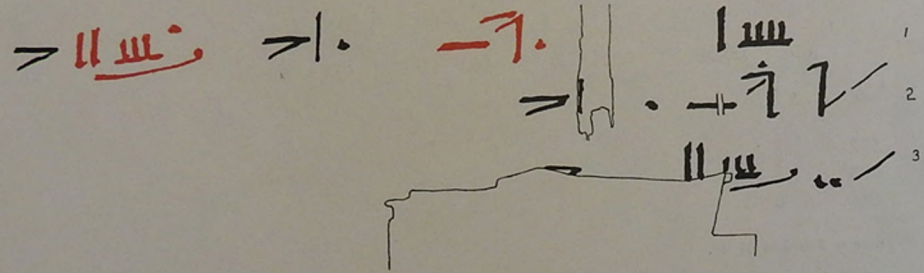
A collection of mathematical diagrams and symbols. On the left, there are several groups of vertical bars and dots, some with red markings, and numbers below them (e.g., 097, 613, 732, 5i, 4, 3). On the right, there are similar groups of vertical bars and dots, some with black markings, and numbers below them (e.g., 97, 06, 332, 614, 097). Brackets on the right side group these diagrams into five numbered sections (1 to 5).

2 divided by 81

$$\begin{array}{r} 81 \\ \sqrt{3} \\ \sqrt{2} \end{array} \quad \begin{array}{r} 54^1 \quad 1 \dot{2} \\ 54 \quad 1 \dot{2} \\ 162 \quad 2 \end{array}$$

¹ Fractional dot omitted.

2 DIVIDED BY 8I

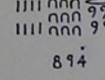
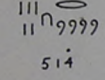
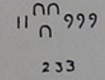
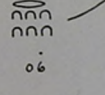
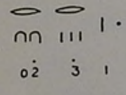
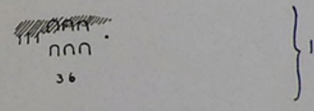
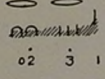
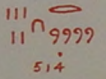
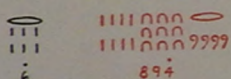
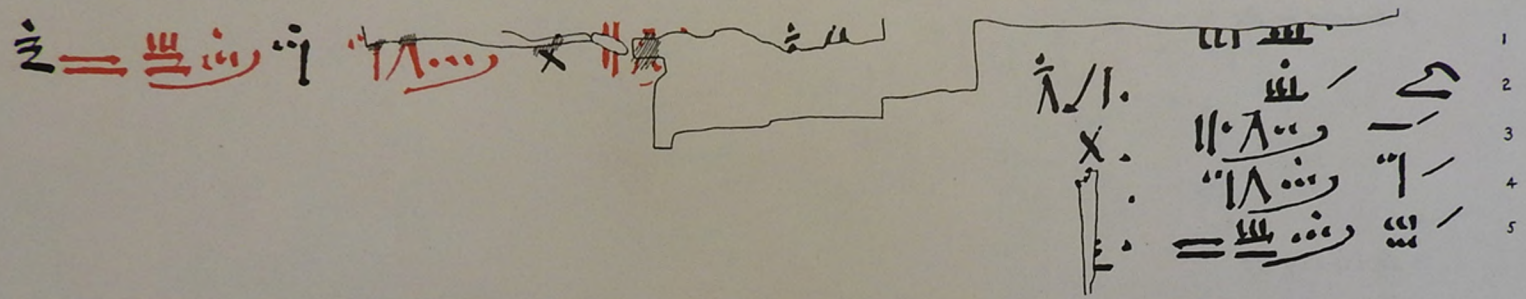


2 divided by 83

| | | | | | | | | | |
|------|-----------------|------|--------|-----|---|-----|---|-----|---|
| | 63 ¹ | [60] | 1 3 20 | 332 | 4 | 415 | 5 | 498 | 6 |
| gm | | | | | | | | | |
| Find | | | | | | | | | |
| \4 | \60 | | 1 3 20 | | | | | | |
| \5 | | 332 | 4 | | | | | | |
| \6 | | 415 | 5 | | | | | | |
| | | 498 | 6 | | | | | | |

¹ 63 was written for 83. See note to 2 divided by 43.

2 DIVIDED BY 83



2 divided by 85

| | | | | | |
|------|------|-----|-----|-----|---|
| | 85 | 51 | 1 3 | 255 | 3 |
| 1 | 85 | | | | |
| gm | \ 51 | 1 3 | | | |
| Find | | | | | |
| \ 3 | 255 | 3 | | | |

2 divided by 87

| | | | | | |
|-----|-----|-----------------|-----|-----|---|
| 1 | 87 | 58 ¹ | 1 2 | 174 | 2 |
| \ 3 | 58 | [1] 2 | | | |
| \ 2 | 174 | 2 | | | |

¹ Fractional dot omitted.

2 DIVIDED BY 85 AND 87

𐎠𐎢𐎡𐎢𐎠 𐎠. 𐎢.

𐎠𐎢𐎡𐎢𐎠
𐎠𐎢𐎡𐎢𐎠
𐎠. 𐎢. 𐎠
𐎠𐎢𐎡𐎢𐎠

𐎠 𐎠𐎢𐎡𐎢𐎠
𐎠𐎢 𐎠𐎢 99
3 552

𐎠 | . 𐎠𐎢𐎡𐎢𐎠.
3 | 15

| | | |
|-------|----------|---|
| 𐎠𐎢𐎡𐎢𐎠 | 𐎠𐎢𐎡𐎢𐎠 | 1 |
| 𐎠𐎢𐎡𐎢𐎠 | 𐎠𐎢𐎡𐎢𐎠 | 2 |
| 𐎠 . | 𐎠𐎢𐎡𐎢𐎠 | 3 |
| 𐎠 | 𐎠𐎢𐎡𐎢𐎠 99 | 4 |

𐎠 - 𐎢. 𐎠 | . = 𐎢.

𐎠𐎢𐎡𐎢𐎠.
= 𐎢 |
- 𐎢. 𐎠

𐎠 𐎠𐎢𐎡𐎢𐎠
𐎠𐎢 𐎠𐎢 9
2 47i

𐎠 | . 𐎠𐎢𐎡𐎢𐎠.
2 | 85

| | | |
|-------|---------|---|
| 𐎠𐎢𐎡𐎢𐎠 | 𐎠𐎢𐎡𐎢𐎠 | 1 |
| 𐎠 | 𐎠𐎢𐎡𐎢𐎠 | 2 |
| 𐎠 | 𐎠𐎢𐎡𐎢𐎠 9 | 3 |

2 divided by 89

nyš 2 hnt 89 60 [1 3] i0 20 356¹ [4 .5] 4² 6² 890² [i0]

ššm-t

Working-out:

| | | |
|------|-----|-----------|
| gm | 60 | 1 3 i0 20 |
| Find | | |
| \4 | 356 | 4 |
| \6 | 534 | 6 |
| \10 | 890 | i0 |

2 divided by 91

91 70 1 5 i0 i30 3 30³

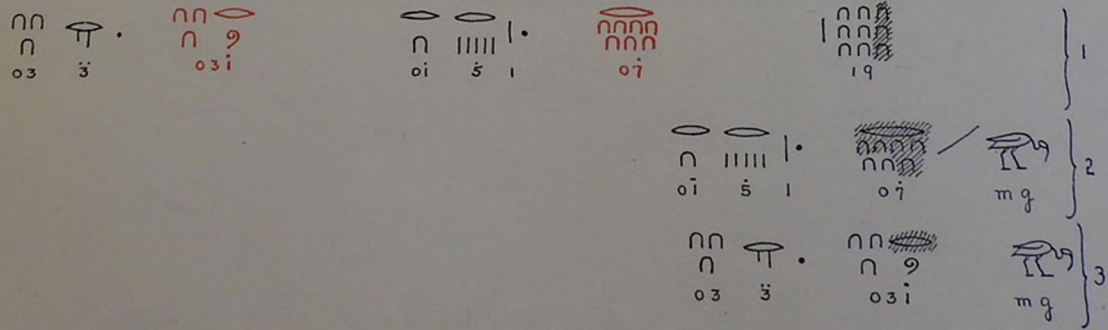
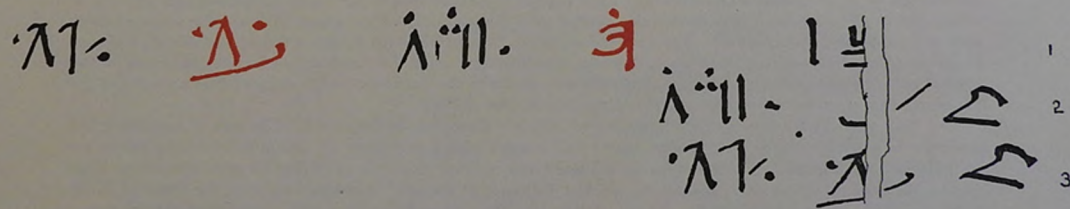
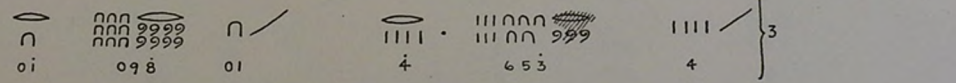
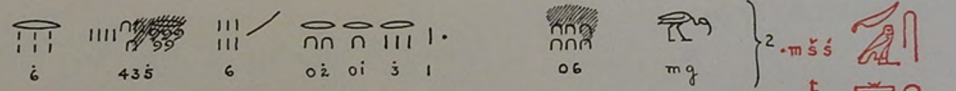
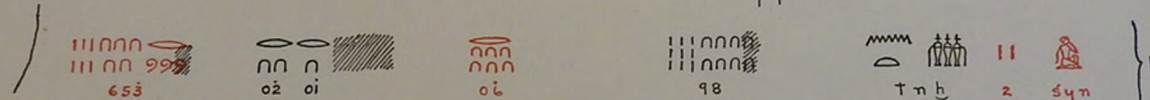
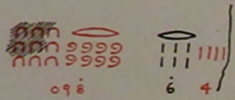
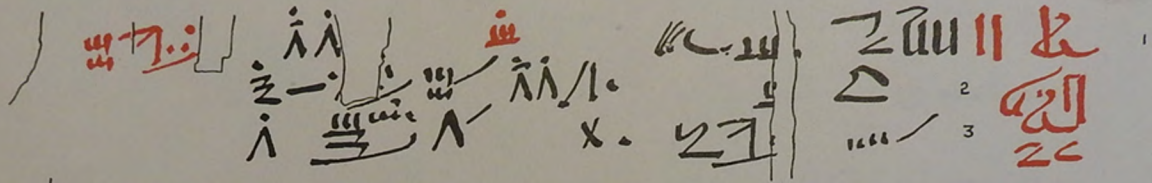
| | | |
|------|-----|-------------------|
| gm | 70 | 1 5 i0 |
| Find | | |
| gm | i30 | 3 30 ³ |
| Find | | |

¹ An error has crept into Peet's Plate D, where $\frac{1}{330}$ occurs in his hieroglyphic transcription.

² From the New York fragments. See Photograph IX. The two fragments which we have placed here, with the fractional dot and part of the 90 in the red $\frac{1}{90}$, are among Peet's unplaced fragments on his Plate E opposite registers 5 and 6, respectively.

³ Fractional dot omitted.

2 DIVIDED BY 89 AND 91



Photograph VIII, Registers 1-2 B. M. Facsimile, Plates VI-VII
 Also Photograph IX, N. Y. Historical Society Fragments

2 divided by 93

| | | | | | |
|------|------------------|----|-----|------------------|---|
| | [9]3 | 62 | 1 2 | 166 ¹ | 2 |
| gm | \ 62 | | 1 2 | | |
| Find | | | | | |
| \ 2 | 166 ¹ | | 2 | | |

2 divided by 95

| | | | | | | |
|------|-----|----|----------|----------------------|------------------|----------------|
| | 95 | 60 | 1 2 [12] | 380 ² [4] | 570 ³ | 6 ⁴ |
| gm | 60 | | 1 2 12 | | | |
| Find | | | | | | |
| \ 4 | 380 | | 4 | | | |
| \ 6 | 570 | | 6 | | | |

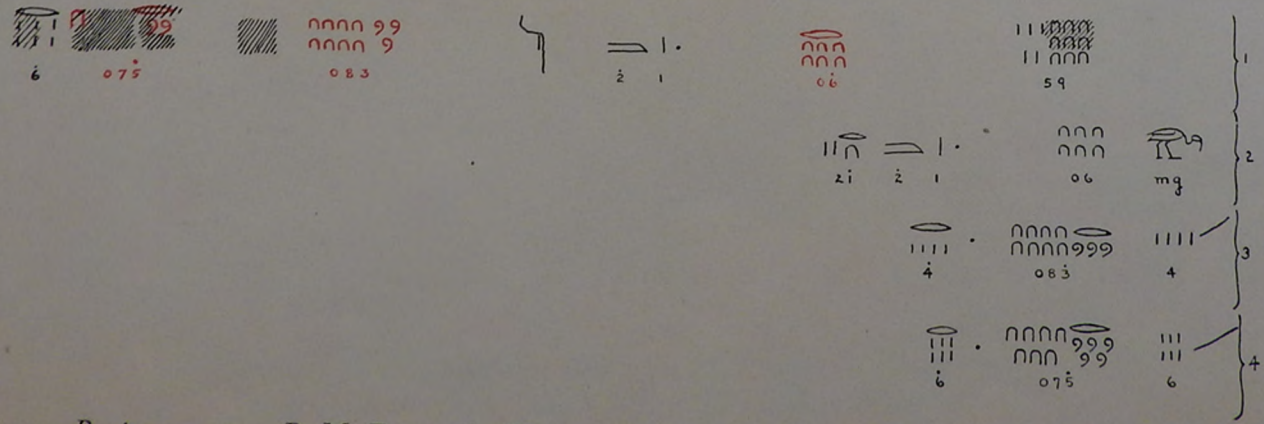
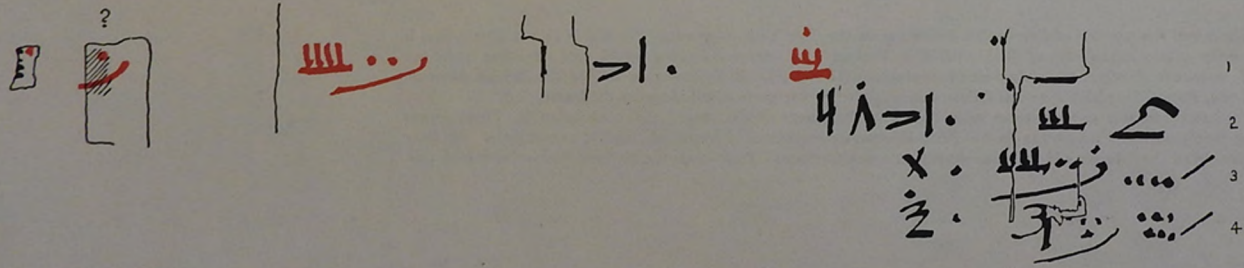
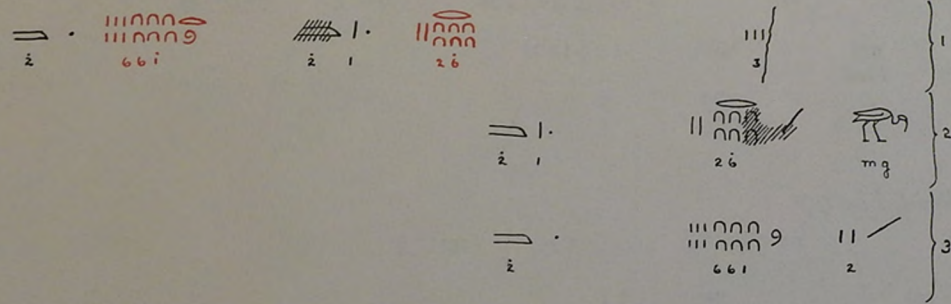
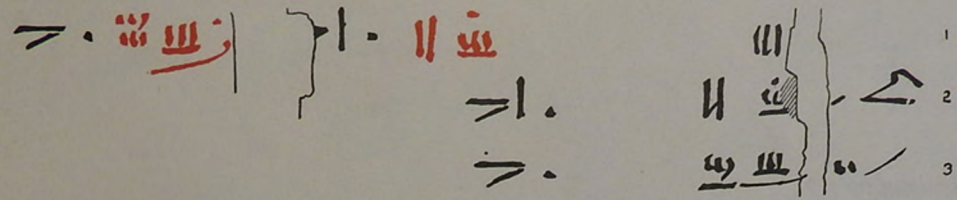
¹ 166 was written for 186. See note to 2 divided by 43.

² The fractional dot may have existed on a missing fragment of papyrus.

³ The fragment on which appears what is probably a portion of the 500 is at present incorrectly placed in register 3, at the edge of B. M. 10058, where the right hand edge of it may be seen at the left in our photograph VIII. It is partly concealed under the frame, so that the number on it is not visible in Photograph VIII, and the fragment itself does not appear in Photograph IX. For the hidden outline Peet, in his Plate E, has followed the British Museum Facsimile (Plate VII, register 3), without, however, reproducing more of the number than he was able to see on the original in its present position. The two additional dots shown in the Facsimile tend to support Peet's placing of the fragment. Our reproduction on the opposite plate follows that of Peet.

⁴ We have placed here a New York fragment on which is a part of the fraction $\frac{1}{6}$. The part of a stroke in red appearing in the upper right hand corner agrees well enough with a preceding 70, but it is surprising not to see our scribe's curved stroke. The fragment is too small and isolated to permit of relying on any resemblance there may be between its fibres and those of the nearest fragment to the left. A comparison with the fibres of B. M. 10058 near this point might settle the matter. Apparently Peet was not furnished with a tracing of this fragment; at least he has not reproduced it among those which he left unplaced.

2 DIVIDED BY 93 AND 95



2 divided by 97

| | | | | | | |
|------|-----|----|--------------|------------------|---|---------|
| | 97 | 56 | 1 2 8 i 4 28 | 679 ¹ | 7 | 77[6 8] |
| gm | \56 | | 1 2 8 i 4 28 | | | |
| Find | | | | | | |
| \7 | 679 | | 7 | | | |
| \8 | 776 | | 8 | | | |

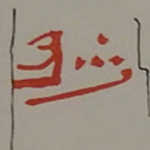
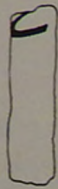
2 divided by 99

| | | | | | |
|------|-----|----|-----|------------------|---|
| | 99 | 66 | 1 2 | 198 ² | 2 |
| gm | \3 | 66 | 1 2 | | |
| Find | | | | | |
| 2 | 198 | | 2 | | |

¹ The 9 and the portions of figures that follow are on the New York fragments. The 670 is on a fragment that is incorrectly placed at the edge of B. M. 10058, in register 4, adjoining 2 divided by 95, and extending under the frame, so that it is only partly shown on Photographs VIII and IX. It is shown in full in the British Museum Facsimile, Plate VII, which Peet has followed in reproducing the parts now hidden by the frame.

² We have been able to place three more New York fragments in $\frac{1}{99}$ s, practically completing it. These appear among Peet's unplaced fragments on his Plate E opposite registers 6, 4 (reversed), and 1, respectively. We have also completed the following $\frac{1}{2}$ by placing another small fragment. Peet seems not to have had a tracing of this.

2 DIVIDED BY 97 AND 99



= ʾ - ʾ - ʾ - ʾ .

= ʾ - ʾ - ʾ - ʾ .
 ʾ .
 ʾ .

1
 2
 3
 4

9999
 9999
 [77]

7

9999
 9999
 976

82 4i 8 2 1

65

79

82 4i 8 2 1

7

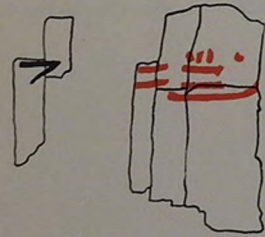
9999
 9999
 976

7

8

9999
 9999
 677

8



> ʾ .

1
 2
 3

2 89i

2 1

66

99

2 1

66

3 mg

2

9 89i

11 2

Photograph VIII, Registers 5-6 B. M. Facsimile, Plates VI-VII
 Also Photograph IX, N. Y. Historical Society Fragments

2 divided by 101

[Call 2¹ out of 101

101] 1 202 2 3[03² 3 606 6]

ššm.t

Working-out:

| | | |
|----|-------|----------------|
| [1 | 101 | 1] |
| \2 | [202] | 2 ³ |
| \3 | 303 | 3 |
| \6 | 606 | 6 |

Table of division by 10

| | |
|------|---------------------|
| 10 | 3 30 ⁴ |
| 5 | 3 10 30 |
| 5 10 | 3 5 30 ⁴ |
| 3 15 | |
| 2 | |
| 2 10 | |

The surviving portions of this example and table which are reproduced on the opposite plate are all from the New York fragments.

¹ At the top of the fragment bearing the word ššm.t appears the end of a stroke in black ink not reproduced on the opposite plate (see Photograph IX, register 1). From the position of ššm.t in the preceding examples one would suppose this to be part of some sign at the beginning of the heading "nyš 2 ħnt 101." It is perhaps a low-placed dot between nyš and 2 (compare the red dot in 2 divided by 29), or possibly a stroke of the 2, although the 2 is everywhere red in these headings except in 2 divided by 3.

² Mr. Glanville of the British Museum informs us that part of a red stroke is visible on B. M. 10057 in the top line of register 1 near the right hand edge of the *recto*. This is perhaps part of the last unit stroke of the 3 in $\frac{1}{303}$.

³ This fraction has been omitted in Peet's text, page 47, but it appears on his Plates D and E. A similar minor slip on his Plate D makes the 1 in the line of answers at the top appear as restored. It is shown as surviving on his Plate E and in his text.

⁴ The $\frac{1}{10}$ in line 1 is correctly reproduced on Peet's Plate E but appears as restored on his Plate F, and in his text, page 50. The same fraction in line 3 appears correctly on Peet's Plate F, where he has restored the fractional dot omitted by the scribe, and in his text, but his Plate E shows $\frac{1}{10}$.

2 DIVIDED BY 101; THE NUMBERS 1-9 DIVIDED BY 10

The image contains several hand-drawn diagrams of ancient Egyptian registers, illustrating mathematical divisions. The top left diagram shows two columns of hieroglyphs with a vertical brace on the right labeled 1 through 6. The top middle diagram shows a large hieroglyphic fragment with red markings and a vertical brace on the right labeled 1 through 3. The bottom left diagram shows a grid of hieroglyphs with a vertical brace on the right labeled 1 through 6. The bottom middle diagram shows a grid of hieroglyphs with a vertical brace on the right labeled 1 through 6. The bottom right diagram shows a large hieroglyphic fragment with red markings and a vertical brace on the right labeled 1 through 3.

Photograph IX, Registers 1-2 N. Y. Historical Society Fragments

Problem 1

tp n psš¹ t:² 1 n³ s 10 ir·hr⁴ [-k]
Example of dividing loaf 1 for man 10. Make [thou]

w:ḥ-[tp]⁵ m i0 sp³ 10
the multiplication : 1/10 times 10.

ir-t my
The doing as [it occurs]:

| | |
|-----------------|----------------------|
| [1 | i0 |
| \2 | ḥ |
| 4 | ḥ i5] |
| \8 ³ | ḥ i0 30 ⁶ |

dmd 1³ myt-t pw
Total 1; the same, this is.

Problem 2

ir-t t: n⁷ ³ir·hr · k w:ḥ-tp
The making of loaf [2] for [man 10] Make thou the multiplication [: 1/5 times 10].

ir-t³ my ḥpr
The doing as it occurs:

| | |
|----------------|-----------|
| [1 | ḥ] |
| 2 ⁸ | ḥ i5 |
| [4 | ḥ i0 30 |
| [\8 | 1 ḥ ḥ] i5 |

pw
[Total 2; it,⁹] this is.

The portions of these problems lying on the right on the opposite plate are from the New York fragments. See Photograph IX. The fragment shown attached to the edge of B. M. 10057 in register 2 in the British Museum Facsimile, Plate VII, actually belongs in register 6, where we have placed it in Photograph IX.

¹ We have been unable to find among the New York fragments the small piece bearing part of the letter š and part of the papyrus-roll determinative of this word and numbered 14 on Peet's Plate E, where, however, the line of junction with fragment 4 is not clearly indicated. We have followed Peet in reproducing it.
² We have been able to place two New York fragments bearing parts of this word. These fragments are shown by Peet among the unplaced fragments on his Plate E opposite register 6 and opposite the line between registers 1 and 2.

³ The blank space appearing in Photographs IX and X after these signs did not exist originally. At some time a long crack appeared in this region running from the top of the papyrus down into register 5. Then some small fragments were lost from the edges of this crack in registers 4 and 5. When repairs were made at some time before the papyrus reached the British Museum it was noticed that there was a slight lacuna in registers 4 and 5 and it was apparently assumed that it extended to the top of the papyrus. A long patch was therefore inserted which need only have been placed in registers 4 and 5. There is almost nothing missing from any signs in registers 2 and 3 along the line of this crack, and if the upper part of the patch were removed the edges of the crack could be joined. The patch has been disregarded on the opposite plate.

⁴ A trace of the r is just visible on the edge of the fragment. See Photograph IX.

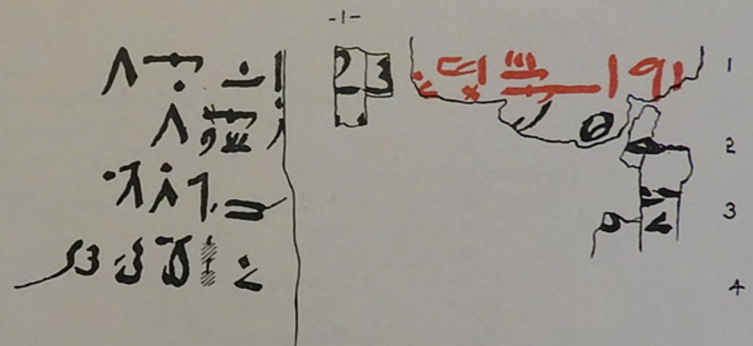
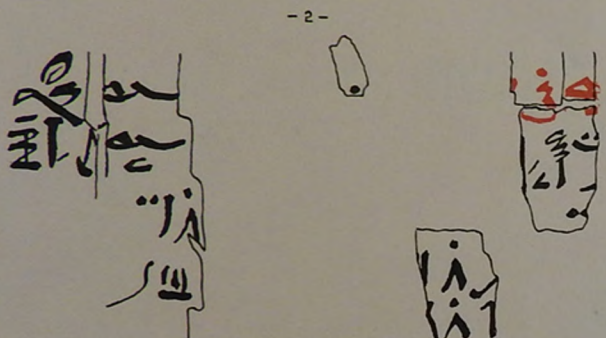
⁵ Part of the stroke of tp and a trace of the following m appear on the lower part of the second of the New York fragments referred to in footnote 2 above.

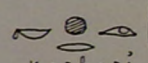
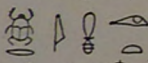


⁶ Fractional dot omitted.
⁷ We have placed here a fragment bearing part of a register line and a black dot which we believe belongs to this n. The fibres of the original correspond very well with those of the nearest fragment to the right and it could scarcely fit elsewhere. Peet has reproduced the fragment on his Plate E opposite register 5.


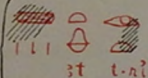
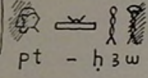
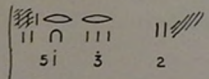
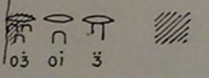
⁸ The reader will notice that the multiplier 2 on the opposite plate and on Photograph IX is considerably nearer the line above than are the fractions 1/5 1/5 which normally would be in the same line with the multiplier. It seems impossible to avoid this in placing the New York fragments. An examination of the phrase ir-t t:·w as it appears in the first lines of Problems 3-6 shows this scribe's manner of writing the signs and suggests that the fragment bearing the t of ir-t and the lower part of the t:·ligature in Problem 2, which is the fragment containing the multiplier 2, could scarcely be placed much lower than we have placed it in Photograph IX. On the other hand, the occurrence of what can be nothing else but the register line at the bottom of the fragment containing the 1/5 1/5, which clearly belongs to Problem 2, appears to fix the position of this latter fragment. We can only assume that the scribe, having placed his 2 higher than usual (unit dots elsewhere in the Rhind papyrus are generally near the base of the line), found himself in danger of crowding the fractions against the line above and dropped them lower than was necessary.

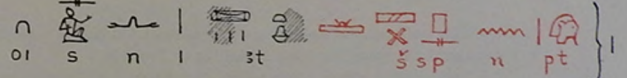
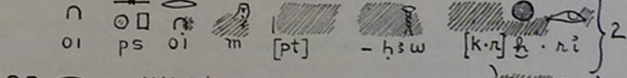
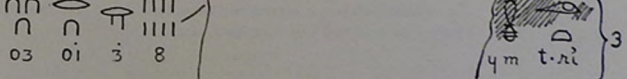
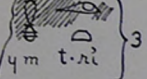
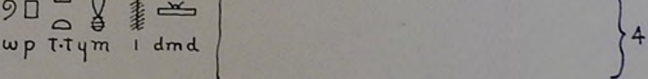
⁹ See Problem 4, footnote 8.

PROBLEMS I AND 2




 k · r · h · ri

 ap · ym · t · ri

 si

 w p


 n

 st t · ri

 pt - h 3 w

 si 3 2

 oi 3


 oi s n i st 3 sp n pt } 1

 oi ps oi m [pt] - h 3 w [k · r · h · ri] } 2

 oi 3 8 } 3

 ym t · ri } 3

 wp t · ym i dmd } 4

Photograph x, Registers 2-3 B. M. Facsimile, Plate VII
 Also Photograph IX, N. Y. Historical Society Fragments

Problem 3

ir[·t]¹ t¹·w² 6 n s ir·hr · k w¹h-tp m i0 sp 10
The making of loaves 6 for man [10]. Make thou the multiplication : [$\frac{1}{2}$] $\frac{1}{10}$ times 10.

ir-t my
The doing as [it occurs]:

| | |
|-------|------------------------------------|
| [1 | 2] i0 |
| [2 | 1] \dot{s} ³ |
| [4 | 2] \dot{s} i5 |
| [8 | 4] [\dot{s} i0] 30 ⁴ |
| dmd | 6 my[t·t] pw |
| Total | 6; <i>the same, this is.</i> |

The main portion of this problem and the next, as well as about half of Problem 5, are from the New York fragments.

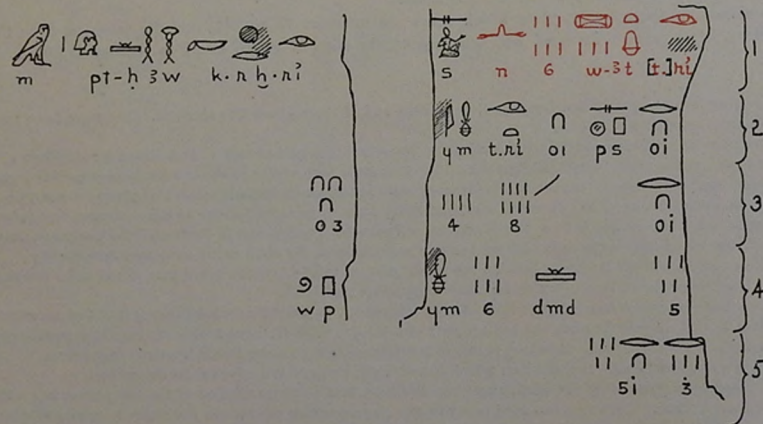
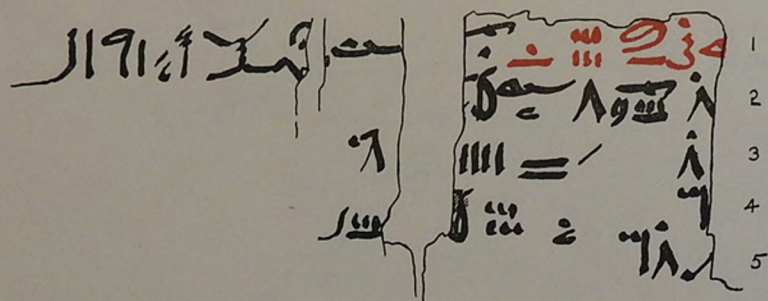
¹ This verb as used in setting out Problems 2-6 means "making ready", that is, doing what will produce equal shares. It was not considered necessary to repeat the longer heading of Problem 1.

² This word is written throughout the papyrus with plural strokes, even where only one loaf is mentioned. The reason for this is that the word as generally used is equivalent to English "bread" and in Egyptian many words for foods are considered as collectives and are therefore written with strokes although they are not actually plural. Words modified by numbers are found in the singular form as often as in the plural and it may be that t¹ as used in the Rhind was thought of as singular throughout. However, in transliterating we have added the plural termination w whenever the modifying number is greater than 2, and have translated the word as a plural.

³ The original shows a somewhat faint fractional dot (see Photograph IX). It has been omitted by mistake on the opposite plate.

⁴ The scribe omitted the fractional dot.

PROBLEM 3



*Photograph x, Register 4 B. M. Facsimile, Plate VII
Also Photograph ix, N. Y. Historical Society Fragments*

Problem 4

ir-t¹ t¹-w 7 n s 10 ir-ḥ[r] · k m 3̄ 30 sp 10 ḥpr(r)²·ḥr 7
The making of loaves 7 for man 10. Make thou : 2/3 1/10 times 10; there result 7.

ir-t my[t-t]³
The producing of the same:
 [1] 4 3̄ [30]
⁵\[2] 1] 3̄ i 5
 4 2 3̄ i 0 30
 \8 5 2̄ i 0
 dmd t¹-w⁷ 7 n-t⁸ pw
Total loaves 7; it, this is.

The scribe has omitted the fractional dot in the 1/10 in the multiplication.

The fragment of the papyrus shown on the opposite plate which bears the numbers 30 and 1/10 and the word n-t, from the third, fourth and fifth lines of this problem, is at present inverted and attached to the edge of B. M. 10057 in register 4 (see B. M. Facsimile, Plate VII).

¹ We have been able to place here a New York fragment bearing part of the ir-sign and of the register line above it. Peet reproduces this among the unplaced fragments on his Plate E opposite registers 5 and 6.

² The scribe forgot that he had made the hieratic sign which includes with the ḥpr-sign a complementary r, and added a redundant r.

³ Our translation of this phrase is based on the probability that, instead of being an error here and in Problem 5 for ir-t my ḥpr (as suggested by Gunn, 1926, page 129), it may have been used deliberately because of the presence in these two problems, just before this phrase, of a statement of the result of the following multiplication. No such statement has survived, nor does there seem to be room for one at the corresponding point, in any of the other four problems of this group of six. The phrase ir-t my ḥpr is present in Problems 2 and 6, and in Problem 3 the complementary y after the my-sign in the second line indicates that the phrase is the same, for we know of no writing of the noun myt.t with complementary y.

⁴ We have been able to place here a small New York fragment bearing the upper part of this 2/3 and the lower part of the same fraction in the line above it. Peet reproduces this among the unplaced fragments on his Plate E opposite register 6.

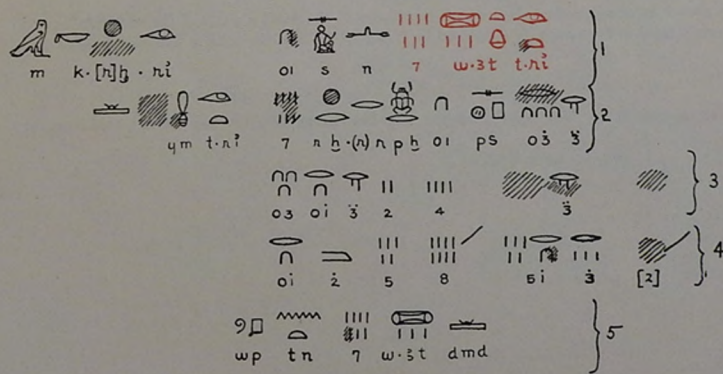
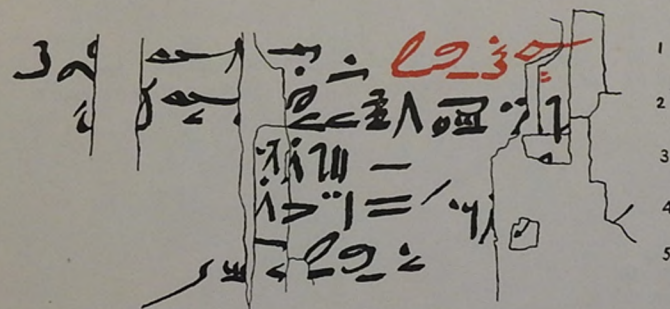
⁵ We have been able to place a New York fragment bearing the check of the multiplier 2. It is not reproduced among Peet's unplaced fragments.

⁶ We have placed here a small New York fragment bearing the greater part of a 1/10-sign. This fraction is also missing from Problems 1 and 2, but the appearance of the fragment makes it seem more likely to belong here. It is not reproduced among Peet's unplaced fragments.

⁷ Here and in Problem 6 this word is written only with the oval loaf which elsewhere in the papyrus serves as its determinative.

⁸ The dot preceding the feminine t has been omitted on the plate opposite. We have based our translation of the last phrase in Problem 2 on the likelihood that n-t may also have occurred there. The scribe has used myt.t in the corresponding phrases in Problems 1, 3, and 5, while he has used n-t in Problems 4 and 6, which suggests that he may also have used it in Problem 2. The word n-t (originally ny.t) is an abstract noun, the same word as the feminine form of the genitive adjective n (originally ny), *belonging to, of*, which occurs in lines 1 and 3 of the Title-page of the papyrus. Both the genitive n and n-t are derived from the preposition n, *to, for*. A freer rendering of n-t as here used might be the phrase "what it is", so that the sentence would read, "This (pw) is what it is".

PROBLEM 4



Photograph x, Register 5 B. M. Facsimile, Plate VII
 Also Photograph IX, N. Y. Historical Society Fragments

Problem 5

ir[·t] t'·w 8 n s 10 ir·hr · k w:ḥ-tp m 3̄ i0 30 sp 10 ḥpr·hr 8
The making of loaves 8 for man 10. Make thou the multiplication : $\frac{2}{3}$ $\frac{1}{10}$ $\frac{1}{30}$ times 10; there result 8.

myt-t¹
 [The producing] of the same:

| | | |
|-----|-------|-------|
| 1 | 3̄ | i0 30 |
| \ 2 | 1 2̄ | [i0 |
| 4 | 3 5̄] | |
| \ 8 | 6 3̄ | i5 |

dmd t'·w 8 myt-t pw
Total loaves 8; the same, this is.

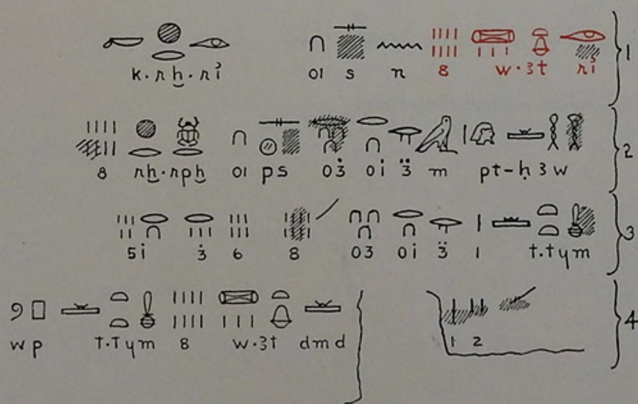
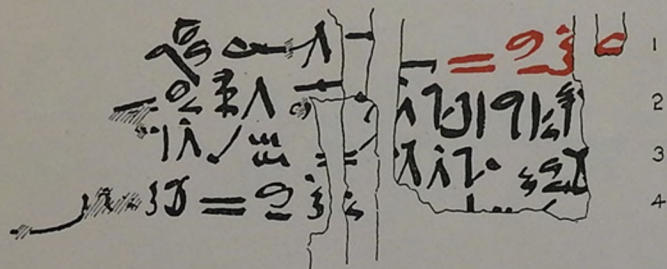
The scribe has omitted the fractional dot in the $\frac{1}{30}$ in the multiplication.

The fragment of the papyrus shown on the opposite plate which bears part of the word s, parts of the numbers $\frac{1}{30}$ and 8, and the word dmd, as well as certain signs in Problem 4, is misplaced in B. M. 10057. See the note to Problem 4 above and B. M. Facsimile, Plate VII.

¹ See Problem 4, footnote 3.

² A trace of the $\frac{1}{2}$ -sign appears at the edge of the New York fragment (see Photograph IX). It has been omitted from the opposite plate.

PROBLEM 5



Photograph x, Register 6 B. M. Facsimile, Plate VII
 Also Photograph IX, N. Y. Historical Society Fragments

Problem 6

ir·t t'·w 9 n s 10

The making of loaves 9 for man 10.

ir·t my hpr ir·hr · k w'h-tp m 3 5 30 sp 10

The doing as it occurs. Make thou the multiplication : $\frac{2}{8}$ $\frac{1}{8}$ $\frac{1}{30}$ times 10.

| | | | |
|----|---|---|-------|
| 1 | 3 | 5 | 30 |
| \2 | 1 | 3 | i0 30 |
| 4 | 3 | 2 | i0 |
| \8 | 7 | 5 | |

dmd t'·w¹ 9² n·t pw

Total loaves 9; it, this is.

The scribe has omitted the fractional dot in the $\frac{1}{30}$ in the multiplication (twice).

¹ See Problem 4, footnote 7.

² By a misprint Peet's text has 8 here. The number is correct on his Plate F.

PROBLEM 6

| | | | | | | | | | | | | | |
|--------|--------|-----------|-------------|------------------|-------|--------|--------|-----------|----------|-----------|-----------|--------|---------|
|
oi |
z |
3 |
4 |
oi |
s |
n |
9 |
w-st |
t-ni | } 1 | | | |
|
s |
pt |
h-3-w |
k-nh-ni |
n-ph-qm-t-ni | } 2 | | | | | | | | |
|
wp |
tn |
9 |
w-st |
dmd | |
03 |
oi |
3-1-2 |
03 |
5-3-1 |
oi-ps |
03 |
5-3 |

Problem 7

tp n skm-t
Example of making complete.

| | | |
|--------------|-------|-----|
| 1 | 4 | 28 |
| | 7 | 1 |
| 2 | 8 | 56 |
| | 3 2 | 2 |
| 4 | 16 | 112 |
| | 1 2 4 | 4 |
| dmd | 2 | |
| <i>Total</i> | | |

The scribe omitted the fractional dot in $\frac{1}{50}$.

Problem 8

| | |
|--------------|-----|
| 1 | 4 |
| | 4 2 |
| 3 | 6 |
| | 3 |
| 3 | 12 |
| | 1 2 |
| dmd | 2 |
| <i>Total</i> | 9 |

Problem 9

| | | |
|--------------|---|-----------------|
| 1 | 2 | 14 ¹ |
| 2 | 4 | 28 |
| 4 | 8 | 56 |
| dmd | 1 | |
| <i>Total</i> | | |

Problem 7B

| | | |
|--------------|---------|-----|
| 1 | 4 | 28 |
| 2 | 8 | 56 |
| 4 | 16 | 112 |
| | 1 2 4 4 | |
| dmd | 2 | |
| <i>Total</i> | | |

Problem 10

| | | |
|--------------|---|----|
| 1 | 4 | 28 |
| 2 | 7 | |
| 4 | 9 | |
| dmd | 2 | |
| <i>Total</i> | | |

The scribe omitted the fractional dots in $\frac{1}{36}$ and $\frac{1}{16}$ in Problem 7B, and in $\frac{1}{6}$ in Problems 8 and 10. There is a curious mistake running through Problems 10, 11, 12, and 14. $\frac{1}{9}$ was written as a half of $\frac{1}{7}$, and then repeated halving gave $\frac{1}{18}$, $\frac{1}{36}$ and $\frac{1}{72}$. Afterwards some one² discovered the mistake and attempted to correct it, but succeeded only in part. In Problem 11 he put in the correction $\frac{1}{14}$ but did not erase the $\frac{1}{6}$, and left the $\frac{1}{18}$ unchanged. In Problem 12 he started with both $\frac{1}{9}$ and $\frac{1}{14}$, corrected the second line, changing $\frac{1}{18}$ to $\frac{1}{28}$, but left the third line $\frac{1}{36}$. In Problem 14 he made no correction in the partial products, and so these read consistently $\frac{1}{18}$, $\frac{1}{36}$, and $\frac{1}{72}$, but not as intended, $\frac{1}{28}$, $\frac{1}{36}$, and $\frac{1}{112}$. In each of the four the total is correct for the numbers obtained by halving from $\frac{1}{7}$. It may be that some of these mistakes were made in copying.

¹ The unit figures 4, 8, and 6 of the partial products are omitted in the British Museum Facsimile, the fractions there being $\frac{1}{10}$, $\frac{1}{20}$, and $\frac{1}{30}$. These fractions come at the edge of a plate of the Facsimile, and Peet, in checking the Facsimile with the papyrus, did not notice that the unit figures were present on the original, and thus was led to omit them from his Plate G and from his text.

² According to Peet (pages 55-56) these corrections are in lighter ink on the papyrus. Peet treats these examples independently, and the corrections that he would make are sometimes different from ours. Thus in Problem 14 he regards the error as lying in the total, and he says that 18 is the number to which these fractions are applied, their "common denominator" as he calls it (see volume 1, pages 7 and 9).

Problem 11

| | | |
|--------------|----|----|
| 1 | 7 | |
| 2 | 9 | i4 |
| 4 | 18 | |
| dmd | 4 | |
| <i>Total</i> | | |

Problem 12

| | |
|--------------|------|
| 1 | 9 i4 |
| 2 | 28 |
| 4 | 36 |
| dmd | 8 |
| <i>Total</i> | |

Problem 13

| | | |
|--------------|--------|-----|
| 1 | i6 | i12 |
| | 1 2 4 | 4 |
| 2 | 32 | 224 |
| | 2 4 8 | 8 |
| 4 | 64 | 448 |
| | 4 8 i6 | i6 |
| dmd | 8 | |
| <i>Total</i> | | |

The scribe omitted the fractional dots in $\frac{1}{6}$ and $\frac{1}{36}$ in Problem 12, and in $\frac{1}{32}$ and $\frac{1}{64}$ in Problem 13. For certain errors in Problems 11 and 12 see note on the page opposite Plate 40.

PROBLEMS II, I2, AND I3

- 13 -

1
2
3
4
5
6
7

- 12 -

1
2
3
4

- 11 -

1
2
3
4

1
2
3
4
5
6
7

1
2
3
4

1
2
3
4

Problem 14

| | |
|-------|----|
| 1 | 18 |
| | 1 |
| 2 | 36 |
| | 2 |
| 4 | 72 |
| | 4 |
| dmd | 16 |
| Total | |

Problem 15

| | | |
|------------------|---------|-----|
| 1 | 32 | 228 |
| | 2 4 8 | 8 |
| 2 | 64 | 456 |
| | 4 8 16 | 16 |
| 4 | 128 | 912 |
| | 8 16 32 | 32 |
| i:t ¹ | dmd | 16 |
| Erroneous. | Total | |

Problem 16

| | |
|-------|---|
| 1 | 2 |
| 3 | 3 |
| 3 | 6 |
| dmd | 1 |
| Total | |

The scribe omitted the fractional dot in $\frac{1}{18}$ and $\frac{1}{36}$ in Problem 14, and in $\frac{1}{32}$ (three times), $\frac{1}{64}$, and $\frac{1}{16}$ (once) in Problem 15. For certain errors in Problem 14 see note on the page opposite Plate 40.

¹This notation, made by some ancient scribe (perhaps the copyist of the Rhind himself), shows that the errors of Problem 15, at least, were recognized.

PROBLEMS 14, 15, AND 16

-16-

1
2
3
4

1 }
2 }
3 }
4 }

-15-

1
2
3
4
5
6
7

1 }
2 }
3 }
4 }
5 }
6 }
7 }

-14-

1
2
3
4
5
6
7

1 }
2 }
3 }
4 }
5 }
6 }
7 }

Problem 17

| | |
|--------------|------|
| 1 | 3 |
| 3 | 6 18 |
| 3 | 9 |
| dmd | 3 |
| <i>Total</i> | |

Problem 18

| | |
|--------------|----|
| 1 | 6 |
| 3 | 9 |
| 3 | 18 |
| dmd | 3 |
| <i>Total</i> | |

Problem 19

| | |
|--------------|-----|
| 1 | 12 |
| | 1 2 |
| 3 | 18 |
| | 1 |
| 3 | 36 |
| | 2 |
| dmd | 6 |
| <i>Total</i> | |

Problem 20

| | |
|--------------|-----|
| 1 | 24 |
| | 2 4 |
| 3 | 36 |
| | 2 |
| 3 | 72 |
| | 4 |
| dmd | 12 |
| <i>Total</i> | |

The scribe omitted the fractional dot in $\frac{1}{9}$ in Problem 17, in $\frac{1}{6}$ and $\frac{1}{9}$ in Problem 18, in $\frac{1}{12}$ in Problem 19, and in $\frac{1}{2}$ in Problem 20.

PROBLEMS 17, 18, 19, AND 20

-20-

1 $\overset{\cdot}{\lambda}$.

2 $\overset{\cdot}{\lambda}$ \rightarrow

3 $\overset{\cdot}{\lambda}$ τ

4 $\overset{\cdot}{\lambda}$ τ

5 $\overset{\cdot}{\lambda}$ τ

6 $\overset{\cdot}{\lambda}$ τ

7 $\overset{\cdot}{\lambda}$ τ

-19-

1 $\overset{\cdot}{\lambda}$.

2 $\overset{\cdot}{\lambda}$ τ

3 $\overset{\cdot}{\lambda}$ τ

4 $\overset{\cdot}{\lambda}$ τ

5 $\overset{\cdot}{\lambda}$ τ

6 $\overset{\cdot}{\lambda}$ τ

7 $\overset{\cdot}{\lambda}$ τ

-18-

1 $\overset{\cdot}{\lambda}$.

2 $\overset{\cdot}{\lambda}$ τ

3 $\overset{\cdot}{\lambda}$ τ

4 $\overset{\cdot}{\lambda}$ τ

-17-

1 $\overset{\cdot}{\lambda}$.

2 $\overset{\cdot}{\lambda}$ τ

3 $\overset{\cdot}{\lambda}$ τ

4 $\overset{\cdot}{\lambda}$ τ

1 $\overset{\cdot}{\lambda}$ τ } 1

2 $\overset{\cdot}{\lambda}$ τ } 2

3 $\overset{\cdot}{\lambda}$ τ } 3

4 $\overset{\cdot}{\lambda}$ τ } 4

5 $\overset{\cdot}{\lambda}$ τ } 5

6 $\overset{\cdot}{\lambda}$ τ } 6

7 $\overset{\cdot}{\lambda}$ τ } 7

1 $\overset{\cdot}{\lambda}$ τ } 1

2 $\overset{\cdot}{\lambda}$ τ } 2

3 $\overset{\cdot}{\lambda}$ τ } 3

4 $\overset{\cdot}{\lambda}$ τ } 4

5 $\overset{\cdot}{\lambda}$ τ } 5

6 $\overset{\cdot}{\lambda}$ τ } 6

7 $\overset{\cdot}{\lambda}$ τ } 7

1 $\overset{\cdot}{\lambda}$ τ } 1

2 $\overset{\cdot}{\lambda}$ τ } 2

3 $\overset{\cdot}{\lambda}$ τ } 3

4 $\overset{\cdot}{\lambda}$ τ } 4

1 $\overset{\cdot}{\lambda}$ τ } 1

2 $\overset{\cdot}{\lambda}$ τ } 2

3 $\overset{\cdot}{\lambda}$ τ } 3

4 $\overset{\cdot}{\lambda}$ τ } 4

Problem 21

gd n · k škm m' š i5 m 1
It is said to thee, Complete $\frac{2}{5} \frac{1}{5}$ as 1.
 10 1

dmd 11 d'·t m 4 w'ḥ-tp m 15 r gm·t 4
Total 11, remainder : 4. Operate on 15 for the finding of 4.

| | |
|--------------|-----|
| 1 | 15 |
| i0 | 1 2 |
| \ 5 | 3 |
| \ i5 | 1 |
| dmd | 4 |
| <i>Total</i> | |

ḥr š i5 m w'ḥ ḥr·f
Therefore $\frac{2}{5} \frac{1}{5}$ is : to be added to² it.

tp n šyty³
Example of proof.

ḥr km š š i5 i5 r 1
Therefore is complete up to
 10 3 1 1

ky š i0 m w'ḥ⁴
Another, $\frac{1}{5} \frac{1}{10}$ is : to be added.

¹ This is an enclitic particle occasionally found after imperatives. It cannot be said to have an English equivalent. The arm written with the bird does not indicate a second consonant; it is here, as often, complementary to the m represented by the bird, for the arm itself came to have the value m and, especially in later times, was frequently written with the bird. In hieroglyphic texts the arm having this value is generally shown with a loaf in the hand.

² Literally *upon*.

³ It is extremely doubtful whether this phrase belongs in this problem. See Peet, pages 58-59.

⁴ These words and numbers have crept in through error. See Peet, pages 58-59, for conjectures as to the cause of their presence here.

PROBLEM 21

-c-

-b-

-a-

1.

1.

1
 2
 3

4 k 4 t 4 s n p t

h 3 w m o i s

m k n h

4 1. m g n s i m p t - h 3 w

1 s i s i 1

m m k s' k. n d d

1 m s i s i

1 n s i s i s s

1 1 3 o i

f. n h h 3 w m s i s n h 4 d m d

2 1 o i

3 s

4 m t. 3 d 11 d m d 1 o i

Problem 22

škm m š 30 m 1
 Complete $\frac{2}{3}$ $\frac{1}{30}$ as 1.
 20 1

dmd 'iw¹ · f m 9 w:h-tp m 30 r gm[·t] 9
 The total of the excess of it is : 9. Operate on 30 for the finding of 9.

1 30
 \ 10 3
 \ 5² 6
 dmd 9
 Total

hr š i0 m w:h hr·f
 Therefore $\frac{1}{3}$ $\frac{1}{10}$ is : to be added to it.

hr km š 5² i0 30 r 1
 Therefore is complete up to
 20 6 3 1

¹ This noun is from the same stem as the words meaning "great" and "to be great." Gunn (1926, page 130) favors translating it "majority" here.

² The scribe omitted the fractional dot.

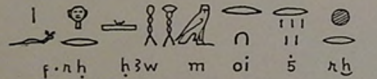

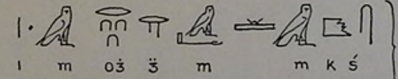
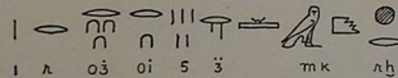
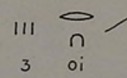

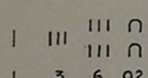
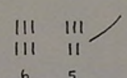
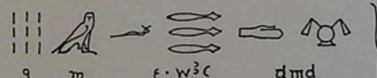
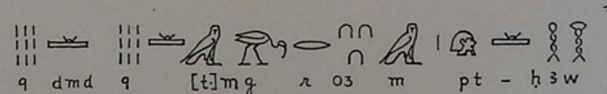
PROBLEM 22

-b-

Handwritten cursive script for problem 22, column -b-. The script consists of several lines of characters, including a large initial character at the top left and a long horizontal line at the bottom right.

-a-

Handwritten cursive script for problem 22, column -a-. It features a large initial character '1.' followed by several lines of script, including a long horizontal line at the bottom right.

| | | | | |
|---|--|---|-----|-----|
|  <p>f-h h3w m oi 5 rh</p> |  <p>03 1</p> |  <p>1 m 03 3 m m k s</p> | } 1 | |
|  <p>1 rh 03 oi 5 3 mk rh</p> |  <p>3 oi</p> |  <p>1 02</p> | | } 2 |
|  <p>1 3 6 02</p> |  <p>6 5</p> |  <p>9 m f-w3c dmd</p> | | |
|  <p>9 dmd 9 [t]mg rh 03 m pt - h3w</p> | | | | } 4 |

Problem 24

'h' 7 · f hr · f hpr · f m 19.
A quantity, 1/4 of it added to it, becomes it : 19.

1 7
 7 1

1 8
 2 16
 2 4
 4 2
 8 1

1 248
 2 424
 4 92

ir-t my hpr
The doing as it occurs.

'h' 16 2 8
The quantity
 7 2 4 8
 dmd 19.
Total

Problem 25

'h' 2 · f h·f hpr · f m 16
 A quantity, $\frac{1}{2}$ of it added to it, becomes it : 16.

| | |
|----|------|
| 1 | 2 |
| 2 | 1 |
| | |
| \1 | 3 |
| 2 | 6 |
| \4 | 12 |
| 3 | 2 |
| \3 | 1 |
| | |
| 1 | 5 3 |
| \2 | 10 3 |

ir·t my hpr
 The doing as it occurs.

| | |
|--------------|------|
| 'h' | 10 3 |
| | |
| The quantity | 2 |
| 2 | 5 3 |
| dmd | 16. |
| Total | |

Problem 26

'h' 4 · f hr·f hpr · f m 15
A quantity, 1/4 of it added to it, becomes it : 15.

w:h-tp m 5 r gm·t 15
 Operate on 5 for the finding of 15.

 \1 5
 \2 10
 hpr(r)¹·hr 3
 There become 3.

w:h-tp m 4 ir·hr · k 4 · sn m 1 dmd 5
 Operate on 4; make thou 1/4 of them, namely, 1; the total is 5.

w:h m 3 sp·w 4
 Multiply : 3 times 4.

 1 3
 2 6
 \4 12
 hpr·hr 12
 There become 12.

| | |
|-------|----|
| 1 | 12 |
| 4 | 3 |
| dmd | 15 |
| Total | |

'h' 12 4 · f 3 dmd 15
The quantity is 12, 1/4 of it is 3, the total is 15.

¹ Redundant r. See Problem 4, footnote 2.

Problem 27

'h' 5 · f hr·f hpr · f m 21
A quantity, $\frac{1}{5}$ of it added to it, becomes it : 21.

1 5
 5 1
 dmd 6
 Total

\1 6
 \2 12
 \2 3
 dmd 21
 Total

\1 3 2
 2 7
 \4 15

'h' 17 2 5 · f 3 2 dmd 21
The quantity is $17 \frac{1}{2}$, $\frac{1}{5}$ of it is $3 \frac{1}{2}$, the total is 21.

Problem 28

š m 'k¹ š m pr-t¹ 10 wd;² ir 10 n 10 pn
2/3 is : to be added, 1/3 is : to be subtracted, 10 remains. Make 1/10 of 10 this;

hpr-hr 1 d't m 9 š . f m 6 m 'k hr-f
there becomes 1; the remainder is : 9. 2/3 of it, namely 6, is : to be added to it;

dmd 15 š . f m 5 in 5 pr³ d't m 10
the total is 15. 1/3 of it is : 5. Lo 5 is what went out; the remainder is : 10.

ir-t my hpr⁴
The doing as it occurs.

Problem 29

| | |
|-------|------|
| 1 | 10 |
| 4 | 2 š |
| 10 | 1 |
| dmd | 13 š |
| Total | |
| š | 9 |
| dmd | 22 š |
| Total | |
| š | 7 š |
| dmd | 30 |
| Total | |
| š | 20 |
| š | 10 |

¹ Literally: *to go in . . . to go out*. Here the scribe has used only the determinatives of two verbs as convenient symbols, so that, as Peet indicates (pages 63-64), it is not perfectly certain what verb is represented by the first pair of legs.

² This appears to be that finite form of the verb called by Erman "pseudo-participle" and by Gardiner "old perfective" (1927, page 234). The reader will notice that, unlike other finite forms, it follows, instead of preceding, its subject.

³ Participle. The construction is the same as that of the last sentence of the Title-page.

⁴ The scribe has omitted the proof here and the statement of the next problem. See volume 1, page 70.

Problem 30

ir ḏd n · k sš ḥpr-n¹ i0 m 3̄ i0 n m šdm · f
If says to thee the scribe, Has become 1/10 : 2/3 1/10 of what? Shall hear he:

ir-ḥr · k 3̄ i0 r gm-t 10
Make thou 2/3 1/10 for the finding of 10.

| | | |
|--------------|----------------------|----|
| \1 | 3̄ i0 | |
| 2 | 1 3̄ 5 ² | |
| \4 | 3 i5 | |
| \8 | 6 i0 30 ² | |
| dmd | 13 | 30 |
| <i>Total</i> | | |

ir-t 3̄0 sp 23 r gm-t 3̄ i0 dmd p: 'h' ḏd šw³ 13 23
The making of 1/30 times 1/23 for the finding of 2/3 1/10. The total is the quantity saying it, 13 1/23.

| | |
|--------------|-------------------------|
| 1 | 13 23 |
| \3̄ | 8 3̄ 46 i38 |
| \i0 | 1 5 ² i0 230 |
| dmd | 10 |
| <i>Total</i> | |

The final sentence of this problem is inconsistent in its meaning with the setting-out. Either the phrase "saying it" should have been omitted or the setting-out should take a form analogous to that of Problems 35-37 in which the required quantity itself is represented as stating the problem.

¹ This n is one of several particles used in making up certain of the forms of the Egyptian verb. The so-called "n-form" generally indicates past time. We have already met it in the form sphr-n.tw at the top of line 2 of the Title-page, where it is accompanied by the passive particle tw.

² The scribe omitted the fractional dots in these places.

³ This is the third person singular masculine of the pronoun to which Gardiner has given the name "dependent" (see 1927, page 45). Its chief use is to express the direct object of all forms of the verb except the infinitive, with which the suffix pronoun is employed. As Gunn notes (page 131), it is surprising to find the masculine form here. We should expect the form št, which often has a neuter meaning.

PROBLEM 30

Handwritten cuneiform script in six lines, with some characters highlighted in red ink. The script is arranged in a grid-like fashion with vertical lines separating columns.

Facsimile of the cuneiform script from the problem above, showing the corresponding signs and their phonetic values. The signs are arranged in six rows, corresponding to the lines of the problem. Some signs are highlighted in red.

Row 1: oi t.mg l oi 3 k.lh.li f.mds m n oi 3 m oi n.lph s.k.n dd n i

Row 2: oi 3 t.mg l 3z ps o3 t.li oi 3 1

Row 3: 3z 3i w.s dd c.h.c :p dmd 5 3 1 2

Row 4: 3z 3i 1 5i 3 4

Row 5: 83i 64 3 8 3 03 oi 6 8

Row 6: oi dmd 03z oi 5 1 oi 03 3i dmd

Problem 31

'h' 3̄ · f 2̄ · f 7̄ · f hr-f hpr · f m 33
 A quantity, $\frac{2}{3}$ of it, $\frac{1}{2}$ of it, $\frac{1}{4}$ of it, added to it, becomes it : 33.

| | | | | | |
|-----|------------------------|------|----|-----|----|
| 1 | 1 3̄ 2̄ 7̄ | | | | |
| \2 | 4 3̄ 4̄ 28 | | | | |
| \4 | 9 6 ¹ 18 | | | 1 | 42 |
| \8 | 18 3̄ 7̄ | | | 3̄ | 28 |
| 2̄ | 2 3̄ 4̄ 14 | | | 2̄ | 21 |
| \4 | 4 6 ¹ 8̄ 28 | | | 7̄ | 6 |
| dmd | 32 2̄ | d̄:t | 2̄ | dmd | 99 |

The total is 32 $\frac{1}{2}$, the remainder is $\frac{1}{2}$.

Total

| | | | | | |
|-------------|-----------------|----|--|--|--|
| \97 | 42 | 1 | | | |
| \56 679 776 | 21 ¹ | 2 | | | |
| \194 | 84 | 2̄ | | | |
| \388 | 168 | 4̄ | | | |

| | | | | | | | | | |
|-----|------|----|------|------|-------|---------|----|--|--|
| 7̄ | 8̄ | 14 | 28 | 28 | | | | | |
| 6 | 5 4̄ | 3 | 1 2̄ | 1 2̄ | 17 4̄ | 3 2̄ 4̄ | 2̄ | | |
| dmd | 33. | | | | | | | | |

Total

The calculations by which $17\frac{1}{4}$, and then $3\frac{1}{2}\frac{1}{4}$ are obtained belong directly after the result of the first multiplication. The calculation of 97 (incorrectly written 99) is placed in the papyrus at the end of Problem 38, but belongs here.

¹ The scribe omitted the fractional dots in these places.

PROBLEM 3I

33 m f.nph f.nh f.7 j.2 f.3 chc

Photograph XIII, Registers 1-4 *B. M. Facsimile, Plate IX*
Also Photograph XV, Register 4 *B. M. Facsimile, Plate XI*

Problem 32

'h' 3 . f 4 . f hr-f hpr . f m 2
 A quantity, $\frac{1}{3}$ of it, $\frac{1}{4}$ of it, added to it, becomes it : 2.

| | | |
|----------------|-------------------|-----|
| 1 | 1 3 4 | 228 |
| 3 | 1 18 | 152 |
| 3 | 2 36 ¹ | 76 |
| 6 ¹ | 4 72 ¹ | 38 |
| 12 | 8 144 | 19 |
| 228 | 144 | 1 |
| 114 | 72 ¹ | 2 |

| | | | | | | |
|-----------|-----|----|-----------------|-----|-----|----------------------------|
| dmd | 1 | 6 | 12 | 114 | 228 | p' 'h' dd sw |
| The total | 3 | 9 | 18 | 171 | 342 | is the quantity saying it. |
| 3 | 3 | 18 | 36 ¹ | 342 | 684 | |
| 2 | [2] | 12 | 24 | 228 | 456 | |
| 4 | [4] | 24 | 48 ¹ | 456 | 912 | |

| | | | |
|-------|-----|-------|-----|
| 'h' 3 | 144 | 1 | 12 |
| Stand | | 2 | 24 |
| 3 | 48 | 4 | 48 |
| 4 | 36 | 8 | 96 |
| dmd | 228 | dmd | 144 |
| Total | | Total | |

tp n syty
 Example of proof.

| | | | | | |
|---|---|----------------|----|-----|-----|
| 1 | 1 | 6 ¹ | 12 | 114 | 228 |
| 3 | 3 | 18 | 36 | 342 | 684 |
| 4 | 4 | 24 | 48 | 456 | 912 |

dmd 1 2 4 d:t m 4
 The total is $1 \frac{1}{2} \frac{1}{4}$, the remainder is : $\frac{1}{4}$.

| | | | | | |
|-----|-----|-----|------|------|-----|
| 12 | 114 | 228 | 18 | 36 | 342 |
| 76 | 8 | 4 | 50 3 | 25 3 | 2 3 |
| 684 | 24 | 48 | 456 | 912 | |
| 1 3 | 38 | 19 | 2 | 1 | |

| |
|------------------|
| 912 ² |
| 2 456 |
| 4 228 |
| dmd 228 m 4 |
| The total namely |

In carrying out the multiplications at the beginning the scribe places next to his partial products their values as applied to 144, beginning with 228, but the multiplication of 144 by $1 \frac{1}{3} \frac{1}{4}$ to determine that this expression applied to 144 is equal to 228 is followed by the multiplication of 12 by 12 to get 144, and both of these multiplications are placed after the partial multiplications of the proof. Perhaps the scribe discovered his omission at this point and so interrupted the course of his proof, introducing his interruption with the word "'h,'" which here may mean "stop," as if for the insertion of something. When he takes up again the multiplications of his proof he does not check the partial products that he is going to use, but writes them again. In the free translation we have placed all the multiplications in their proper places.

¹ The scribe omitted the fractional dots in these places.

² Here there is a fractional dot in the original to a whole number. The same mistake occurs in 2 divided by 41 (Plate 12) and in Problems 33 (four times), 36 (twice), 44, and 46.

PROBLEM 32

11 2 m f.nph f.nh f.4 f.3 ch c

12 8 2 2 4 3 1 1

13 2 5 1 ai i 3

14 6 7 63 2 3

15 18 y t s n p t

19 8 2 2 4 1 i 2 i 6 1 1 91

20 4 8 6 2 4 3 6 3 8 i 3 3 1

21 2 1 9 6 5 4 8 4 4 2 4 4 2

22 w s d d c h c 3 p 8 2 2 4 1 i 2 i 6 1 d m d

23 2 4 3 6 3 8 i 8 2 2 4 1 i 2 i 3 3

24 3 2 3 5 2 3 0 5 4 8 6 7

25 2 1 9 6 5 4 8 4 4 2 4 8 6 4

26 1 2 9 1 8 3 3 1

27 2 1 9 3

28 6 5 4 2 8 4 4 6 3 4

29 4 m e 2 2 d m d 8 2 2 4 4 4 1 d m d 6 9 8 8 2 2 d m d

1 1

2 = λ 2 2

3 = λ 1 2

4 ε λ >

5 = λ x 2

6 - λ 2 = λ 2

7 = λ 2

8 = λ 2

9 = λ 2

10 = λ 2

11 = λ 2

12 = λ 2

13 = λ 2

14 = λ 2

15 = λ 2

16 = λ 2

17 = λ 2

18 = λ 2

19 = λ 2

20 = λ 2

21 = λ 2

22 = λ 2

23 = λ 2

24 = λ 2

25 = λ 2

26 = λ 2

27 = λ 2

28 = λ 2

29 = λ 2

Photograph XIII, Registers 1-6 B. M. Facsimile, Plates IX-X

Problem 33

'h' 3̄ · f 2̄ · f 7̄ · f hr-f hpr · f m 37
 A quantity, 2/3 of it, 1/2 of it, 1/4 of it, added to it, becomes it : 37.

1 1 3̄ 2̄ 7̄
 2 4 3̄ 4̄ 28
 4 9 6¹ 14
 8 18 3̄ 7̄
 \ 16 36 3̄ 4̄ 28
 28 10 1
 2 2

1 42
 3̄ 28
 2 21
 \ 4 10 2̄
 \ 28 1 2̄
 dmd 40 d¹:t m 2

The total is 40, the remainder is : 2.

97¹ 42¹ 1
 \ 56 679 776 21 2
 dmd 37.
 Total

tp n syty
 Example of proof.

| | | | | | |
|----|----------------------|------------------------------------|-------------------|------------------|-------|
| 1 | 16 | 56 | 679 | 776 | |
| | | 97 | 8 | 7 | |
| 3̄ | 10 3̄ | 84 | i358 | 4074 | i184 |
| | | 64 3̄ | 4 | 1 3̄ | 4 3̄ |
| 2 | 8 | i12 | i358 | i552 | |
| | | 48 2̄ | 4 | 3 2̄ | |
| 7̄ | 2 4 28 | 392 | 4753 | 5432 | |
| | | 12 2̄ 4̄ i4 28 | 1 7̄ | 1 | |
| 36 | 3̄ | 4 28 | d ¹ :t | m 28 | 84 |
| | 3621 ² 3̄ | i358 ² i94 ² | | i94 ² | 64 3̄ |

1 5432
 3̄ 3621 3̄
 2 2716
 4 1358
 28 194
 dmd 5173 3̄ d¹:t m 258 3̄

The total is 5173 1/3, the remainder is : 258 2/3.

¹The fractional dots in these places are omitted in the original. The calculation of 97 may be found with Problem 31. See note to that problem.
²These are whole numbers, but are marked with the fractional dot in the original. See Problem 32, footnote 2.

Problem 34

'h' 2 · f 4 · f hr-f hpr · f m 10

A quantity, ½ of it, ¼ of it, added to it, becomes it : 10.

$\backslash 1$ 1 2 4
 2 3 2
 $\backslash 4$ 7
 $\backslash 7$ 4
 4 28 2
 $\backslash 2$ 14 1

dmd p' 'h' 5 2 7 14

The total is the quantity $5 \frac{1}{2} \frac{1}{4} \frac{1}{4}$.

tp n syty

Example of proof.

$\backslash 1$ 5 2 7 14
 $\backslash 2$ 2 2 4 14 28
 $\backslash 4$ 1 4 8 28 56

dmd 9 2 8 d't m 4 8

The total is $9 \frac{1}{2} \frac{1}{8}$, the remainder is : $\frac{1}{4} \frac{1}{8}$.

7 14 14 28 28 56¹
 8 4 4 2 2 1
 4 m 14

:

8 7

dmd

Total 21.

¹ The scribe omitted the fractional dot in this place.

Problem 35

iw·y hꜥ·kwy¹ sp·w 3 r hꜥ·t 3̣ · y hr·y iw · y mh·kwy² in m dd³ šw
 Go down I times 3 into the hekat-measure, 1/3 of me is added to me; return I, filled am I. Then what says it?

ir·t my hpr
 The doing as it occurs.
 \1 1
 \2 2
 \3̣ 3̣
 dmd 3 3̣.
 Total

1 320
 i0 32
 š 64
 dmd 96.
 Total

nyš·hr · k 1 hnt 3 3̣
 Call thou 1 out of 3 1/3.
 1 3 3̣, i0 3̣, š 3̣, dmd 1
 Total

tp n šyty
 Example of proof.
 1 96
 2 192
 3̣ 32
 dmd 320.
 Total

tp n šyty
 Example of proof.
 \1 š i0
 \2 2 i0
 3̣ i0
 dmd 1.
 Total

ir n šš⁴
 Making of grain:
 1 4⁵ 3̣2 64 1
 2 2 16 32 2
 3̣ 16 32 2
 dmd hꜥ·t
 Total a hekat.

¹ kwy is the first person singular termination of the pseudo-participle or old perfective. This is the only finite form of the Egyptian verb showing endings for the various persons, and therefore not employing the suffix-pronouns (but the ending w for the third person is often not written, as in the case of wd in Problem 28). The old perfective is here introduced by the auxiliary iw. We have already met this auxiliary on the Title-page (see Title-page, footnote 2). There it was followed by the principal verb in the n-form and had no expressed subject of its own, but where it is followed by the old perfective it must have its subject expressed, the subject in the present instance being the suffix-pronoun y.

² Old perfective.

³ Participle. Literally *the one saying*.

⁴ This word may have originally read ššr.

⁵ Special hieratic signs for fractions of a hekat are represented in this translation by numbers in heavy type. These are the so-called Horus-eye fractions. See volume 1, pages 31 and 175.

PROBLEM 35

Handwritten cuneiform script in red ink, arranged in eight horizontal lines. The script is highly stylized and includes various signs and symbols. Some lines contain annotations in parentheses, such as (a) and (b).

Registers 1-2 of a facsimile, showing cuneiform signs and their corresponding phonetic values. The registers are numbered 1 through 8 on the right side.

| | | |
|---------------------------------|----------------------------------|---|
| ws dd m ni ywk hm y wi y nh y z | t skh n z w ps y wk - z z h y wi | 1 |
| oi s i n pt | z z tnh ik nh syn | 2 |
| oi z 2 y ty s | 1 dmd z s z oi z z 1 z z dmd z z | 3 |
| 1 dmd oi z | s s n ni y ty s n pt | 4 |
| 1 4 6 2 3 4 1 | 6 9 1 2 3 oi | 5 |
| 2 2 3 6 i z 2 | 2 9 1 2 4 6 s | 6 |
| 2 2 3 6 i z | 2 3 z 6 9 dmd | 7 |
| t skh dmd | o z s dmd | 8 |

Photograph XIV, Registers 1-2 B. M. Facsimile, Plate x

Problem 36

iw-y h¹·kwy sp-w 3 $\dot{3}$ · y $\dot{5}$ · y
 Go down I times 3, $\frac{1}{3}$ of me, $\frac{1}{5}$ of me is added to me; return I, filled am I. What is the quantity saying it?





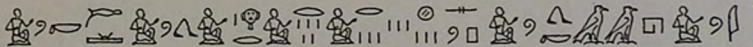
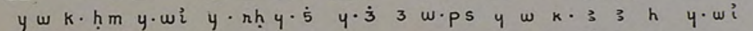




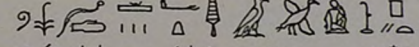
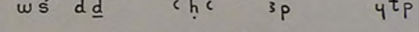





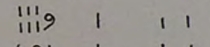





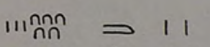





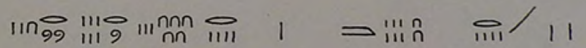










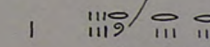










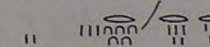










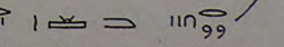











| | | | | | | | | | | | | |
|---|---|---|----|-----------------|-------------|-------------|-----------------|-----|------------------|-------|------|--|
| 1 | 1 | 1 | 4 | 53 ¹ | 106 | 212 | | | | | | |
| 1 | 1 | 2 | 2 | 20 | 10 | 5 | | | | | | |
| 1 | 1 | 3 | 12 | 30 ¹ | 318 | 795 | 53 | 106 | | | | |
| 3 | 3 | 5 | 20 | 35 $\dot{3}$ | 3 $\dot{3}$ | 1 $\dot{3}$ | 20 ² | 10 | | | | |
| 5 | 5 | | | 12 ³ | 159 | 318 | 636 | | | | | |
| | | | | 88 $\dot{3}$ | 6 $\dot{3}$ | 3 $\dot{3}$ | 1 $\dot{3}$ | | | | | |
| | | | | 20 | 265 | 530 | 1060 | | | | | |
| | | | | 53 | 4 | 2 | 1 | | | | | |
| | | | | | | | | 4 | | | | |
| | | | | | | | | | 80 ⁴ | | | |
| | | | | | | | | | 265 ² | | | |
| | | | | | | | | | | 2 | 530 | |
| | | | | | | | | | | 4 | 265 | |
| | | | | | | | | | | 4 | 265 | |
| | | | | | | | | | | dmd | 1060 | |
| | | | | | | | | | | Total | | |

¹ The scribe omitted the fractional dots in these places.
² These are whole numbers, but are marked with fractional dots in the original. See Problem 32, footnote 2.
³ The fractional dot here is made like a dash in the hieratic, giving the number the appearance of 22.
⁴ Mistake for 60.

PROBLEM 36

-a-

Handwritten cuneiform script in two columns. The left column contains several lines of text with red ink annotations, including symbols like 'x', 'y', and 'z' and various cuneiform characters. The right column contains a single line of text at the top, followed by several lines of text with red ink annotations, including symbols like 'x' and 'y'.

| | | | | | | | | | | | |
|--|---|--|--|--|---|--|--|---|--|---|----|
| 
53 | 
212 | 
60i | 
35 |  |  | 1 | | | | | |
| 
07 | 
5 | 
01 | 
02 |  |  | 2 | | | | | |
| 
60i | 
35 | 
597 | 
813 | 
03 |  | 3 | | | | | |
| 
01 | 
02 | 
31 | 
33 | 
353 |  | 4 | | | | | |
| 
001 | 
636 | 
813 | 
95i | 
2i |  | 5 | | | | | |
| 
31 | 
33 | 
36 | 
388 | 
60i | 
35 | 
597 | 
813 | 
03 | 
2 |  | 6 |
| 
08 | 
060i | 
035 | 
562 | 
02 | 
636 | 
813 | 
95i | 
2i | 
3 |  | 7 |
| 
4 | 
1 | 
2 | 
4 | 
35 | 
060i | 
035 | 
562 | 
02 | 
5 |  | 8 |
| 
562 | 
562 | 
4 | 
035 | 
2 | 
060i | 
dmd | 
562 | 
4 |  | 9 | |
| | | | | | | | | | |  | 10 |

Photograph xv, Registers 1-2 B. M. Facsimile, Plates x-xi

Problem 37

iw-y hii-kwy sp-w 3 r hk'i-t š · y hr-y š n š · y hr-y 9 · y hr-y iw · y mh-kwy
 Go down I times 3 into the hekat-measure, 1/3 of me is added to me, 1/3 of 1/3 of me is added to me, 1/3 of me is added to me; return I, filled am I.

in m dd šw šdm · f¹
 Then what says it? Shall hear it:

1 1
 2 2
 3 3
 š n š · f 9
 of of it
 9 · f 9
 of it
 dmd 3 2 18
 Total

nyš 1 hnt 3 2 18
 Call 1 out of 3 1/2 1/8.
 1 3 2 18
 2 1 2 4 36²
 \ 4 2 4 8 72
 8 4 8 16 144
 16 8 16 32 288
 \ 32 16 32 64 576
 dmd 1
 Total

km 2 4 8 72 16 32 64 576
 Add
 8 36 18 9 1

dmd 8
 Total
 72

tp n šyty
 Example of proof.
 1 4 32
 2 2 16
 š · f 12 96
 of it
 š n š · f 36 288
 of of it
 9 · f 36 288
 of it
 dmd 1
 Total

km 2 4 32 16 12 96 36 288 36 288
 Add
 9 18 24 3 8 1 8 1
 dmd 4
 Total
 72

dmd 320
 Total
 2 160
 \ 4 80
 8 40
 16² 20
 \ 32² 10
 dmd 90
 Total

tp n šyty
 Example of proof.
 \ 1 90
 \ 2 180
 3 30
 š n š 10
 of
 \ 9 · f 10
 of it
 dmd 320
 Total

ir n šš
 Making of grain:
 \ 1 4 32
 \ 2 2 16
 \ 3 16 32
 \ š n š 32
 of
 \ 9 · f 32
 of it
 dmd 2 8 4 8
 Total

¹ That is, *Let it hear*. The "it" which is the subject of this clause apparently refers to the quantity that is represented as stating the problem. But it is also possible that the scribe became confused and thought for a moment that this problem, like Problem 30, began, "If the scribe says."

² The scribe omitted the fractional dots in these places.

Problem 38

iw·y h^h:kwy sp·w 3 r h^hk^h:t ḡ · y hr·y iw · y mh·kwy
 Go down I times 3 into the hekat-measure, 1/4 of me is added to me; return I, filled am I.

∖1 1
 ∖2 2
 ∖ḡ ḡ
 dmd 3 ḡ
 Total

nyś 1 hnt 3 ḡ
 Call 1 out of 3 1/4.
 1 3 ḡ
 22 ḡ ir-tw¹ pw ḡ 22
 Is multiplied, this means, 1/4 [times] 22

r gm·t 3 ḡ
 for the finding of 3 1/4.

11 4 28²
 6 66 2 14
 dmd 1
 Total

tp n syty
 Example of proof.

1 6 11 22 66
 2 2 11 33² 66
 ḡ 22 ir-tw¹ pw 22 sp·w 7 r
 Is multiplied, this means, 1/22 times 7 for

gm·t t¹ i:t³ hr·t
 the finding of the series of fractions above.

dmd 1.
 Total

1 320
 3 213 3
 3 106 3
 ∖6² 53 3
 ∖11 29 11
 ∖22 14 2 22
 ∖66 4 3 6 66
 dmd 101 3 11 22 66
 Total

tp n syty
 Example of proof.

∖1 101 3 11 22 66
 ∖2 203 2 11 33 66
 ∖ḡ 14 2 22
 dmd 1.
 Total

ir n šš
 Making of grain,

1 4 i6 r: 3 11 22 66
 2 2 8 ro 3 " 2 11 33 66
 ḡ 32 4 " 2 22
 dmd 319 3 11 11 22 22 33 66 66 3
 Total 6 6 3 3 2 1 1 22⁴

¹ The w of the passive particle tw is often omitted in writing. In the normal English word-order these two observations would begin: *This means that 1/4 (or 1/22) is multiplied, etc.* The translation of these sentences in volume 1, page 83, first paragraph of the note, was based on the assumption that ir·t is the infinitive. We are now inclined to follow Gunn (page 131) in thinking that it is more likely to be a finite form in the passive.

² The scribe omitted the fractional dots in these places.

³ The primary meaning of the word is *backbone*, which was evidently thought of as a series of vertebrae.

⁴ This is a whole number but is marked with a fractional dot in the original. See Problem 32, footnote 2.

Problem 39

tp n ir-t twnw t'w 100 n s 10 50 n 6 50 n 4 pty twnw
*Example of making the difference of share*¹. Loaves 100 for man 10, 50 to 6, 50 to 4. What is the difference of share?

1 4
 \10 40
 2 8
 \2 2

1 6
 2 12
 4 24
 \8 48
 \3 2

12 2 8 3
 12 2 8 3
 12 2 8 3
 12 2 8 3
 8 3
 8 3

twnw 4 6
 The difference of share is 4 1/6.

¹ More literally *excess* according to Gunn (page 131), who derives the word from a verb that probably means *rise*.

Problem 40

t^hw 100 n s 5 7 n 3 hry-w n s 2 hry-w
Leaves 100 for man 5, 1/4 of the 3 above to man 2 those below.

pty twnw
What is the difference of share?

ir-t my hpr twnw 5 2
The doing as it occurs. The difference of share being 5 1/2.

| | |
|--------------|------|
| \1 | 23 |
| \1 | 17 2 |
| \1 | 12 |
| \1 | 6 2 |
| \1 | 1 |
| dmd | 60 |
| <i>Total</i> | |
| \1 | 60 |
| \3 | 40 |

ir-h[r] · k w^h-tp m 1 3
Make thou the multiplication : 1 3/4

| | |
|--------------------|---------------------|
| r sp 23 | hpr-hr-f m 38 3 |
| <i>up to times</i> | <i>becomes it :</i> |
| " 17 2 | " 29 6 |
| " 12 | " 20 |
| " 6 2 | " 10 3 6 |
| " 1 | " 1 3 |
| dmd 60 | dmd 100. |
| <i>Total</i> | <i>Total</i> |

PROBLEM 40

-b- -a-

| | | | | |
|---------------------------|------------------|---------------------------|-------------------------------------|----------------------|
| | | | | |
| <p>3 83 m f-nb-npb 32</p> | <p>ps n 06 1</p> | <p>06 1</p> | <p>w-y n h 3 n 7 5 s n 001 w-3t</p> | <p>1</p> |
| <p>6 92</p> | <p>2 71</p> | <p>04 3</p> | <p>32</p> | <p>2</p> |
| <p>02</p> | <p>11 0</p> | <p>- h 3 w k-[n] h-ni</p> | <p>2 71</p> | <p>w-y n h 2 s n</p> |
| <p>6 3 01</p> | <p>2 6</p> | <p>3 1 m pt</p> | <p>2 1</p> | <p>3</p> |
| <p>9 001 dmd 3 1</p> | <p>06 dmd 1</p> | | <p>2 6</p> | <p>w n w t y t p</p> |
| | | | <p>06 dmd 1</p> | <p>4</p> |
| | | | <p>2 5 w n w t n p h y m t-xi</p> | |

Problem 41

tp n ir-t š' dbn n 9^s 10 ḥb-ḥr · k 9 n 9 m 1 d:t 8 w:ḥ-tp m 8 r
Example of making¹ a granary² round, of 9 by 10. Take away thou $\frac{1}{9}$ of 9, namely 1; the remainder is 8. Multiply : 8 up to
 sp-w 8 ḥpr-ḥr 64 ir-ḥr · k w:ḥ-tp m 64 r sp 10 ḥpr-ḥr-f m 640 dy 2 · f ḥr-f ḥpr-ḥr-f m 960
times 8; there become 64. Make thou the multiplication : 64 up to times 10; becomes it : 640. Add $\frac{1}{2}$ of it to it; becomes it : 960,

rḥt · f⁴ m ḥ:r-w ir-ḥr · k 20 n 960 m 48 h:i:t pw r · f m 4-ḥk:t šš 4800⁵ ḥk:t
the content of it in khar. Make thou $\frac{1}{20}$ of 960, namely 48; what goes, this is, into it in quadruple hekat : grain, 4800 hekat.

| | | | | | | | |
|---------------------------------------|----|-------|---|---|-------|-----|----|
| ḥy | n | ššm-t | · | f | | 1 | 64 |
| <i>Manner of the reckoning of it.</i> | | | | | | | |
| | 1 | 8 | | | \10 | 640 | |
| | 2 | 16 | | | \2 | 320 | |
| | 4 | 32 | | | dmd | 960 | |
| | \8 | 64 | | | Total | | |
| | | | | | 10 | 96 | |
| | | | | | \20 | 48. | |

¹ That is, in this case, *calculating the content of*.

² Gunn (page 131) would prefer here to say *volume* or *space*. He quotes a passage containing a word š', which, because of the context, must mean something like *space*, and which cannot be translated by the name of any concrete container. He notes, however, that the word in the passage referred to has for determinative the papyrus roll instead of the house sign as here, and the papyrus roll is rarely used as determinative of words of purely concrete meaning.

³ The circle drawn by the scribe around the 9 evidently represents a circular section of the granary and indicates that the 9 is the diameter and not the height.

⁴ After rḥt-f one would expect the word pw, so that the sentence would read, *the content of it, this is, in khar*, as in Problem 43. The word rḥt means literally *number, amount*.

⁵ Since numerals in Egyptain are written after the nouns which they modify, we cannot here read 48 *hekat*. In hieratic hundreds of *hekat* are expressed by writing before the word *hekat* the number of hundreds required. In hieroglyphic any number of *hekat* is written in the ordinary way by means of the *hekat* sign followed by the required number written out in full. See volume 1, pages 31-32.

Problem 42

š' dbn n 10 10 ḥb-ḥr · k ḡ n 10 m 1 ḡ d:t m 8 3̄ 6̄ i8 ir-ḥr · k
A granary round, of 10 by 10. Take away thou 1/6 of 10, namely 1 1/6; the remainder is : 8 2/3 1/6 1/8. Make thou

w:ḥ-tp m 8 3̄ 6̄ i8 r sp-w 8 3̄ 6̄ i8 ḥpr-ḥr 79 i08 3̄24 ir-ḥr · k w:ḥ-tp m
the multiplication : 8 2/3 1/6 1/8 up to times 8 2/3 1/6 1/8; there become 79 1/108 1/324. Make thou the multiplication :

79 i08 3̄24 sp 10 ḥpr-ḥr-f m 790 i8 27 54 dy 2 · f ḥr-f ḥpr(r¹)-ḥr-f m 1185 w:ḥ-tp m 1185 20
79 1/108 1/324 times 10; becomes it : 790 1/18 1/27 1/54. Put 1/2 of it to it; becomes it : 1185. Operate on 1185, 1/20 is

m 59 4 h:t pw r · f m 4-ḥk:t šš 5900 ḥk:t 4²
: 59 1/4; what goes, this is, into it in quadruple hekat : grain, 5900 hekat 25.

ky n ššm-t · f
Manner of the reckoning of it.

| | | |
|-------|----------------|-------------------------------|
| | 1 | 8 3̄ 6̄ i8 |
| | 2 | 17 3̄ 9 ³ |
| | 4 | 35 2̄ i8 |
| ∖ | 8 | 71 ḡ |
| ∖ | 3̄ | 5 3̄ 6 ³ i8 27 |
| | 3̄ | 2 3̄ 6̄ i2 36 ³ 54 |
| ∖ | 6 ³ | 1 3̄ i2 24 72 i08 |
| ∖ | i8 | 3̄ ḡ 27 i08 3̄24 |
| dmd | | 79 i08 3̄24 |
| Total | | |

| | | |
|-----------------|----------------------------|------|
| 1 | 79 i08 3̄24 | |
| 10 | 790 i8 27 54 | |
| 2̄ | 395 36 ³ 54 i08 | |
| dmd | 1185 | |
| Total | | |
| 10 ³ | 118 2̄ | |
| ∖ | 20 | 59 4 |

¹ Redundant r in the original.

² In hieratic the fractions 1/2 and 1/4, following the word *hekat*, and written in the ordinary way and not in the Horus-eye notation, represent 50 and 25 *hekat*. These numbers of *hekat* are considered as fractions of 100 *hekat* and this method of writing them is a part of the system which includes the special way of writing hundreds of *hekat* in hieratic. See Problem 41, footnote 4.

³ The scribe omitted the fractional dots in these places.

Problem 43

š' dbn n mh 9 m k'w · f 6 m wšh' · f pty h'·t r · f m šš
A granary round of cubit 9 in the height of it, 6 in the breadth of it; what is that which goes into it in grain?

ir-t my hpr
The doing as it occurs:

h[b]·hr · k 1 hnt 9 d'·t 8 wih-tp m 8 ir·hr · k 3 · f hr·f hpr·hr · f m 10 š wih-tp² m 10 š
Take away thou 1 from 9; the remainder is 8. Operate on 8, make thou 1/8 of it to it; becomes it : 10 3/8. Multiply : 10 3/8

sp 10 š hpr·hr · f m 113 š 9 ir wih-tp m 113 š 9 r sp-w 4 š pw n mh 6 nty³ m
times 10 3/8; becomes it : 113 3/8 1/8. Make the multiplication : 113 3/8 1/8 up to times 4; 3/8, this is, of the cubit 6, which is :

wšh hpr·hr · f m 455 9 rht · f pw m h'r-w gm·hr·k 20 n rht · f m h'r-w hpr·hr · f m
the breadth; becomes it : 455 1/8; the content of it, this is, in khar. Find thou 1/20 of the content of it in khar; becomes it :

22 2 4 45⁴ h'·t pw r · f (m šš h'k'·t)⁵ m 4-h'k'·t šš 2200 h'k'·t 2 4 2 32 64 2 r' 2 4 36
22 1/2 1/4 1/8; what goes, this is, into it in quadruple hekat: grain, 2200 hekat 50 25 1/2 1/32 1/64 2 ro 1/2 1/4 1/8.

ky n ššm-t
Manner of working out:

| | | | | | | | |
|-------|------|-------|---------|----|----------|-----|------------|
| \1 | 8 | | | | | | |
| 3 m | 5 3 | 1 | 10 š | 1 | 113 š 9 | 1 | 455 9 |
| : | | \10 | 106 š | 2 | 227 2 i8 | i0 | 45 2 90 |
| \3 | 2 š | \3 | 7 9 | \4 | 455 9 | \20 | 22 2 4 45. |
| dmd | 10 š | dmd | 113 š 9 | | | | |
| Total | | Total | | | | | |

In the statement of the problem the given dimensions are transposed. See volume 1, page 88.

¹ Peet (page 85) and Gunn (page 133, footnote) prefer to read šhw here, an older form from the same stem, presumably because they doubt that the noun wšh, meaning breadth, was in use at the time the Rhind papyrus was written down. There is no doubt, however, that the cup used in writing this word was read wšh at this time in other words from this stem.

² The scribe first omitted the word tp and later inserted it above the line.

³ This is a relative adjective formed from n-t, the feminine of the genitive n. The feminine of nty is nt-t, which occurs on the Title-page in its frequent sense of *that which is*, or, more freely, *what exists*, or, *existing things*.

⁴ This should be 180.

⁵ The words in parenthesis crept in through an error of the ancient copyist.

Problem 44

tp n [n]yś¹ š² ifd³ (n 10 m)³ ;w · f 10 wśh · f 10 k:w · f 10 pty
Example of reckoning a granary four-angled, the length of it 10, the breadth of it 10, the height of it 10; what is

h:t r · f m šš
that which goes into it in grain?

w:h⁴ m 10 sp 10 hpr·hr · f m 100 w:h-tp m 100 sp 10 hpr·hr · f m 1000 ir·hr · k 2 n 1000 m 500
Multiply : 10 times 10; becomes it : 100. Multiply : 100 times 10; becomes it : 1000. Make thou 1/2 of 1000, namely, 500;

hpr·hr · f m 1500 rht · f pw m h:r-w ir·hr · k 2 n 1500 hpr·hr · f m 75 h:t pw r · f m
becomes it : 1500; the content of it, this is, in khar. Make thou 1/20 of 1500; becomes it : 75; what goes, this is, into it in

4-hk:t šš (hk:t)⁵ 7500 hk:t
quadruple hekat; grain, 7500 hekat.

tp n ššm·t
Example of working out:

| | | | | | |
|----|------|----|------|---------------------|------------------|
| 1 | 10 | 1 | 1000 | 1 | 75 |
| 10 | 100 | 2 | 500 | 10 | 750 ⁶ |
| 1 | 100 | 1 | 1500 | \ 20 | 1500 |
| 10 | 1000 | 10 | 150 | 10 | 150 |
| | | 20 | 75 | 10 n 10 | 15 |
| | | | | of | |
| | | | | 3 n 10 n 10 · f · m | 10. |
| | | | | of of of it : | |

¹ The scribe presumably wrote the genitive n and afterwards took it as the first letter of nyś and did not write another n. The word nyś primarily means *call*, but it also definitely means something like our *reckon*, doubtless because the process is a *calling forth* of the result (Gunn, page 125).

² This word is derived from the stem of fdw, the Egyptian word for the number 4. It therefore means something with four parts. If we assume that four equal parts are intended then the parts must be angles, for the word appears to be used only of rectangular figures, but not always of figures with four equal sides.

³ As Peet explains (page 85), the scribe became confused between two methods of statement. He might have continued as he began: *of 10 in the length of it, 10 in the breath of it, etc.*; but instead he changed to: *the length of it 10, the breadth of it 10, etc.*

⁴ Here, as also in Problems 26 and 60, the scribe has written w:h where he usually writes w:h-tp. The principal meaning of w:h is *put down, place*, and w:h hr means *put upon*, and hence, in mathematics, *add to*. w:h-tp, in non-mathematical uses, means *put down, or bow the head*. Peet suggests (pages 13-14) that nodding the head was a natural operation in primitive counting, and that therefore the phrase w:h-tp came to be used for mathematical operations. Gunn, however (page 124), puts forward the idea that w:h-tp in mathematics may not mean *count*, but may mean *add a case or instance*; for the meanings *add* for w:h, and *case, instance, example* (as in the first line of this problem) for tp, are well established. A multiplication, such as the above, would mean *put down or add with 10 ten times*, and the presence of tp would scarcely change the meaning, which would be *add a case with 10 ten times*. The same theory applies to the division formula, which is w:h-tp m x r gm·t y.

⁵ Redundant.

⁶ The scribe seems inadvertently to have put here what looks like a fractional dot. See Problem 32, footnote 2.

Problem 45

š' h'n šš r · f m 4-hk:t 75 n-św² wr³ r⁴ wr
A granary, has gone grain into it in quadruple hekat 75[00 hekat].¹ Of, it is, how much by how much?

ir-ḥr · k wih-tp m 75 r sp 20 ḥpr-ḥr · f m 1500 ir-ḥr · k wih-tp m 1500 ir-ḥr · k i0 · f
Make thou the multiplication : 75 up to times 20; becomes it : 1500. Make thou the operation on 1500, make thou 1/10 of it.

m 150 i0 n i0 · f 15 3 n i0 n i0 · f m 10 ḥr n-św 10 r 10 r 10
namely, 150; 1/10 of 1/10 of it, 15; 2/3 of 1/10 of 1/10 of it, namely, 10. Therefore of, it is, 10 by 10 by 10.

| | |
|----|-------|
| 1 | 75 |
| 10 | 750 |
| 20 | 1500. |

mk štwty · f pw
Behold the content of it this is.

| | | | | | | | |
|---|------|----|-----|-------------|-------|-----------------|---------------|
| 1 | 1500 | i0 | 150 | i0 n i0 · f | 15 | 3 n i0 n i0 · f | m 10. |
| | | | | of | of it | of | of of of it : |

¹ The scribe, as Peet indicates, forgot to write the *hekat*-sign after the number 75, which, when restored, gives us the regular hieratic method of writing 7500 *hekat*. In the preceding problems of this group (41-44) we have been dealing regularly with hundreds of *hekat*.

² The compound word *n-św*, which is really a phrase meaning *he, or it, is of, or belonging to*, is composed of the dependent pronoun *św*, which is the subject, and the genitive adjective *n* (originally *ny* as on plate), which is the predicate of the phrase.

³ An interrogative adjective, apparently from the same stem as the word meaning *great*.

⁴ This is the common preposition generally rendered *to, for*, etc.

Problem 46

š' h:n šš r · f m 4-ḥk:t 2500 ḥk:t pty rḥt' · f
A granary, has gone grain into it in quadruple hekat 2500 hekat. What are the dimensions of it?

ir·ḥr · k w:ḥ-tp m 25 r sp 20 ḥpr·ḥr · f m 500 štwty · f pw ir·ḥr · k w:ḥ-tp m 500
Make thou the multiplication : 25 up to times 20; becomes it : 500; the content of it this is. Make thou the operation on 500;

ir·ḥr · k i0 · f m 50 20 · f m 25 i0 n i0 · f m 5 3̄ n i0 n i0 · f m 3 3̄ n-šw
make thou 1/10 of it, namely, 50; 1/20 of it, namely, 25; 1/10 of 1/10 of it, namely, 5; 2/3 of 1/10 of 1/10 of it, namely, 3 1/3; of, it is,

10 r 10 r 3 3̄ p: š'
10 by 10 by 3 1/3, the granary.

ššm·t · f

The working out of it:

1 25
 10 250
 20² 500

štwty · f pw

The content of it this is.

1 500
 i0 50
 i0 n i0 · f m 5

of of it :

3̄ n i0 n i0 · f 3 3̄.

of of of it

ḥpr·ḥr š' pn m mḥ 10 r 10 r 3 3̄ myt·t pw

Becomes granary this, in cubit, 10 by 10 by 3 1/3; the same this is.

¹Literally, amount, number. This is the word which in Problem 41 and elsewhere has a meaning approximating the English word content.
²The photograph (Photograph XIX) seems to show a fractional dot written here by mistake. See Problem 32, footnote 2.

Problem 47

ir' dd n · k sš dy · k rh · y iō hpr · f m š' dbn r'—pw
 If says to thee the scribe, Cause thou that know I $\frac{1}{10}$, when² becomes it : a rectangular³ granary, a circular granary or.

| | | | | |
|-----|---|----|---------|--|
| 10 | r | šš | 4-ḥk'·t | 10 |
| | | | | is to be: grain, quadruple hekat |
| 20 | " | | | 5 |
| 30 | " | | | 3 $\frac{1}{4}$ $\frac{1}{6}$ $\frac{1}{64}$ r' $\frac{3}{3}$ |
| | | | | ro |
| 40 | " | | | 2 $\frac{1}{2}$ |
| 50 | " | | | 2 |
| 60 | " | | | 1 $\frac{1}{2}$ $\frac{1}{8}$ $\frac{1}{32}$ 3 r' $\frac{3}{3}$ |
| | | | | ro |
| 70 | " | | | 1 $\frac{1}{4}$ $\frac{1}{8}$ $\frac{1}{32}$ $\frac{1}{64}$ 2 r' $\frac{1}{4}$ $\frac{1}{21}$ $\frac{1}{42}$ |
| | | | | ro |
| 80 | " | | | 1 $\frac{1}{4}$ |
| 90 | " | | | 1 $\frac{1}{6}$ $\frac{1}{32}$ $\frac{1}{64}$ $\frac{1}{2}$ $\frac{1}{8}$ |
| 100 | " | | | 1 |

As explained in volume 1, page 32, the word *ro* (r') was written alone for 1 *ro*, and fractions of a *ro* were written after this word. When there were only fractions the word *ro* was omitted. Thus in the third line of the above table we have, after the "Horus eye" fractions, $\frac{1}{2}$ *ro*, and in the ninth line $\frac{1}{2}$ $\frac{1}{18}$ *ro*.

¹ See Problem 62, footnote 7.

² This clause is unnecessary as Griffith noted (volume 16, page 336). Peet suggests (page 88) that it may have been added by a scribe who wished to connect this problem more closely with the preceding six.

³ No word meaning *rectangular* has been written here, and, but for the word r'—pw at the end of the phrase and the determinative of dbn, which seems inconsistent with the meaning *circular*, we might read š' dbn as a *circular granary* as in Problems 41–43. However, it appears from Problems 45 and 46 that š' was thought of as *rectangular* unless otherwise described. The adjective *lfd* was probably used in Problem 44 only to mark the change from problems involving a cylinder to those involving a rectangular figure. The word dbn is here a noun whose meaning and context require it to be translated by a noun and adjective. The reader will notice that the determinative of dbn as adjective in Problems 42 and 43 is a circle. With the noun, however, the Egyptian scribe prefers to use a determinative descriptive of its nature as an enclosed space or structure. The fact that the general determinative used happens to be rectangular in form does not restrain the Egyptian from using it in this connection. Note that in Egyptian the conjunction *or* comes after instead of between alternatives.

Problem 48

| | | | |
|----|--------------------|-------|----------------------|
| 1 | št̄:t 8 | ↘1 | št̄:t 9 ² |
| | setat | | setat |
| 2 | 1 " 6 ¹ | 2 | 1 " 8 |
| 4 | 3 " 2 | 4 | 3 " 6 ¹ |
| ↘8 | 6 " 4. | ↘8 | 7 " 2 |
| | | dmd | 8 " 1. |
| | | Total | |

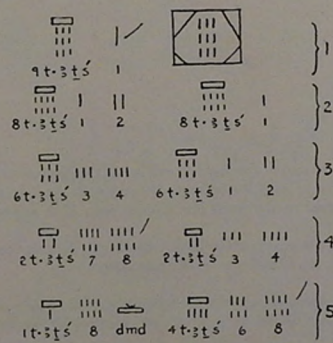
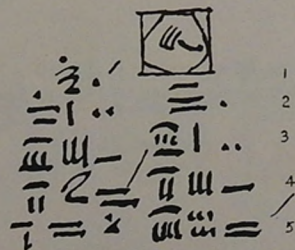
This problem compares the areas of a circle of radius 9 and the circumscribing square.

The number before the word št̄:t denotes the number of times ten *setat*. Thus the second line of the first table represents 16 *setat*, the third line 32 *setat*, and so on. See volume 1, page 33. The writing of multiples of ten *setat* in this way is explained by the fact that ten *setat* is equivalent to the old Egyptian unit called a "thousand-of-land" equal to a thousand cubit-strips or cubits-of-land (see volume 1, page 33). Griffith and Peet consider these numbers as representing so many thousands-of-land (Griffith, volume 16, page 236; see also volume 14, pages 410-415. Peet, page 25 and under Problems 48-55).

¹ The numeral sign here which resembles the ordinary sign for 60 is probably a special sign used in writing both 6 *setat* and 6 *hekat*. See Introduction.

² The numeral 9 here is a special sign used in writing both 9 *setat* and 9 *hekat*. See Problems 53 and 84.

PROBLEM 48



Problem 49

tp n iś-t¹ ḥ-t my² dd n · k ifd n ḥ-t³ n ḥt 10 r ḥt 2⁴ pty ḥ-t · f
Example of reckoning area. If is said to thee, A rectangle of land, of khet 10 by khet 2, what is the area of it?

ir-t my ḥpr
The doing as it occurs:

| | |
|----------------|---------|
| 1 | 1,000 |
| 10 | 10,000 |
| 100 | 100,000 |
| iō n 100,000 m | 10,000 |
| of : | |
| iō n iō · f m | 1,000. |
| of of it : | |

nt-f⁵ pw m ḥ-t
It, this is, in area.

¹ The stem of this word was originally *is*, not *iś*, and the second sign in the word as written in this problem had primarily the value *is*. Before this papyrus was written, however, the letters *s* and *ś* had come to be used interchangeably and some scholars make no distinction between them in transliteration. The word, unknown elsewhere, is perhaps related to the word *iśw* (Gunn, page 132), *recompense, exchange, substitution*, and *iś-t* may mean the *converting* of dimensions into area.

² As we have seen, this word primarily means *like, as*, but in the phrase given here it can hardly be translated by any English word but *if*.

³ *Land, field*, are the commonest meanings of this word, but in the Rhind it generally means *area*.

⁴ The solution is for 1 *khet* instead of 2

⁵ This word is made up of the word *n-t*, the feminine of the genitive adjective *n*, *belonging to*, and the third person suffix pronoun *f*. It might be translated *its belonging*. It is also in frequent use as a pronoun meaning *he, it*, in the series called by Gardiner "independent pronouns." See Problem 4, footnote 8.

Problem 50

tp n ir-t ḥt dbn n ḥt-w¹ 9 pty rḥt · f m ḥt
Example of making a field round of khet 9. What is the amount of it in area?

ḥb · ḥr · k ḡ · f m 1 dī:t m 8 ir · ḥr · k wḥ-tp m 8 sp 8 ḥpr · ḥr · f m 64
Take away thou 1/9 of it, namely, 1; the remainder is : 8. Make thou the multiplication : 8 times 8; becomes it : 64;

rḥt · f pw m ḥt 60² ṣtī:t 4
the amount of it, this is, in area, 60 setat 4.

ir-t my ḥpr
The doing as it occurs:

1 9
 ḡ · f 1.
 of it

ḥ[b] ḥnt · f dī:t 8
Take away from it; the remainder is 8.

1 8
 2 16
 4 32
 \ 8 64

rḥt · f m ḥt 60² ṣtī:t 4
The amount of it in area: 60 setat 4.

¹ The w suggested by the plural strokes has been omitted on the plate. The same omission occurs on the figure in Problem 51, and in Problem 52, line 2.

² The scribe has by mistake written here either the number 60 or the special form for 6 used in Problem 48 in writing 6 setat. He may have had in his mind the fact that he was actually dealing with 60 setat (which, however, would not properly be written in this way), and he had written the abstract number 60 a moment before at the end of the multiplication, or, remembering that 60 setat is written with the numeral 6, he did write 6, but used the special sign instead of the ordinary numeral.

Problem 51

tp n ir-t špd-t¹ m ḥt my dd n · k špd-t n-t² ḥt 10 ḥr mry-t³ · š ḥt 4
Example of making a triangle in land. If is said to thee, A triangle of khet 10 on the side of it, khet 4

m tp-r⁴ · š pty ḥt · š
in the base of it, what is the area of it?

ir-t my ḥpr
The doing as it occurs:

| | |
|---|-----|
| 1 | 400 |
| 2 | 200 |

| | |
|---|--------|
| 1 | 1,000 |
| 2 | 2,000. |

ḥt · š pw 2

The area of it this is: 20 setat.

ir-ḥr · k ḥ n 4 m 2 r rd-t ifd · š
Make thou ½ of 4, namely, 2, for the giving of the rectangle⁵ of it.

ir-ḥr · k wḥ-tp m 10 r sp 2 ḥt · š pw
Make thou the multiplication : 10 up to times 2; the area of it this is.

¹ The stem means *sharp, pointed*.

² The genitive n-t is in the feminine to agree with špd-t.

³ Literally a *quay* or *sea-wall*. For a discussion of its meaning here see volume 1, pages 36-37, and references there given.

⁴ Literally *example of mouth* or simply *mouth*. The word tp is prefixed to a number of nouns to form compounds, but often scarcely affects the meaning of the other word. Peet has suggested (page 91) that in a triangle of this type the short base would be much in the position of a *mouth* between two jaws.

⁵ It is possible to translate the phrase r rd-t ifd · š here and in Problem 52 as *to cause that it become rectangular*, taking ifd as a verb (Gunn, page 132, citing Sethe, 1916, page 119). This construction following rd-t is the same as that of the phrase dy-k ḥy, *cause thou that I know*, in Problem 47 and elsewhere. The verb dy is simply an abbreviated form of the verb rdy.

Problem 52

tp n ir-t h'k-t¹ n-t 'h-t my dd n:k h'k-t n-t 'h-t n-t (n-t)² ht-w² 20
Example of making a cut-off triangle of land. If is said to thee, A cut-off triangle of land of khet 20

hr mry-t · s ht 6 m tp-r' · s ht 4 hr p' h'k¹ pty 'h-t · s
on the side of it, khet 6 in the base of it, khet 4 on the cut-off; what is the area of it?

dmd-hr · k tp-r' · s hr p' h'k hpr-hr 10 ir-hr · k 2 n 10 m 5 r rd-t
Add thou the base of it to the cut-off; there become 10. Make thou ½ of 10, namely, 5, for the giving of

ifd · s ir-hr · k w'h-tp m 20 r sp-w 5 hpr-hr 10 'h-t · s pw
the rectangle⁴ of it. Make thou the multiplication : 20 up to times 5; there become 10; the area of it this is.

ir-t my hpr
The doing as it occurs:

| | |
|---|-------|
| 1 | 1,000 |
| 2 | 500 |

| | |
|-------|--------|
| √1 | 2,000 |
| 2 | 4,000 |
| √4 | 8,000 |
| dmd | 10,000 |
| Total | |

ir m 'h-t 20⁵ rht · s pw m 'h-t
making in area 200 setat; the amount of it, this is, in area.

¹ h'k-t seems to be the word for a trapezoid, thought of as a truncated triangle. The h'k is the line along which the triangle is cut, the shorter of the two bases of the trapezoid. The two words come from a verb-stem meaning *cut off*, especially *cut off a tail*; hence the end of an animal's tail was used as determinative.

² The scribe has repeated the word n-t by mistake.

³ See Problem 50, footnote 1.

⁴ See Problem 51, footnote 5.

⁵ The answer should be 100 *setat*, which the Egyptian would write simply 10, just as in the preceding problem he writes 20 *setat* as 2, but by mistake he wrote 20 instead of 10, or he added a stroke above for the *setat*-sign, forgetting that he was dealing not with simple *setat*, but with tens of *setat*.

Problem 53

| | | | | |
|-----------------|--|-----------------|--|------------------------------|
| \1 | št̄:t 4 ḏ̄ | 1 | | št̄:t 7 |
| | setat | | | setat |
| \2 | " 9 | \2 | | 1 " 4 |
| ḏ̄ ¹ | " 2 ḏ̄ | ḏ̄ ¹ | | 3 ḏ̄ |
| 4 | 1 ḏ̄ | \4 | | 1 ḏ̄ ḏ̄ |
| dmd | " 5 ḏ̄ ḏ̄ | dmd | | št̄:t ⁴ 1 5 ḏ̄ ḏ̄ |
| Total | | Total | | setat |
| i0 · f | " 1 ḏ̄ ḏ̄ mh ² 10. | \2 | | št̄:t 7 ḏ̄ ḏ̄ ḏ̄. |
| | of it cubit-strip | | | setat |
| i0 · f m | hb-t hr t ³ m rht | | | |

1/10 of it is : to be taken away; then this is : the amount.

For explanation and statement of numerical mistakes, see volume 1, page 94.
 In this problem and in Problems 54 and 55 we find the special signs used for fractions of the *setat*. In hieratic the sign for $\frac{1}{4}$ in this series is the same as the ordinary sign for $\frac{1}{4}$.

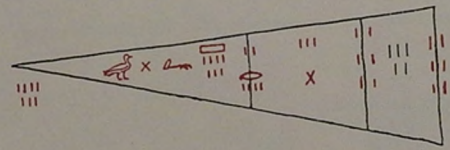
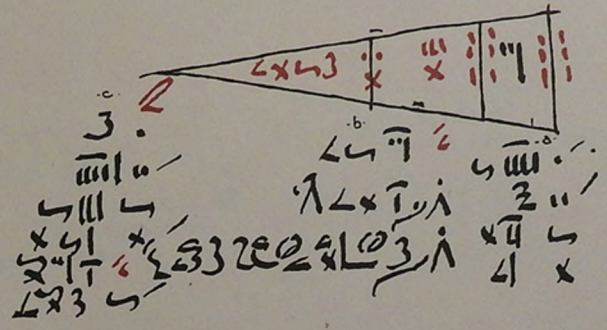
¹ The scribe has here by mistake written the multiplier $\frac{1}{2}$ in the special notation for $\frac{1}{2}$ *setat*.
² Here and in Problem 54 mh 10 is represented by a sign exactly like 30. Peet (page 96) considers this a special sign for 10 cubit-strips. Griffith (volume 14, page 411, footnote) and Möller (1909, page 66, footnote 1) suspected a mistake. Apparently this sign occurs nowhere else except as representing 30, while a writing of mh 10 corresponding to that of other numbers of mh appears in Problem 55 and in a papyrus from Illahûn. If the signs in Problems 53 and 54 are errors they may have been due to careless or rubbed mh-signs in an earlier copy of the work. Copyists, working mechanically, may have thought that they saw 30 and so reproduced that number. The fact that the sign occurs twice, however, makes the matter uncertain.



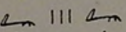

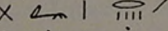

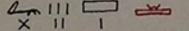

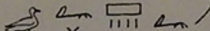


The word mh, primarily used for the linear cubit, but also for the cubit-strip, originally meant *forearm*, the length from the elbow to the finger-tips being the origin of the cubit measure.












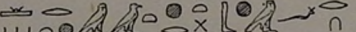











³ This seems to be the feminine of the weak demonstrative whose masculine is p̄ and plural n̄. The word had already, at the time of the Rhind papyrus, come to be used also as a mere definite article, its regular use in later times. It may be translated by the English article everywhere in the Rhind papyrus except here and in the phrases p̄ pw in Problems 57, 58, and 60, and n̄ pw in Problem 67.

⁴ This should be 1 št̄:t 5, etc. The *setat* sign is placed over the 1 instead of the 5 by mistake.

PROBLEM 53



 |
 7t-3tš 1
 | || /
 4t-3tš 1 2
 ||| 
 2 3 2
  /
 4 2 1 4
 |||  /
 4 2 5 1t-3tš dmd
   /
 8 4 2 7t-3tš 2

    /
 8 2 5t-3tš dmd  | /
 2 4t-3tš 1
     /
 oi hm 8 4 1t-3tš f. oi  || /
 qt-3tš 2
        /
 thn m 3t nh t-bh m f. oi   /
 4 2t-3tš 2
 |  /
 8 1 4

PROBLEM 54

| | | | | | | | | | | | |
|--------|-----|-------------|------|----|---|----|---------|---------|-------|---|---|
| | | | 1 | | 1 | | | | | | 1 |
| 2 7 hm | 8 2 | 1 | oi | 1 | | | | t · h 3 | t · b | b | 1 |
| | | | 11 | | | | | | | | 2 |
| 2 2 hm | 8 4 | 1 t · 3 t 6 | 2 | 5 | 2 | | | | | | 2 |
| | | | 1111 | 11 | | | | | | | 3 |
| 5 hm | 2 | 2 t · 3 t 6 | 4 | 2 | 5 | oi | t · h 3 | t n b | | | 3 |
| | | | 1111 | | | | | | | | 4 |
| 10 hm | 2 | 5 t · 3 t 6 | 8 | | | | | | | | 4 |

Photograph xx, Register 5 B. M. Facsimile, Plate XIV

Problem 56

tp n nys mr 360 m whi-tb-t 250 m pr-m-ws n.f imy² dy.k rh.y
Example of reckoning a pyramid; 360 in the ukha-thebet¹, 250 in the per-em-us¹ to it therein; cause thou that know I

skd . f
the seked¹ of it.

ir-hr.k 2 n 360 hpr-hr.f m 180 ir-hr.k whi-tp m 250 r gm.t 180 hpr-hr 2 5 50
Make thou 1/2 of 360; becomes it : 180. Make thou the operation on 250 for the finding of 180; there becomes 1/2 1/5 1/50

n mh iw mh pn³ [m] šsp 7 ir-hr.k whi-tp m 7
of a cubit. Is cubit this : palm 7. Make thou the operation on 7.

| | |
|----------------|--------|
| 1 | 7 |
| 2 | 3 2 . |
| 5 ⁴ | 1 3 15 |
| 50 | 10 25. |

skd . f šsp 5 25
The seked of it is palm 5 1/25.

¹ See volume 1, pages 37-38. These words mean, respectively, the side of the base, the altitude, and the ratio of the two (which is, as Peet says, the batter of the face of the pyramid). Gunn (page 134) has suggested the probable literal meanings of these terms. The whi-tb-t is *what the base requires* (literally *sole*, as the word-sign, a sandal, indicates). The pr-m-ws is *what goes up from the ws* (a chamber beneath the pyramid). One wonders whether the vertical line at the right of the figure represents this. The word pr-m-ws may be the origin of the Greek *πυραμῖς*. The skd is the *turning* or *deflection* from the vertical.

² The phrase n.f imy found in Problems 56-60 is simply an involved method of expressing the possessive: *its* per-em-us. Apparently, imy is an adverb derived from the preposition m, *in*. So far as we know it is found only in this construction. Though differing in form it seems to resemble in meaning the common adverb im.

³ This is a cursive form of pn which occurs also in Problem 58 and twice in Problem 67. A certain resemblance between this sign and m may have caused the scribe to omit the preposition which we have placed after pn. For another possible emendation, making this sentence like those beginning with iw ir in Problems 58 and 62, see Gunn, page 134. As Gunn suggests, this statement is included to show that the unit is the royal cubit and not the short cubit of 6 palms.

⁴ Fractional dot omitted.

Problem 57

mr 140 m whi-tb-t šsp 5 1 m škd . f pty pr-m-ws n . f imy
A pyramid, 140 in the ukha-thebet, palm 5 finger 1 in the seked of it. What is the per-em-us to it therein?

nyš-hr . k mh hft škd sp 2 hpr 10 2 ir-hr . k whi-tp m 10 2 r gm . t 7
State thou a cubit in relation to the seked times 2; there become 10 ½. Make thou the operation on 10 ½ for the finding of 7;

mk mh pw whi-tp m 10 2 3 n 10 2 m 7 ir-hr . k whi-tp m 140 p:1 pw:2 whi-tb-t
behold a cubit this is. Operate on 10 ½: ⅔ of 10 ½ is : 7. Make thou the operation on 140; that this is: the ukha-thebet.

ir 3 n 140 m 93 3 mk pr-m-ws pw n . f imy
Make ⅔ of 140, namely, 93 ⅓; behold the per-em-us, this is, to it therein.

¹ See Problem 53, footnote 3.

² The scribe first omitted pw and then added it above the line.

Problem 58

mr pr-m-ws n · f imy m 93 š dy · k rḥ · y škd · f iw 140 m wḥi-tb-t
A pyramid, the per-em-us to it therein is : 93 1/3; cause thou that know I the seked of it; there are 140 in the ukha-thebet.

ir-ḥr · k 2 n 140 m 70 ir-ḥr · k wḥi-tp m 93 š r gm-t 70 wḥi-tp m 93 š 2 · f 46 š
Make thou 1/2 of 140, namely, 70. Make thou the operation on 93 1/3 for the finding of 70. Operate on 93 1/3, 1/2 of it is 46 2/3,

4 · f 23 š ir-ḥr · k 2 4 n mḥ wḥi-tp m 7 2 · f 3 2 4 · f 1 2 4 dmd šsp 5 1 pḥ pw
1/4 of it is 23 1/3. Make thou 1/2 1/4 of a cubit. Operate on 7; 1/2 of it is 3 1/2, 1/4 of it is 1 1/2 1/4, the total is palm 5 finger 1; that this is:

škd n · f imy
the seked to it therein.

ššm-t
Working out:

| | |
|-----|-------|
| 1 | 93 š |
| \ 2 | 46 š |
| \ 4 | 23 š. |

ir-ḥr · k 2 4 n mḥ iw¹ ir mḥ pn² šsp 7 [p]w
Make thou 1/2 1/4 of a cubit. As for cubit this, palm 7 this is.

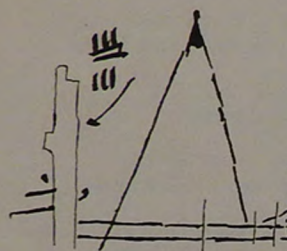
| | |
|---|-----|
| 1 | 7 |
| 2 | 3 2 |
| 4 | 1 4 |

dmd šsp 5 1 škd pw
The total is palm 5 finger 1; the seked this is.

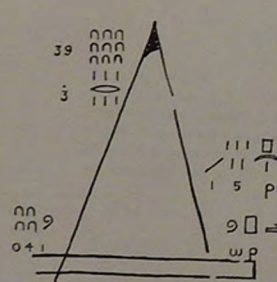
¹ This is the verb *be* which occurs in line 1 above and elsewhere in the papyrus. It is best left untranslated here. See Problem 62, footnote 3.
² See Problem 56, footnote 3.

PROBLEM 58

-b- -a-



Handwritten cuneiform script in four lines, with some characters in red ink. The script is arranged in a grid-like fashion, corresponding to the geometric diagram on the left.



Handwritten cuneiform script in four lines, with some characters in red ink. This section includes a detailed transcription of the script from the top section, with numbers (e.g., 39, 7, 3, 39, 1, 2, 3, 2, 3, 64, 2, 4, 1, 4, 3, 32, 4, 4, 2, k-n-b-ni, 3, 32, f-4, 3, 64, f-2, 3, 39, m, pt-h3w, 07, t-mq, n) and phonetic transcriptions (e.g., .mšš, t, 041 wi f-dkš q-hn k-ya š 39 m ymi f-n šw-m-np nm, 3 39 m pt-h3w k-n-b-ni 07 m 041 n š k-n-b-ni t-bt-šhw m, 4 š k-n-b-ni š 32 f-4 š 64 f-2 š 39 m pt-h3w 07 t-mq n, ymi f-n dkš wp šp 1psš dmd š 1 f-4 š 2 3 f-2 7 m pt-h3w hm n) provided for each line of script.

Problem 59

mr pr-m-ws n · f imy m 12¹ whi-tb-t n · f imy m 8¹
A pyramid, the per-em-us to it therein is : 12, the ukha-thebet to it therein is : 8.

ir-hr · k wih-tp m 8 r gm-t 6 2 pw n pr-m-ws
Make thou the operation on 8 for the finding of 6; ½, this is, of the per-em-us.

| | |
|-----|----|
| 1 | 8 |
| \ 2 | 4 |
| \ 4 | 2. |

ir-hr · k 2 4 n 7 mk₁ mh pw
Make thou ½ ¼ of 7; behold a cubit this is.

| | |
|-----|--------|
| 1 | 7 |
| \ 2 | 3 2 |
| \ 4 | 1 2 4. |

hpr-hr · f m šsp 5 2² mk škd · f pw
becomes it : palm 5 finger 2; behold the seked of it this is.

my n m³

¹ In Problem 59 the given dimensions were transposed. In 59B, the inverse of 59, whi-tb-t was omitted in connection with 12, perhaps intentionally.

² Mistake for 1.

³ These signs are difficult to explain. Gunn suggests (page 134) that the expression may be a corruption of the phrase myt-t pw which occurs in Problems 1, 3, 5, and 46.

⁴ The determinative of this word on the plate was copied from the British Museum Facsimile before the photographs were available. The makers of the Facsimile apparently saw a clear sign resembling the determinative of mr in Problem 58, which has a single line at the base. Peet (Plate Q) indicates that this sign is at present not clear, and this is borne out by Photograph XXII. However, at the point where the sign occurs the papyrus was patched on the back in ancient times by fragments of a papyrus of accounts (constituting Number 86 below) and since the Facsimile was made, the position of these fragments has been changed to bring them into proper relation with one another. It is not unlikely that this operation reduced the legibility of the sign.

⁵ The hyphen on the plate indicates that a part of this word is in one line and a part in the next.

Problem 59B

ir-hr · k mr⁴ n 12¹ škd · f m šsp 5 1
Make thou a pyramid of 12; the seked of it is : palm 5 finger 1;

dy · k rh [y] pr-m-ws n · f imy
cause thou that know I the per-em-us to it therein.

ir-hr · k wih-tp m 5 1 sp 2 r
Make thou the operation on [palm] 5 finger 1 times 2 for the

gm-t mh mk⁵ šsp 7 pw hpr-hr · f m 10 2
finding of a cubit; behold palm 7 this is. Becomes it : 10 ½;

3 · f m 7 ir wih-tp m 12 3 · f m 4⁶
⅔ of it is : 7. Make the operation on 12; ⅔ of it is : 4;

mk pr-m-ws pw
behold the per-em-us this is.

⁶ Mistake for 8.

PROBLEMS 59 AND 59B

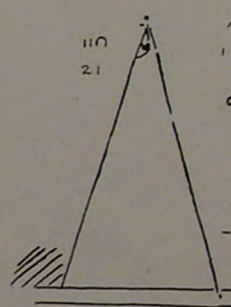
- 59B -

- 59 -



1. $\frac{1}{2} \times 10 \times 10 = 50$
 2. $50 + 50 = 100$
 3. $100 \div 2 = 50$
 4. $50 \div 2 = 25$
 5. $25 \times 2 = 50$

1. $\frac{1}{2} \times 10 \times 10 = 50$
 2. $50 + 50 = 100$
 3. $100 \div 2 = 50$
 4. $50 \div 2 = 25$
 5. $25 \times 2 = 50$



110
21

1. $5 \text{ ps}^5 \text{ m} \text{ f} \cdot \text{dk}^5$ [2] n n m k.rh.ni
 2. k.rh.ni ymi f.n s.w-m-rp [y].hr.k.yd
 3. -m hm t.mg n 2 ps 1 5 m pt-h3w
 4. ni 7 m f.3 2 oi m f.rh.rpb wp 7ps5 K
 5. wp s.w-m-rp km 4 m f.3 21 m pt-h3w

1. 8 m ymi f.n t.bt - 3hw 21 m ymi f.n s.w-m-rp nm
 2. s.w-m-rp n wp 2 6 t.mg n 8 m pt-h3w k.rh.ni
 3. km 2 5 ps5 m f.rh.rpb 7 1 7 n 4 2 k.rh.ni 8 1
 4. wp f.dk5 2 3 2 wp hm km 4 2
 5. m n ym 4 2 1 4 2 4

Problem 60

iwn¹ n mh 15 m snt-t² · f 30 m k'y-f-n-hrw³ dy · k rh · y škd · f
A pillar (?) of cubit 15 in the sentet of it, 30 in its kay-en-heru; cause thou that know I the seked of it.

w:h⁴ m 15 2 · f m 7 2 w:h-tp m 7 2 (sp-w 4)⁵ r gm-t 30 hpr-hr štwty⁶ · f m 4
Operate on 15; ½ of it is : 7 ½. Operate on 7 ½ for the finding of 30; becomes the result of it : 4;

p: pw škd n · f imy
that this is: the seked to it therein.

ššm-t
Working-out:

| | | | |
|-----|-----|-----|-----|
| 1 | 15 | 1 | 7 2 |
| \ 2 | 7 2 | \ 2 | 15 |
| | | \ 4 | 30. |

¹ The word means *column, pillar, or support* in general, including the figurative sense. Peet (page 101) is inclined to believe that a cone may be intended. In this connection note that the figure illustrating this problem differs from those of the pyramid problems preceding in that its base consists of a single line. But this may be a mere accident.

² The stem of this word was originally written šnt. It means *base* and applies well enough to a cone, for whose base we need only one dimension. That is true also of a figure with square base and this would include the pyramid. But the use of iwn and the new terms here employed seem to rule out the pyramid. The true sign for the stem šnt, represented here by a simple diagonal stroke above the papyrus-roll, is a coil of rope in several loops (Gardiner, 1927, page 506). In hieratic the stroke was sometimes substituted for elaborate signs.

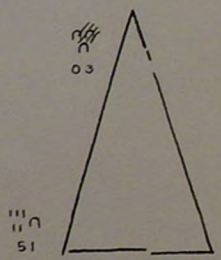
³ The phrase k'y-n-hrw means *height of the top* and was evidently a technical term used of the iwn and probably also of other structures. The term pr-m-wš may have been confined to pyramids or perhaps to sepulchral monuments in general.

⁴ See Problem 44, footnote 4.

⁵ The scribe has by mistake inserted the result in the statement of the operation.

⁶ This is the word which we have translated *content* in Problems 45 and 46.

PROBLEM 60



Handwritten cursive script in four lines, numbered 1 through 4 on the right. The script is dense and appears to be a form of shorthand or a specific dialect of a language.

A collection of handwritten symbols and diagrams arranged in four rows, numbered 1 through 4 on the right. Each row includes a set of symbols on the left and a corresponding set of symbols on the right, often with a vertical line between them. Row 1 includes a symbol resembling '51' and a symbol resembling '18'. Row 2 includes a symbol resembling '2' and a symbol resembling '7'. Row 3 includes a symbol resembling '2' and a symbol resembling '7'. Row 4 includes a symbol resembling '51' and a symbol resembling '2'.

Problem 61

| | | | | |
|--------|---------------------|------------------|----------------|------------------------------|
| | 3̄ n 3̄ | m | 3 | 9 ¹ |
| | | of is : | | |
| | 3̄ | " 3̄ | " | 6 ² 18 |
| | 3̄ | " 3̄ | " | 6 ² 18 |
| | 3̄ | " 6 ² | " | 12 36 ¹ |
| | 3̄ | " 2̄ | m ³ | 3 |
| | | is : | | |
| | 3̄ | " 2̄ | " | 6 |
| | 6 ⁴ | " 2̄ | " | 12 |
| | 12 | " 2̄ | " | 24 ¹ |
| 9 n 3̄ | 18 54, ⁵ | 9 3̄ · f | m | 18 ¹ [54] |
| of | | of it is : | | |
| | | | | |
| | | | | |
| | [5] | 4 · f | m | 20 |
| | | of it is : | | |
| | 7̄ | 3̄ | " | 14 42 ¹ |
| | 7̄ | 2̄ | " | 14 |
| | 11 | 3̄ | " | 22 66, 3̄ · f 33 |
| | | | | of it |
| | 11 | 2̄ | " | 22, 4̄ " m 44 ¹ . |
| | | | | is : |

The table and rule on this page are not a part of the text. They are somewhat more hastily written and were evidently jotted down for reference in the blank margin to the right of the point where the text on the *verso* was to begin. The lost lines seem to have been five in number and to have contained fractions of $\frac{1}{6}$ and $\frac{1}{8}$.

¹ The scribe omitted the fractional dot. As to 42 and 44, see note to 2 divided by 21.

² The special sign for $\frac{1}{6}$ normally includes a dot above, and where the dot is omitted, as here, we have represented the sign by the whole number 6. The sign seems to be a ligature of three horizontal strokes and in earlier papyri two such ligatures, each with a dot, represented the fraction $\frac{1}{6}$ (Möller 1909, volume 1, page 65). Griffith (volume 16, page 169) believes the Rhind sign (also found in a XX dynasty papyrus) to be an abbreviation of the earlier sign.

³ This expression and the three next after it were originally written by the scribe according to the form of 9 3̄ · f m 18 54, used in the ninth and following lines. Afterwards he saw that lines 5-8 could be written in the form of lines 1-4 and he added an n above the second fraction in each of these lines and partly erased the f. See note to this problem in volume 1.

⁴ The sign here used resembles the sign for 6 used in 2 divided by 37 (in the $\frac{1}{96}$ near the end of line 1) and in Problem 69 (f, line 5), and the similar sign which occurs half-a-dozen times in the account papyri from Illahūn (Griffith 1897, XIV, 9, 10; XVI, 16, 18; XVII, 8; XXIII, 19, 22), and it also resembles, but less closely, the sign used at the end of line 4 above and often elsewhere. But these forms are apparently used nowhere else in writing a fraction. Without consulting the original we cannot determine whether the apparent stroke over the sign is due to the scribe's pen. It was possible for the makers of the British Museum Facsimile to be deceived; for Peet notes (top of page 106) that a stroke which they made in another place does not exist. Possibly that is the case here, for from Photograph XXIII it appears that the mark in question may be a mere break along the line of an incipient crack. Moreover, it is only very rarely that the Rhind scribe errs in making a stroke for a dot or a dot for a stroke. If we have here a stroke of the pen it is just possible that he intended to make the sign that occurs in lines 2, 3, and 4, and that his pen (actually a stiff brush) jumped while he was making the ligature.

⁵ When the scribe was altering lines 5-8 he evidently had the impression that line 9 should also be altered, but instead of adding n and erasing f he rewrote the expression on the right in the form used in lines 1-4.

⁶ See volume 1, page 25, footnote 1.

⁷ This indefinite pronoun is the same word as the particle used to form the passive of verbs. Examples are sp̄hr-n.tw on the Title-page and in.tw in Problem 62, line 2. In its use to form the passive it loses its pronominal function and is followed by a noun or pronoun as subject of the verb. See Gardiner, 1927, pages 41 middle and 46 bottom.

⁸ A variant writing of the ty.t in line 1.

⁹ This is a kind of verbal adjective with a future meaning. It is formed by adding to the verb stem the particle ty and a final suffix which has forms for gender, person, and number agreeing with the noun or pronoun modified, in this case ty:t. See Gardiner, 1927, page 280, §§363-364.

Problem 61B

ir-t 3̄ n ty-t gb-t my dd n · k pty 3̄ n 5̄
 The making of $\frac{2}{3}$ of a fraction uneven⁶. If is said to thee, What is $\frac{2}{3}$ of $\frac{1}{3}$?

ir-ḥ[r] · k sp · f 2 sp-w 6 · f 3̄ · f pw mk ir-tw⁷ m
 make thou times of it 2, times 6 of it; $\frac{2}{3}$ of it this is. Behold does one according to

myt:t r ty:t⁸ nb-t gb-t ḥpr-ty-śy⁹
 the like for fraction every uneven which may occur.

PROBLEMS 6I AND 6IB

1
 2
 k · n dd ym t · b g
 3
 4
 z f · ps k · (n) h · ni
 5
 w p f · 3 f · 6 w · ps
 6
 t · t y m m w t · ni km
 7
 t · b n t · 3 y t n
 8
 y 6 · y t · n p h t · b g

1
 2
 3
 4
 5
 6
 7
 8
 9
 81 m f · 3 9 45 81 3 n 9

- 61B -

1
 2
 3
 4
 5
 6
 7
 8

- 61 -

1
 2
 3
 4
 5
 6
 7
 8
 9

10
 11
 12
 13
 14
 44 m f · 4 2 2 f · 2 11

10
 11
 12
 13
 14

Photograph xxiii, Right Half B. M. Facsimile, Plate xvi

Problem 62

tp n lr-t¹ krf-t hr 'i-t 'š't my dd n · k krf-t nb im³·ś hđ im · ś dđty im · ś
 Example of making a bag under² precious metals various. If is said to thee, A bag, gold in it, silver in it, lead in it;

iw⁴ in-tw krf-t tn⁵ hr š'ty⁶ 84 pty nt-t n⁷ 'i-t nb-t
 is bought bag this for sha'ty 84. What is that which there is to precious metal each?

iw⁴ ir⁸ dd⁹·t hr nb dbn š'ty 12 pw hđ š'ty 6 pw dđty dbn š'ty 3 pw
 As for what is given for gold, a deben, sha'ty 12 this is; for silver sha'ty 6 this is; for lead, a deben, sha'ty 3 this is.

dmd·hr · k dd⁹·t hr š'ty¹⁰ n 'i-t nb-t hpr¹¹·hr 21. ir·hr · k pⁱ 21 r gm-t š'ty 84
 Add thou what is given for a sha'ty of precious metal each; there become 21. Make thou the 21 for the finding of sha'ty 84;

iny-t pw m krf-t tn hpr hr m 4 dd¹² · k n 'i-t nb-t
 what was bought, this is, in bag this; there become : 4, which assignest thou to precious metal each.

ir-t my hpr
 The doing as it occurs:

| | | | | | | | | | | | |
|---|--------------------|---|---|----|----|--------|--------------------|----|-----|-----|----|
| ir-tw | p[w] ¹⁴ | 4 | r | sp | 12 | hpr·hr | nb m | 48 | rht | · f | pw |
| Multiplies one ¹³ , this means, 4 up to times 12; there becomes gold : 48; the amount of it this is. | | | | | | | | | | | |
| | | | | | 6 | | hđ | 24 | | | |
| | | | | | | | silver | | | | |
| | | | | | 3 | | dđty ¹⁵ | 12 | | | |
| | | | | | | | lead | | | | |
| | | | | | 21 | | dmd | 84 | | | |
| | | | | | | | Total | | | | |

For a somewhat different interpretation of this Problem see Perpelkin, 1929.

¹ That is, reckoning.

² This preposition is often used to express the ideas of containing, possessing, supporting, etc.

³ The preposition m has this form before suffixes. Compare Problems 66, line 1, and 80, line 1.

⁴ Here iw is untranslatable. In line 2 it is auxiliary (Gardiner, 1927, page 385), in the other case a mere particle as in Problem 58, a, last line.

⁵ This is the feminine singular form corresponding to the masculine singular pn.

⁶ A unit of value, not merely the name of an object. See volume 1, note to Problem 62 and page 189. The hieroglyphic sign represents a cylindrical seal on a cord.

⁷ We should expect the genitive here between two nouns and because n meaning to is almost never found before inanimate objects. On the other hand, we should expect the genitive to be n-t since in the Rhind papyrus the feminine form regularly follows feminine nouns (Problems 51, 52, 68, 69, 70, and 84) and the sign here used is rarely found for the genitive. Gardiner (1906, page 47) translated nt-t n amount of; Peet (page 104) translates the phrase assignable to, but quotes Gardiner's rendering as an alternative.

⁸ The particle ir is an older form of the preposition r. It can be used before a nominal phrase, as here, and also before a finite verb, where it is equivalent to the English if. See Problems 30 and 47.

⁹ Imperfect participle of the verb dy. The doubling of a consonant in this and certain other forms occurs in certain classes of verbs (see footnote 12 below). A participle used in this way without a definite antecedent is regularly feminine.

¹⁰ The scribe should have written dbn here, not š'ty.

¹¹ The complementary r in hpr is omitted on Peet's Plate R.

¹² A finite form from the verb dy which has the doubled consonant. We have followed Gardiner (1906, page 47) and Peet (page 105) in translating this as though it were the so-called imperfect relative form. Gunn (page 135) believes this to be another form of the verb which also has the reduplication.

¹³ The w of tw has been omitted by the scribe as in Problems 38 and 64.

¹⁴ For this use of pw compare Problem 38, footnote 1, and see Peet, pages 105-106, and Gardiner, 1927, page 143, §189.

¹⁵ Following the h in this word the scribe first made a vertical stroke and afterwards wrote over it, without erasure, the t and the two diagonal strokes.

PROBLEM 62

k-n dd ym t-3c t-3c n h t-fnk t-ni n pt
 wt-ni wi s-mi ythd s-mi dh s-mi bn t-fnk
 t-bn t-3c n t-in ytp 48 yt's nh nt t-fnk
 wp 6 yt's dh wpzi yt's nbd bn nh t-dd ni wi
 yt's nh t-dd k-nh-dmd wp 3 yt's nbd ythd
 t-mg n 12 3p k-nh-ni 12 nh-nph t-bn t-3c n
 4 m nh-nph nt t-fnk m wp t-y-ni 48 yt's
 nph ym t-ni t-bn t-3c n k-dd
 wp f-thn 84 m bn nh-nph 21 ps n 4 [w]p t-ni
 42 dh 6
 21 ythd 3
 48 dmd 12

1
 2
 3
 4
 5
 6
 7
 8
 9
 10
 11
 12

Problem 63

[Example of dividing] $t^1 \cdot w^1$ 700 n s 4 $\ddot{3}$ n 1 $\dot{2}$ n ky dy · k rh · y
loaves 700 for man 4, $\frac{2}{3}$ to 1, $\frac{1}{2}$ to another [$\frac{1}{3}$ to another, $\frac{1}{4}$ to another]; cause thou that know I

hr-t² w'w³ im nb
the share of one thereof each.

dmd·hr·k $\ddot{3}$ $\dot{3}$ $\dot{4}$ hpr·hr 1 $\dot{2}$ $\dot{4}$ nys·hr·k 1 hnt 1 $\dot{2}$ $\dot{4}$ hpr·hr $\dot{2}$ i4 ir·hr·k $\dot{2}$ i4 n 700
Add thou $\frac{2}{3}$, [$\frac{1}{2}$]⁴, $\frac{1}{3}$, $\frac{1}{4}$; there becomes $1 \frac{1}{2} \frac{1}{4}$. Call thou 1 out of $1 \frac{1}{2} \frac{1}{4}$; there becomes $\frac{1}{2} \frac{1}{4}$. Make thou $\frac{1}{2} \frac{1}{4}$ of 700,
m 400 ir·hr·k $\ddot{3}$ n 400 m 266 $\ddot{3}$ $\dot{2}$ n 400 m 200 $\dot{3}$ n 400 m 133 $\dot{3}$ $\dot{4}$ n 400 m 100
namely, 400. Make thou $\frac{2}{3}$ of 400, namely, 266 $\frac{2}{3}$; $\frac{1}{2}$ of 400, namely, 200; $\frac{1}{3}$ of 400, namely, 133 $\frac{1}{3}$; $\frac{1}{4}$ of 400, namely, 100;

hr-t w'w im nb
the share of one thereof each.

| | | | | |
|---|------------|-----------|-----|----------------------------|
| ir-t | my | hpr | rht | 700 |
| <i>The doing as it occurs: The amount, 700.</i> | | | | |
| | $\dot{2}$ | i4 | | 400 |
| | $\ddot{3}$ | n 400 n 1 | | 266 $\ddot{3}$ |
| | | of to | | |
| | $\dot{2}$ | " 400 " | 1 | 200 |
| | $\dot{3}$ | " 400 " | 1 | 113 ⁵ $\dot{3}$ |
| | $\dot{4}$ | " 400 " | 1 | 100 |
| dmd | | | | 700. |
| <i>Total</i> | | | | |

The beginning of the first three lines of this problem and a part of each line near the end were concealed by patches in ancient times (see Photographs XXIII and XXIV). After that a scribe restored what he thought was necessary on the patches. He was justified in omitting the preliminary words of the problem but scarcely in failing to complete the second line.

¹ Note that the first two signs in $t^1 \cdot w^1$ have been made separately instead of as a ligature. See Problem 72, footnote 2.

² Literally, *what is under a man*, that is, what he receives for his *support*.

⁴ The scribe who wrote on the patches omitted to restore this $\frac{1}{2}$, which may well have been written originally.

³ See Problem 69, footnote 1.

⁵ Mistake for 133.

PROBLEM 63

y kn 2 i n 3 4 s n 007 w 3t

k · r h · d m d b n m i w ʿ w t · r h y · h r k y d

r h · r p h 4 2 i t n h | k · r h · ʿ s y n 4 2 i r h · r p h 4 3 3

3 662 m 004 n 3 k · r h r i 004 m 007 n 4 i 2 k · r h r i 4 i 2

b n m i w ʿ w t · r h 001 m 004 n 4 3 331 m 004 n 3 002 m 004 n 2

3 311 | n 004 n 3 r p h y m t r i

9 | 9999 m 007 t h r

001 | 004 n 4

9999 999 d m d 004 4 i 2

3 662 | n 004 n 3

99 | 9999 m 002 | n 004 n 2

1

2

3

4

5

6

7

8

9

10

Problem 64

tp n psš prw my dd n · k it hk:t 10 n s 10 prw n s nb r sn·nw ·f
Example of distributing¹ difference². If is said to thee, Barley, hekat 10 for man 10, the difference of man each to second³ his,

m it hk:t š⁴ pw
in barley, hekat 1/8 this is.

psš·t⁵ mtr·t m hk:t ž⁷ hb 1 hnt 10 d:t m 9 ir·tw⁸ ž n prw m i6
The share average⁶ is : hekat 1/2. Take away 1 from 10; the remainder is : 9. Is made 1/2 of the difference, namely, 1/16.

ir r sp·w 9 hpr·hr hk:t ž i6 w:h hr psš·t mtr·t hb·hr · k hk:t š hr s nb r
Make up to times 9; there becomes hekat 1/2 1/16. Add on to the share average. Take away thou the hekat 1/8 for man each to

šht hry phwy
include the one under⁹ the end.

ir·t my hpr
The doing as it occurs:

1 ž i6, 1 4 š i6, 1 4 i6, 1 š i6, 1 i6, 2 4 š i6, 2 4 i6, 2 š i6, 2 i6, 4 š i6,

dmd 10
Total 10 hekat.

The 'h'-sign at the end of line 1 on the Plate is probably a form of the verb meaning *stand, stop*, and was perhaps placed here by the scribe, after he had begun to write the page containing Problems 65-70, to remind him, when he reached the last register, not to begin too closely to Problem 64, which had extended somewhat further to the left than had been expected. See Photograph XXIV. For a probably similar use of 'h' see Problem 32, line 14.

¹ Literally *dividing*, and so translated in Problem 1. The diacritical mark on the š is not clear in the transliteration on the opposite plate.

² More literally *excess*, from the verb stem meaning *go forth*.

³ That is, *neighbor* or *next one*. The stem sn is the word for *two*; nw is the ordinal ending. See Problem 68.

⁴ Horus eye fraction. See Problem 35, footnote 5.

⁵ Derived of course from psš, *to divide*.

⁶ Literally *regular*.

⁷ Mistake for 1.

⁸ The passive particle tw written without the w. See Problem 62, footnote 13.

⁹ The one *under* or *having the end* is of course the last one.

PROBLEM 64

191 - 192 - 193 - 194 - 195 - 196 - 197 - 198 - 199 - 200

191 192 193 194 195 196 197 198 199 200

1
 f-w-n-s n bn s n wnp oi s n oit-3kh ti k-n dd ym wnp ssp n pt

2
 n z t-ni q m t-3d oi tnh i bh z t-3kh m t-nim t-s'sp wp t-3kh ti m

3
 k-n h-bh t-nim t-s'sp nh hsw 6i z t-3kh nh-nph 9 wps n ni 6i m wnp

4
 nph ym t-ni qwhp yn h ths n bn s nh t-3kh

5
 oi dmd 6i B 4 6i z 6i B z 6i 4 z 6i B 4 z 6i 1 6i B 1 6i 4 1 6i B 4 1 6i z 1

Problem 65

tp n ir-t t'w 100 n s 10 nfw tsw iry - 'i m k'ib²
Example of making loaves 100 for man 10; a boatman, a foreman, one at the door¹, with double.

ššm-t . f dmd-hr . k n' n³ rmt⁴ 'pr hpr-hr 13 w'ḥ-tp m 13 r gm-t t'⁶ t'w 100
The working-out of it: Add thou the people supplied⁵; there become 13. Operate on 13 for the finding of the loaves 100;

hpr-hr 7 3̄ 39 d̄d-hr . k wnm pw n p' s 7 nfw tsw iry - 'i m k'ib
there become 7 3̄ 39. Say thou, The eating, this is, of the man 7, and the boatman, the foreman, the one at the door, with double.

| | | | |
|----------------------|---------|---------------------|-------------|
| 7 3̄ 39 | 7 3̄ 39 | nfw | 15 3̄ 26 78 |
| | | the boatman | |
| 7 3̄ 39 ⁷ | 7 3̄ 39 | tsw | 15 3̄ 26 78 |
| | | the foreman | |
| 7 3̄ 39 | 7 3̄ 39 | iry - 'i | 15 3̄ 26 78 |
| | | the one at the door | |
| 7 3̄ 39 | | dmd | 100. |
| | | Total | |

¹ That is, a door-keeper. The first part of the word, iry, is an adjective derived from the preposition r, to, at.

² The presence of 'i in this word is not certain, but it has been inferred from the fact that several words known to have the stem k'ib are written with the sign used here. The sign represents part of an animal's intestine.

³ The plural of the weak demonstrative and article was connected with its noun by the genitive n down to the time of our papyrus. Later the n was omitted.

⁴ This word is commonly written without the alphabetic m (Gardiner, 1927, page 52, §59). However, the presence of the m in the stem is certain from a number of fuller writings and from Coptic. Peet (page 109) and Gunn (page 135) seem to assume that we must read rmt-t the feminine form.

⁵ That is, supplied with food. As is shown by the result, what is actually added is the number of single rations, including the extra rations given to three of the men.

⁶ The article or demonstrative accompanying a word modified by a numeral is always singular, but with two exceptions it agrees in gender with its noun. The exceptions are the cases where the numeral is 100 (feminine), as here, or 1000 (masculine). In these cases the article or demonstrative takes the gender of the numeral. See Problems 72 and 74 and Gardiner, 1927, page 193.

⁷ The scribe omitted the fractional dot.

PROBLEM 65

d c b a

Facsimile of a cuneiform tablet with four columns of text labeled d, c, b, and a. Below the facsimile is a transcription of the cuneiform into a phonetic script.

Transcription of the facsimile:

Row 1: e7 62 3 51 wfn 93 3 7 wfn 5p 5 b3k m 3i-yai wst wfn ois n ooi wst t-ni n pt

Row 2: e7 62 3 51 wst 93 3 7 wst 7 pt-h3w 3i nh-nph nph tma n3n k-nh-dmd f.t.m 55

Row 3: eoidma e7 62 3 51 3i-yai 93 3 7 b3k m 3i-yai wp m nw k-nh-dd 93 3 7 nh-nph ooi w-st 3t t-mg n 3i m

Problem 66

'd ḥk:t 10 pry n rnp:t pty ḥr-t² hrw im-f
Fat, hekat 10, goes out¹ for a year; what is the share of a day therein?

ššm-t · f ir.ḥr · k p: 'd ḥk:t 10³ m r:w ḥpr-ḥr 3200 ir.ḥr · k rnp:t m hrw-w ḥpr-ḥr 365
The working-out of it: Make thou the fat, hekat 10, in ro; there become 3200. Make thou the year in days; there become 365.

nyš-ḥr · k 3200 ḥnt 365 ḥpr-ḥr 8 ḫ̄ iō 2190 ir⁴ m r:w⁵ m 64 3 r: 3 iō 2190 ḥr-t hrw pw
Call thou 3200 out of 365; there become 8 2/3 1/10 1/2100, making in ro : 1/64 3 ro 2/3 1/10 1/2100; the share of a day this is.

ir-t my ḥpr
The doing as it occurs:

| | |
|------|--------|
| 1 | 365 |
| 2 | 730 |
| 4 | 1460 |
| [8 | 2920] |
| ḫ̄ | 243 ḫ̄ |
| iō | 36 2 |
| 2190 | 6 |

dmd 8 ḫ̄ iō 2190.

Total

irr⁶ · k m myt-t r dd-t⁷ n · k nb-t my tp pn
Shalt do thou according to the like in relation to what is said to thee, all, like example this.

¹ That is, *is issued*. The form is the pseudo-participle (old perfective). See Problems 28, footnote 2, and 35, footnote 1.

² Literally, *that which is under* (that is, *supports*) a day. See Problem 63, footnote 2.

³ The scribe first omitted ḥk:t 10 and then added it above the line.

⁴ Gardiner (1927, page 341, §422, 3) believes that the verb in this expression and in the similar phrase *ir n* is a finite form in the passive, although its form is equally consistent with that of the perfective active participle, or it might also be the pseudo-participle (old perfective). One or the other of these phrases occurs also in Problems 35, 37, 38, 52, 68 twice, 72, 74, 75, 76, 82 four times, 82B twice, 83, and 84 four times; and the *ir* occurring twice in Problem 23 seems to be the same form.

⁵ The phrase *m r:w* is not accurately used since we have first a fraction of a *hekat*.

⁶ The second *r* has been omitted in the transliteration on the plate. The verb is not regularly written with alphabetic *r* except in forms where the *r* is doubled. For the form used here see Gardiner, 1927, page 353, §440, 3.

⁷ Passive participle. The phrase *dd-t n-k nb-t* means *anything that is said to thee*.

PROBLEM 66

b.

𐎠𐎡𐎢𐎣𐎤𐎥𐎦𐎧𐎨
𐎠𐎡𐎢𐎣𐎤𐎥𐎦𐎧𐎨

a.

𐎠𐎡𐎢𐎣𐎤𐎥𐎦𐎧𐎨𐎩𐎪𐎫𐎬𐎭𐎮𐎯𐎰𐎱𐎲𐎳𐎴𐎵𐎶𐎷𐎸𐎹𐎺𐎻𐎼𐎽𐎾𐎿𐏀𐏁𐏂𐏃𐏄𐏅𐏆𐏇𐏈𐏉𐏊𐏋𐏌𐏍𐏎𐏏𐏐𐏑𐏒𐏓𐏔𐏕𐏖𐏗𐏘𐏙𐏚𐏛𐏜𐏝𐏞𐏟𐏠𐏡𐏢𐏣𐏤𐏥𐏦𐏧𐏨𐏩𐏪𐏫𐏬𐏭𐏮𐏯𐏰𐏱𐏲𐏳𐏴𐏵𐏶𐏷𐏸𐏹𐏺𐏻𐏼𐏽𐏾𐏿𐐀𐐁𐐂𐐃𐐄𐐅𐐆𐐇𐐈𐐉𐐊𐐋𐐌𐐍𐐎𐐏𐐐𐐑𐐒𐐓𐐔𐐕𐐖𐐗𐐘𐐙𐐚𐐛𐐜𐐝𐐞𐐟𐐠𐐡𐐢𐐣𐐤𐐥𐐦𐐧𐐨𐐩𐐪𐐫𐐬𐐭𐐮𐐯𐐰𐐱𐐲𐐳𐐴𐐵𐐶𐐷𐐸𐐹𐐺𐐻𐐼𐐽𐐾𐐿𐑀𐑁𐑂𐑃𐑄𐑅𐑆𐑇𐑈𐑉𐑊𐑋𐑌𐑍𐑎𐑏𐑐𐑑𐑒𐑓𐑔𐑕𐑖𐑗𐑘𐑙𐑚𐑛𐑜𐑝𐑞𐑟𐑠𐑡𐑢𐑣𐑤𐑥𐑦𐑧𐑨𐑩𐑪𐑫𐑬𐑭𐑮𐑯𐑰𐑱𐑲𐑳𐑴𐑵𐑶𐑷𐑸𐑹𐑺𐑻𐑼𐑽𐑾𐑿𐒀𐒁𐒂𐒃𐒄𐒅𐒆𐒇𐒈𐒉𐒊𐒋𐒌𐒍𐒎𐒏𐒐𐒑𐒒𐒓𐒔𐒕𐒖𐒗𐒘𐒙𐒚𐒛𐒜𐒝𐒞𐒟𐒠𐒡𐒢𐒣𐒤𐒥𐒦𐒧𐒨𐒩𐒪𐒫𐒬𐒭𐒮𐒯𐒰𐒱𐒲𐒳𐒴𐒵𐒶𐒷𐒸𐒹𐒺𐒻𐒼𐒽𐒾𐒿𐓀𐓁𐓂𐓃𐓄𐓅𐓆𐓇𐓈𐓉𐓊𐓋𐓌𐓍𐓎𐓏𐓐𐓑𐓒𐓓𐓔𐓕𐓖𐓗𐓘𐓙𐓚𐓛𐓜𐓝𐓞𐓟𐓠𐓡𐓢𐓣𐓤𐓥𐓦𐓧𐓨𐓩𐓪𐓫𐓬𐓭𐓮𐓯𐓰𐓱𐓲𐓳𐓴𐓵𐓶𐓷𐓸𐓹𐓺𐓻𐓼𐓽𐓾𐓿𐔀𐔁𐔂𐔃𐔄𐔅𐔆𐔇𐔈𐔉𐔊𐔋𐔌𐔍𐔎𐔏𐔐𐔑𐔒𐔓𐔔𐔕𐔖𐔗𐔘𐔙𐔚𐔛𐔜𐔝𐔞𐔟𐔠𐔡𐔢𐔣𐔤𐔥𐔦𐔧𐔨𐔩𐔪𐔫𐔬𐔭𐔮𐔯𐔰𐔱𐔲𐔳𐔴𐔵𐔶𐔷𐔸𐔹𐔺𐔻𐔼𐔽𐔾𐔿𐕀𐕁𐕂𐕃𐕄𐕅𐕆𐕇𐕈𐕉𐕊𐕋𐕌𐕍𐕎𐕏𐕐𐕑𐕒𐕓𐕔𐕕𐕖𐕗𐕘𐕙𐕚𐕛𐕜𐕝𐕞𐕟𐕠𐕡𐕢𐕣𐕤𐕥𐕦𐕧𐕨𐕩𐕪𐕫𐕬𐕭𐕮𐕯𐕰𐕱𐕲𐕳𐕴𐕵𐕶𐕷𐕸𐕹𐕺𐕻𐕼𐕽𐕾𐕿𐖀𐖁𐖂𐖃𐖄𐖅𐖆𐖇𐖈𐖉𐖊𐖋𐖌𐖍𐖎𐖏𐖐𐖑𐖒𐖓𐖔𐖕𐖖𐖗𐖘𐖙𐖚𐖛𐖜𐖝𐖞𐖟𐖠𐖡𐖢𐖣𐖤𐖥𐖦𐖧𐖨𐖩𐖪𐖫𐖬𐖭𐖮𐖯𐖰𐖱𐖲𐖳𐖴𐖵𐖶𐖷𐖸𐖹𐖺𐖻𐖼𐖽𐖾𐖿𐗀𐗁𐗂𐗃𐗄𐗅𐗆𐗇𐗈𐗉𐗊𐗋𐗌𐗍𐗎𐗏𐗐𐗑𐗒𐗓𐗔𐗕𐗖𐗗𐗘𐗙𐗚𐗛𐗜𐗝𐗞𐗟𐗠𐗡𐗢𐗣𐗤𐗥𐗦𐗧𐗨𐗩𐗪𐗫𐗬𐗭𐗮𐗯𐗰𐗱𐗲𐗳𐗴𐗵𐗶𐗷𐗸𐗹𐗺𐗻𐗼𐗽𐗾𐗿𐘀𐘁𐘂𐘃𐘄𐘅𐘆𐘇𐘈𐘉𐘊𐘋𐘌𐘍𐘎𐘏𐘐𐘑𐘒𐘓𐘔𐘕𐘖𐘗𐘘𐘙𐘚𐘛𐘜𐘝𐘞𐘟𐘠𐘡𐘢𐘣𐘤𐘥𐘦𐘧𐘨𐘩𐘪𐘫𐘬𐘭𐘮𐘯𐘰𐘱𐘲𐘳𐘴𐘵𐘶𐘷𐘸𐘹𐘺𐘻𐘼𐘽𐘾𐘿𐙀𐙁𐙂𐙃𐙄𐙅𐙆𐙇𐙈𐙉𐙊𐙋𐙌𐙍𐙎𐙏𐙐𐙑𐙒𐙓𐙔𐙕𐙖𐙗𐙘𐙙𐙚𐙛𐙜𐙝𐙞𐙟𐙠𐙡𐙢𐙣𐙤𐙥𐙦𐙧𐙨𐙩𐙪𐙫𐙬𐙭𐙮𐙯𐙰𐙱𐙲𐙳𐙴𐙵𐙶𐙷𐙸𐙹𐙺𐙻𐙼𐙽𐙾𐙿𐚀𐚁𐚂𐚃𐚄𐚅𐚆𐚇𐚈𐚉𐚊𐚋𐚌𐚍𐚎𐚏𐚐𐚑𐚒𐚓𐚔𐚕𐚖𐚗𐚘𐚙𐚚𐚛𐚜𐚝𐚞𐚟𐚠𐚡𐚢𐚣𐚤𐚥𐚦𐚧𐚨𐚩𐚪𐚫𐚬𐚭𐚮𐚯𐚰𐚱𐚲𐚳𐚴𐚵𐚶𐚷𐚸𐚹𐚺𐚻𐚼𐚽𐚾𐚿𐛀𐛁𐛂𐛃𐛄𐛅𐛆𐛇𐛈𐛉𐛊𐛋𐛌𐛍𐛎𐛏𐛐𐛑𐛒𐛓𐛔𐛕𐛖𐛗𐛘𐛙𐛚𐛛𐛜𐛝𐛞𐛟𐛠𐛡𐛢𐛣𐛤𐛥𐛦𐛧𐛨𐛩𐛪𐛫𐛬𐛭𐛮𐛯𐛰𐛱𐛲𐛳𐛴𐛵𐛶𐛷𐛸𐛹𐛺𐛻𐛼𐛽𐛾𐛿𐜀𐜁𐜂𐜃𐜄𐜅𐜆𐜇𐜈𐜉𐜊𐜋𐜌𐜍𐜎𐜏𐜐𐜑𐜒𐜓𐜔𐜕𐜖𐜗𐜘𐜙𐜚𐜛𐜜𐜝𐜞𐜟𐜠𐜡𐜢𐜣𐜤𐜥𐜦𐜧𐜨𐜩𐜪𐜫𐜬𐜭𐜮𐜯𐜰𐜱𐜲𐜳𐜴𐜵𐜶𐜷𐜸𐜹𐜺𐜻𐜼𐜽𐜾𐜿𐝀𐝁𐝂𐝃𐝄𐝅𐝆𐝇𐝈𐝉𐝊𐝋𐝌𐝍𐝎𐝏𐝐𐝑𐝒𐝓𐝔𐝕𐝖𐝗𐝘𐝙𐝚𐝛𐝜𐝝𐝞𐝟𐝠𐝡𐝢𐝣𐝤𐝥𐝦𐝧𐝨𐝩𐝪𐝫𐝬𐝭𐝮𐝯𐝰𐝱𐝲𐝳𐝴𐝵𐝶𐝷𐝸𐝹𐝺𐝻𐝼𐝽𐝾𐝿𐞀𐞁𐞂𐞃𐞄𐞅𐞆𐞇𐞈𐞉𐞊𐞋𐞌𐞍𐞎𐞏𐞐𐞑𐞒𐞓𐞔𐞕𐞖𐞗𐞘𐞙𐞚𐞛𐞜𐞝𐞞𐞟𐞠𐞡𐞢𐞣𐞤𐞥𐞦𐞧𐞨𐞩𐞪𐞫𐞬𐞭𐞮𐞯𐞰𐞱𐞲𐞳𐞴𐞵𐞶𐞷𐞸𐞹𐞺𐞻𐞼𐞽𐞾𐞿𐟀𐟁𐟂𐟃𐟄𐟅𐟆𐟇𐟈𐟉𐟊𐟋𐟌𐟍𐟎𐟏𐟐𐟑𐟒𐟓𐟔𐟕𐟖𐟗𐟘𐟙𐟚𐟛𐟜𐟝𐟞𐟟𐟠𐟡𐟢𐟣𐟤𐟥𐟦𐟧𐟨𐟩𐟪𐟫𐟬𐟭𐟮𐟯𐟰𐟱𐟲𐟳𐟴𐟵𐟶𐟷𐟸𐟹𐟺𐟻𐟼𐟽𐟾𐟿𐠀𐠁𐠂𐠃𐠄𐠅𐠆𐠇𐠈𐠉𐠊𐠋𐠌𐠍𐠎𐠏𐠐𐠑𐠒𐠓𐠔𐠕𐠖𐠗𐠘𐠙𐠚𐠛𐠜𐠝𐠞𐠟𐠠𐠡𐠢𐠣𐠤𐠥𐠦𐠧𐠨𐠩𐠪𐠫𐠬𐠭𐠮𐠯𐠰𐠱𐠲𐠳𐠴𐠵𐠶𐠷𐠸𐠹𐠺𐠻𐠼𐠽𐠾𐠿𐡀𐡁𐡂𐡃𐡄𐡅𐡆𐡇𐡈𐡉𐡊𐡋𐡌𐡍𐡎𐡏𐡐𐡑𐡒𐡓𐡔𐡕𐡖𐡗𐡘𐡙𐡚𐡛𐡜𐡝𐡞𐡟𐡠𐡡𐡢𐡣𐡤𐡥𐡦𐡧𐡨𐡩𐡪𐡫𐡬𐡭𐡮𐡯𐡰𐡱𐡲𐡳𐡴𐡵𐡶𐡷𐡸𐡹𐡺𐡻𐡼𐡽𐡾𐡿𐢀𐢁𐢂𐢃𐢄𐢅𐢆𐢇𐢈𐢉𐢊𐢋𐢌𐢍𐢎𐢏𐢐𐢑𐢒𐢓𐢔𐢕𐢖𐢗𐢘𐢙𐢚𐢛𐢜𐢝𐢞𐢟𐢠𐢡𐢢𐢣𐢤𐢥𐢦𐢧𐢨𐢩𐢪𐢫𐢬𐢭𐢮𐢯𐢰𐢱𐢲𐢳𐢴𐢵𐢶𐢷𐢸𐢹𐢺𐢻𐢼𐢽𐢾𐢿𐣀𐣁𐣂𐣃𐣄𐣅𐣆𐣇𐣈𐣉𐣊𐣋𐣌𐣍𐣎𐣏𐣐𐣑𐣒𐣓𐣔𐣕𐣖𐣗𐣘𐣙𐣚𐣛𐣜𐣝𐣞𐣟𐣠𐣡𐣢𐣣𐣤𐣥𐣦𐣧𐣨𐣩𐣪𐣫𐣬𐣭𐣮𐣯𐣰𐣱𐣲𐣳𐣴𐣵𐣶𐣷𐣸𐣹𐣺𐣻𐣼𐣽𐣾𐣿𐤀𐤁𐤂𐤃𐤄𐤅𐤆𐤇𐤈𐤉𐤊𐤋𐤌𐤍𐤎𐤏𐤐𐤑𐤒𐤓𐤔𐤕𐤖𐤗𐤘𐤙𐤚𐤛𐤜𐤝𐤞𐤟𐤠𐤡𐤢𐤣𐤤𐤥𐤦𐤧𐤨𐤩𐤪𐤫𐤬𐤭𐤮𐤯𐤰𐤱𐤲𐤳𐤴𐤵𐤶𐤷𐤸𐤹𐤺𐤻𐤼𐤽𐤾𐤿𐥀𐥁𐥂𐥃𐥄𐥅𐥆𐥇𐥈𐥉𐥊𐥋𐥌𐥍𐥎𐥏𐥐𐥑𐥒𐥓𐥔𐥕𐥖𐥗𐥘𐥙𐥚𐥛𐥜𐥝𐥞𐥟𐥠𐥡𐥢𐥣𐥤𐥥𐥦𐥧𐥨𐥩𐥪𐥫𐥬𐥭𐥮𐥯𐥰𐥱𐥲𐥳𐥴𐥵𐥶𐥷𐥸𐥹𐥺𐥻𐥼𐥽𐥾𐥿𐦀𐦁𐦂𐦃𐦄𐦅𐦆𐦇𐦈𐦉𐦊𐦋𐦌𐦍𐦎𐦏𐦐𐦑𐦒𐦓𐦔𐦕𐦖𐦗𐦘𐦙𐦚𐦛𐦜𐦝𐦞𐦟𐦠𐦡𐦢𐦣𐦤𐦥𐦦𐦧𐦨𐦩𐦪𐦫𐦬𐦭𐦮𐦯𐦰𐦱𐦲𐦳𐦴𐦵𐦶𐦷𐦸𐦹𐦺𐦻𐦼𐦽𐦾𐦿𐧀𐧁𐧂𐧃𐧄𐧅𐧆𐧇𐧈𐧉𐧊𐧋𐧌𐧍𐧎𐧏𐧐𐧑𐧒𐧓𐧔𐧕𐧖𐧗𐧘𐧙𐧚𐧛𐧜𐧝𐧞𐧟𐧠𐧡𐧢𐧣𐧤𐧥𐧦𐧧𐧨𐧩𐧪𐧫𐧬𐧭𐧮𐧯𐧰𐧱𐧲𐧳𐧴𐧵𐧶𐧷𐧸𐧹𐧺𐧻𐧼𐧽𐧾𐧿𐨀𐨁𐨂𐨃𐨄𐨅𐨆𐨇𐨈𐨉𐨊𐨋𐨌𐨍𐨎𐨏𐨐𐨑𐨒𐨓𐨔𐨕𐨖𐨗𐨘𐨙𐨚𐨛𐨜𐨝𐨞𐨟𐨠𐨡𐨢𐨣𐨤𐨥𐨦𐨧𐨨𐨩𐨪𐨫𐨬𐨭𐨮𐨯𐨰𐨱𐨲𐨳𐨴𐨵𐨶𐨷𐨹𐨺𐨸𐨻𐨼𐨽𐨾𐨿𐩀𐩁𐩂𐩃𐩄𐩅𐩆𐩇𐩈𐩉𐩊𐩋𐩌𐩍𐩎𐩏𐩐𐩑𐩒𐩓𐩔𐩕𐩖𐩗𐩘𐩙𐩚𐩛𐩜𐩝𐩞𐩟𐩠𐩡𐩢𐩣𐩤𐩥𐩦𐩧𐩨𐩩𐩪𐩫𐩬𐩭𐩮𐩯𐩰𐩱𐩲𐩳𐩴𐩵𐩶𐩷𐩸𐩹𐩺𐩻𐩼𐩽𐩾𐩿𐪀𐪁𐪂𐪃𐪄𐪅𐪆𐪇𐪈𐪉𐪊𐪋𐪌𐪍𐪎𐪏𐪐𐪑𐪒𐪓𐪔𐪕𐪖𐪗𐪘𐪙𐪚𐪛𐪜𐪝𐪞𐪟𐪠𐪡𐪢𐪣𐪤𐪥𐪦𐪧𐪨𐪩𐪪𐪫𐪬𐪭𐪮𐪯𐪰𐪱𐪲𐪳𐪴𐪵𐪶𐪷𐪸𐪹𐪺𐪻𐪼𐪽𐪾𐪿𐫀𐫁𐫂𐫃𐫄𐫅𐫆𐫇𐫈𐫉𐫊𐫋𐫌𐫍𐫎𐫏𐫐𐫑𐫒𐫓𐫔𐫕𐫖𐫗𐫘𐫙𐫚𐫛𐫜𐫝𐫞𐫟𐫠𐫡𐫢𐫣𐫤𐫦𐫥𐫧𐫨𐫩𐫪𐫫𐫬𐫭𐫮𐫯𐫰𐫱𐫲𐫳𐫴𐫵𐫶𐫷𐫸𐫹𐫺𐫻𐫼𐫽𐫾𐫿𐬀𐬁𐬂𐬃𐬄𐬅𐬆𐬇𐬈𐬉𐬊𐬋𐬌𐬍𐬎𐬏𐬐𐬑𐬒𐬓𐬔𐬕𐬖𐬗𐬘𐬙𐬚𐬛𐬜𐬝𐬞𐬟𐬠𐬡𐬢𐬣𐬤𐬥𐬦𐬧𐬨𐬩𐬪𐬫𐬬𐬭𐬮𐬯𐬰𐬱𐬲𐬳𐬴𐬵𐬶𐬷𐬸𐬹𐬺𐬻𐬼𐬽𐬾𐬿𐭀𐭁𐭂𐭃𐭄𐭅𐭆𐭇𐭈𐭉𐭊𐭋𐭌𐭍𐭎𐭏𐭐𐭑𐭒𐭓𐭔𐭕𐭖𐭗𐭘𐭙𐭚𐭛𐭜𐭝𐭞𐭟𐭠𐭡𐭢𐭣𐭤𐭥𐭦𐭧𐭨𐭩𐭪𐭫𐭬𐭭𐭮𐭯𐭰𐭱𐭲𐭳𐭴𐭵𐭶𐭷𐭸𐭹𐭺𐭻𐭼𐭽𐭾𐭿𐮀𐮁𐮂𐮃𐮄𐮅𐮆𐮇𐮈𐮉𐮊𐮋𐮌𐮍𐮎𐮏𐮐𐮑𐮒𐮓𐮔𐮕𐮖𐮗𐮘𐮙𐮚𐮛𐮜𐮝𐮞𐮟𐮠𐮡𐮢𐮣𐮤𐮥𐮦𐮧𐮨𐮩𐮪𐮫𐮬𐮭𐮮𐮯𐮰𐮱𐮲𐮳𐮴𐮵𐮶𐮷𐮸𐮹𐮺𐮻𐮼𐮽𐮾𐮿𐯀𐯁𐯂𐯃𐯄𐯅𐯆𐯇𐯈𐯉𐯊𐯋𐯌𐯍𐯎𐯏𐯐𐯑𐯒𐯓𐯔𐯕𐯖𐯗𐯘𐯙𐯚𐯛𐯜𐯝𐯞𐯟𐯠𐯡𐯢𐯣𐯤𐯥𐯦𐯧𐯨𐯩𐯪𐯫𐯬𐯭𐯮𐯯𐯰𐯱𐯲𐯳𐯴𐯵𐯶𐯷𐯸𐯹𐯺𐯻𐯼𐯽𐯾𐯿𐰀𐰁𐰂𐰃𐰄𐰅𐰆𐰇𐰈𐰉𐰊𐰋𐰌𐰍𐰎𐰏𐰐𐰑𐰒𐰓𐰔𐰕𐰖𐰗𐰘𐰙𐰚𐰛𐰜𐰝𐰞𐰟𐰠𐰡𐰢𐰣𐰤𐰥𐰦𐰧𐰨𐰩𐰪𐰫𐰬𐰭𐰮𐰯𐰰𐰱𐰲𐰳𐰴𐰵𐰶𐰷𐰸𐰹𐰺𐰻𐰼𐰽𐰾𐰿𐱀𐱁𐱂𐱃𐱄𐱅𐱆𐱇𐱈𐱉𐱊𐱋𐱌𐱍𐱎𐱏𐱐𐱑𐱒𐱓𐱔𐱕𐱖𐱗𐱘𐱙𐱚𐱛𐱜𐱝𐱞𐱟𐱠𐱡𐱢𐱣𐱤𐱥𐱦𐱧𐱨𐱩𐱪𐱫𐱬𐱭𐱮𐱯𐱰𐱱𐱲𐱳𐱴𐱵𐱶𐱷𐱸𐱹𐱺𐱻𐱼𐱽𐱾𐱿𐲀𐲁𐲂𐲃𐲄𐲅𐲆𐲇𐲈𐲉𐲊𐲋𐲌𐲍𐲎𐲏𐲐𐲑𐲒𐲓𐲔𐲕𐲖𐲗𐲘𐲙𐲚𐲛𐲜𐲝𐲞𐲟𐲠𐲡𐲢𐲣𐲤𐲥𐲦𐲧𐲨𐲩𐲪𐲫𐲬𐲭𐲮𐲯𐲰𐲱𐲲𐲳𐲴𐲵𐲶𐲷𐲸𐲹𐲺𐲻𐲼𐲽𐲾𐲿𐳀𐳁𐳂𐳃𐳄𐳅𐳆𐳇𐳈𐳉𐳊𐳋𐳌𐳍𐳎𐳏𐳐𐳑𐳒𐳓𐳔𐳕𐳖𐳗𐳘𐳙𐳚𐳛𐳜𐳝𐳞𐳟𐳠𐳡𐳢𐳣𐳤𐳥𐳦𐳧𐳨𐳩𐳪𐳫𐳬𐳭𐳮𐳯𐳰𐳱𐳲𐳳𐳴𐳵𐳶𐳷𐳸𐳹𐳺𐳻𐳼𐳽𐳾𐳿𐴀𐴁𐴂𐴃𐴄𐴅𐴆𐴇𐴈𐴉𐴊𐴋𐴌𐴍𐴎𐴏𐴐𐴑𐴒𐴓𐴔𐴕𐴖𐴗𐴘𐴙𐴚𐴛𐴜𐴝𐴞𐴟𐴠𐴡𐴢𐴣𐴤𐴥𐴦𐴧𐴨𐴩𐴪𐴫𐴬𐴭𐴮𐴯𐴰𐴱𐴲𐴳𐴴𐴵𐴶𐴷𐴸𐴹𐴺𐴻𐴼𐴽𐴾𐴿𐵀𐵁𐵂𐵃𐵄𐵅𐵆𐵇𐵈𐵉𐵊𐵋𐵌𐵍𐵎𐵏𐵐𐵑𐵒𐵓𐵔𐵕𐵖𐵗𐵘𐵙𐵚𐵛𐵜𐵝𐵞𐵟𐵠𐵡𐵢𐵣𐵤𐵥𐵦𐵧𐵨𐵩𐵪𐵫𐵬𐵭𐵮𐵯𐵰𐵱𐵲𐵳𐵴𐵵𐵶𐵷𐵸𐵹𐵺𐵻𐵼𐵽𐵾𐵿𐶀𐶁𐶂𐶃𐶄𐶅𐶆𐶇𐶈𐶉𐶊𐶋𐶌𐶍𐶎𐶏𐶐𐶑𐶒𐶓𐶔𐶕𐶖𐶗𐶘𐶙𐶚𐶛𐶜𐶝𐶞𐶟𐶠𐶡𐶢𐶣𐶤𐶥𐶦𐶧𐶨𐶩𐶪𐶫𐶬𐶭𐶮𐶯𐶰𐶱𐶲𐶳𐶴𐶵𐶶𐶷𐶸𐶹𐶺𐶻𐶼𐶽𐶾𐶿𐷀𐷁𐷂𐷃𐷄𐷅𐷆𐷇𐷈𐷉𐷊𐷋𐷌𐷍𐷎𐷏𐷐𐷑𐷒𐷓𐷔𐷕𐷖𐷗𐷘𐷙𐷚𐷛𐷜𐷝𐷞𐷟𐷠𐷡𐷢𐷣𐷤𐷥𐷦𐷧𐷨𐷩𐷪𐷫𐷬𐷭𐷮𐷯𐷰𐷱𐷲𐷳𐷴𐷵𐷶𐷷𐷸𐷹𐷺𐷻𐷼𐷽𐷾𐷿𐸀𐸁𐸂𐸃𐸄𐸅𐸆𐸇𐸈𐸉𐸊𐸋𐸌𐸍𐸎𐸏𐸐𐸑𐸒𐸓𐸔𐸕𐸖𐸗𐸘𐸙𐸚𐸛𐸜𐸝𐸞𐸟𐸠𐸡𐸢𐸣𐸤𐸥𐸦𐸧𐸨𐸩𐸪𐸫𐸬𐸭𐸮𐸯𐸰𐸱𐸲𐸳𐸴𐸵𐸶𐸷𐸸𐸹𐸺𐸻𐸼𐸽𐸾𐸿𐹀𐹁𐹂𐹃𐹄𐹅𐹆𐹇𐹈𐹉𐹊𐹋𐹌𐹍𐹎𐹏𐹐𐹑𐹒𐹓𐹔𐹕𐹖𐹗𐹘𐹙𐹚𐹛𐹜𐹝𐹞𐹟𐹠𐹡𐹢𐹣𐹤𐹥𐹦𐹧𐹨𐹩𐹪𐹫𐹬𐹭𐹮𐹯𐹰𐹱𐹲𐹳𐹴𐹵𐹶𐹷𐹸𐹹𐹺𐹻𐹼𐹽𐹾𐹿𐺀𐺁𐺂𐺃𐺄𐺅𐺆𐺇𐺈𐺉𐺊𐺋𐺌𐺍𐺎𐺏𐺐𐺑𐺒𐺓𐺔𐺕𐺖𐺗𐺘𐺙𐺚𐺛𐺜𐺝𐺞𐺟𐺠𐺡𐺢𐺣𐺤𐺥𐺦𐺧𐺨𐺩𐺪𐺫𐺬𐺭𐺮𐺯𐺰𐺱𐺲𐺳𐺴𐺵𐺶𐺷𐺸𐺹𐺺𐺻𐺼𐺽𐺾𐺿𐻀𐻁𐻂𐻃𐻄𐻅𐻆𐻇𐻈𐻉𐻊𐻋𐻌𐻍𐻎𐻏𐻐𐻑𐻒𐻓𐻔𐻕𐻖𐻗𐻘𐻙𐻚𐻛𐻜𐻝𐻞𐻟𐻠𐻡𐻢𐻣𐻤𐻥𐻦𐻧𐻨𐻩𐻪𐻫𐻬𐻭𐻮𐻯𐻰𐻱𐻲𐻳𐻴𐻵𐻶𐻷𐻸𐻹𐻺𐻻𐻼𐻽𐻾𐻿𐼀𐼁𐼂𐼃𐼄𐼅𐼆𐼇𐼈𐼉𐼊𐼋𐼌𐼍𐼎𐼏𐼐𐼑𐼒𐼓𐼔𐼕𐼖𐼗𐼘𐼙𐼚𐼛𐼜𐼝𐼞𐼟𐼠𐼡𐼢𐼣𐼤𐼥𐼦𐼧𐼨𐼩𐼪𐼫𐼬𐼭𐼮𐼯𐼰𐼱𐼲𐼳𐼴𐼵𐼶𐼷𐼸𐼹𐼺𐼻𐼼𐼽𐼾𐼿𐽀𐽁𐽂𐽃𐽄𐽅𐽆𐽇𐽋𐽍𐽎𐽏𐽐𐽈𐽉𐽊𐽌𐽑𐽒𐽓𐽔𐽕𐽖𐽗𐽘𐽙𐽚𐽛𐽜𐽝𐽞𐽟𐽠𐽡𐽢𐽣𐽤𐽥𐽦𐽧𐽨𐽩𐽪𐽫𐽬𐽭𐽮𐽯𐽰𐽱𐽲𐽳𐽴𐽵𐽶𐽷𐽸𐽹𐽺𐽻𐽼

Problem 67

tp n ḥsb b'k-w n mnyw išt grt iy-n mnyw pn r irw² ḥr iw'·w⁴ 70 dd-n nyśw⁵ pn
Example of reckoning the dues¹ of a herdsman. Now then came herdsman this to the cattle-numbering under³ cattle 70. Said accountant this

n iw'·w n mnyw pn 'nd-wy⁶ ?⁷ pn⁸ in-n⁹ · k iw tr tny ?⁷ · k 'š;
of cattle to herdsman this, Small indeed is cattle-amount (?) this that hast brought thou. Is then where the cattle-amount (?) of thine great?

dd-n mnyw pn⁸ ḥr · f in-n⁹ · y n · k m 3̄ n 3̄ n iw'·w śyp-n¹⁰ · k n · y ḥsb n · y
Said herdsman this to him, What have brought I to thee is : 2/3 of 1/3 of the cattle which hast committed thou to me. Count for me and

| | | |
|---|--------------------------------|-------------------------------------|
| gm · k wy km·kwy ¹¹ | ir-t my ḥpr | nyś·ḥr · k 1 ḥnt 6 ¹² i8 |
| <i>will find thou me complete am I.</i> | <i>The doing as it occurs:</i> | <i>Call thou 1 out of 6 1/8.</i> |
| | 1 1 | 1 6 ¹² i8 |
| | 3̄ 3̄ | 2 3̄ 9 ¹³ |
| | 3̄ 3̄ | 4 3̄ 6 ¹² i8 |
| | 3̄ n 3̄ · f m 6 i8 | 2 9 |
| | <i>of of it :</i> | dmd 1. |
| | | <i>Total</i> |

ir-t 70¹⁴ ir 70 r sp-w 4 2̄ ḥpr(r)¹⁵ 315 n' pw śypy¹⁶ n · f
The making of 70: Make 70 up to times 4 1/2; there become 315. These, this is, which were committed to him.

| | | |
|------------------|-----|--|
| 1 | 315 | |
| 3̄ | 210 | |
| 3̄ ¹⁷ | 105 | |
| 3̄ n 3̄ · f | 70. | n' pw in-n ⁹ · f |
| <i>of of it</i> | | <i>These, this is, which brought he.</i> |

¹ Dues seems to us a better word than *produce* used by Griffith (volume 16, page 239) and Peet (page 110). *Produce* in terms of living animals would seem to mean only the young born since the animals were farmed out, or since the last payment of dues.

² From the stem of the verb *make, do*. This word has several meanings (Erman and Grapow, 1925, *Wörterbuch*, volume 1, pages 113-114) and it is generally held that the ox which accompanies it in this use is determinative only.

³ That is, *having with him*.

⁴ The sign here read iw' could also be read ih. The only phonetic writing of a word for cattle in the Rhind papyrus is iw' in Problem 84, line 2.

⁵ From the same stem as the verb *nyś, call*.

⁶ The particle *wy* is sometimes added to adjectives for emphasis. Gardiner suggests (1927, page 47 §49) that it is probably the masculine dual ending, which would make the meaning here *twice small*. The word has been rewritten on a patch and the extra stroke in the d of 'nd is the thumb of the original sign visible above the patch.

⁷ This word is unknown elsewhere and the reading is therefore uncertain. The sign is the same as that which occurs in the word š'ty in Problem 62. Note the less cursive hieratic form in line 2.

⁸ Cursive form. See Problem 56, footnote 3. Peet (Plate T and note c) reads the ligature in line 2 as horizontal plural strokes but calls attention to them by his "sic" and notes the resemblance to pn in line 3.

⁹ In the three occurrences of this verb in this problem an n has been omitted in the transliteration on the opposite plate. In each case we have a relative form; if it is imperative the n of the stem of this verb is doubled, if it is perfective the particle n (originally the preposition) is present. These forms are probably perfective since the context makes it likely, and the abbreviated writing is known elsewhere (Gardiner, 1927, page 305, end of §387). *Bring* is the ordinary meaning of iny. The sense *buy* of Problem 62 is not common.

¹⁰ Perfective relative form.

¹¹ The pseudo-participle (old perfective). For this use see Gardiner, 1927, page 240, § 315. See also Problem 35, footnote 1.

¹² See Problem 61, footnote 2. Peet notes the absence of dots with three of these signs, but refers to the first three instead of the last three. He does not note the absence of the dot with this sign elsewhere (in 2 divided by 9 and 17, and in Problems 17, 18, 31-33, 38, 42, 61, and 70).

¹³ This phrase may be merely a false start by the scribe, and, in any case it may read ir-tw 70, *one multiplies 70*.

¹⁴ Fractional dot omitted.

¹⁵ Participle.

¹⁶ Through confusion with the 100-sign Peet has placed an f after this fraction on his Plate T. His text is correct.

¹⁷ Redundant r.

PROBLEM 67

-d- -c- -b- -a-

f. 3 n 3
 07
 3n
 wp
 .ni
 f

513 (n) rpb
 f.n ypy 3 n
 513 1
 n 99
 012 3
 111 9
 11 111
 501 3

t
 07
 ni
 07
 w.p 3
 2 4

8i 6 1
 111 111 11
 9 3 2
 8i 6 3 4
 9 2 8i 6 m f. 3 n 3
 1 dmd 8i 6 tnh 1 k.rh.syn

1 1
 3 3
 3 3

1 1
 3 3
 3 3

wri r np wynn n . yi tng tsi wynn n w.k3b bsh n pt
 k.ni np ? yw.d n r np wynn n w3wi n np w3yn n.dd 07 w3wi rh
 n 3 n 3 m k.n y.ni f.rh np wynn n . dd 3sr k. ? y n t rt wi
 rpb ym t.ni ywk . mk yw k.mg yn bsh yn k.n . p y 3 w3wi

Problem 68

ir¹ dd n · k sš tsw-w 4 šhn²:n · šn šš 4-hk:t '[t] 100 (hk:t)³ iw is-t n-t tpy⁴ m s 12
 If says to thee the scribe, Foremen 4, have received they grain, quadruple hekat great, 100. Is the gang of the first : man 12.

| | | | | | | | |
|-----------------------|----------------------|-------------------------------|------------------------|----------------------|-------------------|---------------------|--------------------------------|
| tpy | s 12 | ir-hr · k ⁶ | wi-h-tp | ir ⁷ m sp | 12 n | tpy ⁹ | |
| The first | man | Make thou the operation | | making : times | for | the first | |
| šn-nw ⁵ | 8 | | | | | šn-nw ⁵ | |
| The second | | m 30 r gm-t | 100 | | 8 | the second | |
| hmt-nw | 6 | on 30 for the finding of 100; | | | 6 | hmt-nw | |
| The third | | hpr-hr | 3 š ir ⁷ m | | 4 | the third | |
| fdw-nw | 4 | there become 3 1/3, making in | | | | fdw-nw | |
| The fourth | | šš 3 4 16 64 r: 3 | | | | the fourth | |
| dmd | 30 | grain 3 1/4 1/16 1/64 ro 2/3, | | | | | |
| Total | | | | | | | |
| 1 | 3 4 16 64 r: 3 | 1 | 3 4 16 64 r: 3 | 1 | 3 4 16 64 r: 12 3 | 1 | 3 4 16 64 [r: 3] ¹³ |
| | ro | | ro | | ro | | ro |
| 2 | 6 2 8 32 3 " 3 | 2 | 6 2 8 32 3 " 3 | 2 | 6 2 8 32 3 " 3 | 2 | 6 2 8 32 3 " 3 |
| 4 | 13 4 16 64 " 3 | 4 | 13 4 16 64 " 3 | 4 | 13 4 16 64 [" 3 | 4 | 13 4 16 64 " 3 |
| 8 | 26 2 8 32 3 " 3 | 8 | 26 2 8 32 3 " 3 | | | | |
| dmd | 4 1 2 8 32 3 " 3 | dmd | 4 1 2 8 32 3 " 3 | dmd | hmt-nw 20 | dmd | fdw-nw 13 4 16 64 " [3] |
| tpy ¹¹ | 4 15 | Total | the second | Total of the third | | Total of the fourth | |
| Total of the first | | | | | | | |
| šhwy nn ¹⁴ | tsw-w | it | 4-hk:t | '[t] | | | |
| List of these: | Foremen | Barley ¹⁵ , | quadruple hekat great | | | | |
| | tpy 12 | 4 15 | 40 | | | | |
| | The first | 4 1 2 8 32 3 r: 3 | 26 3 | | | | |
| | šn-nw ⁵ 8 | ro | 20 | | | | |
| | The second | 20 | 20 | | | | |
| | hmt-nw 6 | 13 4 16 64 " 3 | 13 3 | | | | |
| | The third | 100 hk:t | 100 hk:t ¹⁶ | | | | |
| | fdw-nw 4 | hekat | hekat. | | | | |
| | The fourth | | | | | | |
| | dmd 30 | | | | | | |
| | Total | | | | | | |

¹ See Problem 62, footnote 8.
² This hekat-sign is superfluous since the word has already been written. Moreover, in combination with an ordinary numeral the hekat-sign should precede, not follow, the numeral. See footnote 16 below.
³ An adjective from the word for head. Unlike other ordinals it is not derived from the stem of the corresponding cardinal, which is w'. See Problem 63.
⁴ The ligature surely includes the w-bird in three of the writings of šn-nw in this problem. It is omitted in Peet's transcription (Plate T).
⁵ The short stroke to the right of this k is doubtless part of an earlier k now largely concealed by a patch. See Problem 66, footnote 4.
⁶ See note to Problem 47.
⁷ The scribe made no horizontal stroke in the letter p here.
⁸ The writing of 6 hekat in this problem and in Problem 82 resembles the abstract number 6 as written in 2 divided by 59 and in Problems 14 and 70. But this is not a common form for abstract 6 until some 300 years later, and the scribe may have intended the special sign for 6 hekat which occurs in Problem 84, line 3, and in the Illahün papyri (see Möller, 1909, volume 1, page 66), where it resembles the ordinary writing of 60.
⁹ When the papyrus was patched at this point the scribe did not notice that the vertical strokes of the tp-sign were visible, and instead of merely adding a loop he rewrote the sign completely on the patch.
¹⁰ Photograph XXV shows traces of finger-prints on a patch at this point. Whether they are ancient or modern even an examination of the original might not show.
¹¹ The scribe who wrote on the patch here omitted 1 1/3 ro, and he also omitted 2/3 ro at the end of the total below. The signs may not have been missing originally. In the total Peet gives the sign for one ro on Plate T, but allows it to appear as restored in his text.
¹² We have followed Peet in translating nn as though used in its absolute sense (Gardiner, 1927, page 86, §111), but we believe that it is also possible to render, List of these foremen. The arrangement of words does not seem to dictate a choice. The fact that nn ends the phrase in red ink is not important, nor, apparently, is the space between šhwy nn and tsw-w, for the latter appears to be rewritten on a patch, and may originally have been nearer the line above.
¹³ By a slip Peet uses the general term "corn" here.
¹⁴ The scribe should properly have omitted the hekat-sign here since this column is not on its face in hekat. In any case the hekat-sign should have preceded, not followed, the 100-sign, since numerals are written after their nouns except those in the hundred hekat notation, which precede the hekat-sign. See, for example, Problems 41-44, 46. Whole numbers of ro are also an exception.

PROBLEM 68

-d- -c- -b- -a-

46 6i 4 3 | 3 3n 46 6i 4 3 | 3 3n 46 6i 4 3 | 3 3n 46 6i 4 3 | ypt n 2i ps m ni
 3 3n 23 8 2 6 2 | 3 3n 23 8 2 6 2 | 3 3n 23 8 2 6 2 | 3 3n 23 8 2 6 2 | wn-nš 8
 3 3n 46 6i 4 3 0i 4 | 3 46 6i 4 3 0i 4 | 3 3n 46 6i 4 3 0i 4 | 3 3n 46 6i 4 3 0i 4 | wn-tmh 6
 3n 46 6i 4 3 0i wn-wdf dmd 02 | wn-tmh dmd | 3 3n 23 8 2 6 02 | 8 | 3 3n 23 8 2 6 02 | 8 | wn-wdf 4
 wn-nš 3 3n 23 8 2 1 4 | dmd 5 0i 4 | ypt dmd

šš nš-n · nšš 4 w-wst šš k-n dš ni
 2i s m ypt tn t-si wi 00i [t-]šc t-škḫ-4
 n 03 m pt-hšw k-nš-ni 2i 5 ypt
 3 3 nš-nph 00i t-mg 8 wn-nš
 3 3n 46 6i 4 3 šš m ni 6 wn-tmh
 n 03 dmd 4 wn-wdf

nn 04 | 5 0i 4 | 2i ypt
 3 62 | 3 3n 23 8 2 1 4 | 8 wn-nš
 n 02 | 02 | 6 wn-tmh
 3 31 | 3 3n 46 6i 4 3 0i | 4 wn-wdf
 00i | t-škḫ 00i | n 03 | dmd

-f-

Problem 69

nd hk:t 3 2 ir m ti:w 80 dy · k rh · y rht w't¹ im m nd dy · k rh · y pšw² · šn
 Meal, hekat 3 1/2, made into loaves 80. Cause thou that know I the amount of a unit therefrom in meal, cause thou that know I the pefsu of them.

ir·hr · k w:h-tp m 3 2 r gm·t 80
 Make thou the operation on 3 1/2 for the finding of 80.

| | | |
|---|----|-----|
| | 1 | 3 2 |
| | 10 | 35 |
| \ | 20 | 70 |
| \ | 2 | 7 |
| \ | 3 | 2 3 |
| \ | 21 | 6 |
| \ | 7 | 2 |

pšw 22 3/3 7 21³
 The pefsu is 22 2/3 1/4 1/21.

ir·hr · k w:h-tp m 80 r gm·t 1120
 Make thou the operation on 80 for the finding of 1120.

ir[·t]⁴ my hpr
 The doing as it occurs:

| | | |
|-------|----|------|
| | 1 | 80 |
| \ | 10 | 800 |
| \ | 2 | 160 |
| \ | 4 | 320 |
| dmd | | 1120 |
| Total | | |

ir rht w't n·t ti:w m nd 32 4 r⁵
 As for the amount of a unit of the loaves in meal, 1/32 4 ro [this is].⁵

| | | |
|---|---|-----------------|
| \ | 1 | 22 3 7 21 |
| \ | 2 | 45 3 4 14 28 42 |
| \ | 2 | 11 3 14 42 |

| | | |
|---|---|-----|
| \ | 1 | 320 |
| \ | 2 | 640 |
| \ | 2 | 160 |

dmd 1120 m r:·w
 Total in ro

| | | |
|----|----------|------------------|
| 1 | 32 | 4 r ¹ |
| | | ro |
| 2 | 16 64 | 3 " |
| 4 | 8 32 64 | " |
| 8 | 4 16 32 | 2 " |
| \ | 16 | 2 8 16 4 " |
| 32 | 1 4 8 64 | 3 " |
| \ | 64 | 2 2 4 32 64 " |

hpr nd hk:t 3 2
 There becomes meal : hekat 3 1/2.

¹ The sign here transcribed t seems the same as that which we read as w in Problems 63, lines 2 and 5, 83, line 3, and 86, lines 5 and 6, and one could read *one thereof* here. But we believe that w't was intended since it occurs in the statement of the answer in this problem and is shown to have been intended in Problem 70, lines 2 and d 3, by the following feminine genitive adjective n·t, although in both the latter cases the sign for t resembles that used here. Peet is not consistent in his transcription of the sign. He uses t in Problem 70, line 2, but has a dot in d 3 where t seems required. Where t would not be expected Peet has w (Problem 83, line 3), a short curved stroke (63 line 2, 86 lines 5 and 6), and a dot (63 line 5, 69 line 2). Where w is to be read it might be accounted for as a survival in hieratic of the old ending of the names of the units.

² We have followed Peet in transliterating all the consonants used in writing this word. The stem was originally written fšw. Later the pronunciation of the first consonant probably changed to that of p and a p was added, although the f was retained in writing. Late writings show pšw, with the unpronounced consonant abandoned. A similar phenomenon involving other consonants also occurs in Egyptian. On the meaning of *pefsu* in Problems 69-78 see volume 1, page 105.

³ Here should follow the operations designated d (proof of the *pefsu*) and e on the plate. They appear in their proper order in volume 1.

⁴ The patch at this point may conceal an earlier t.

⁵ The scribe omitted the word pw at the end of this sentence.

PROBLEM 69

-c- -b- -a-

| | | | | | | | | |
|----------------------------|----------------------------|--------------------------|----------------------|-------------------------------------|--------------------------------------|--|--------------------------------|----------------------------------|
|
08 1 12 7 3 22 w s f p |
01 08 m pt-h3w k-nh-ni |
06 1 2 02 1 1 t-mg n |
02 1 1 dmd 023 4 |
2 3 1 08 w-st m ni z s t-3kh dn |
01 53 dn m mi t-cw thn y-hn k-yd |
07 02 k-nh-ni ns w s f p y-hn k-yd |
7 2 08 t-mg n z s m pt-h3w |
3 2 3 08 t-mg n z s m pt-h3w |
|----------------------------|----------------------------|--------------------------|----------------------|-------------------------------------|--------------------------------------|--|--------------------------------|----------------------------------|

[wp] 3n4 23 dn m w-st tn t-cw thn ni

-g- -f- -e- -d-

| | | | | |
|--|---|--|------------------------------------|--------------------|
|
3n3 46 8 4 1 23 3n4 23 1 023 1 12 7 3 22 1 |
3n 46 23 4 2 2 46 3n 3 46 61 2 046 2 24 8 2 41 4 3 54 2 |
2 3 t-3kh dn nph 3n 46 23 8 4 061 2 24 41 3 11 2 |
3n 2 23 61 4 8 w-3n m 0211 dmd |
3n 4 61 8 2 61 |
|--|---|--|------------------------------------|--------------------|

Problem 70

nd hk̄i-t 7 2̄ 4̄ 8̄ ir m t̄-w 100 pty hr-t² w't³ n-t t̄-w im⁴ m nd pty pfšw · šn
 Meal, hekat 7 1/2 1/4 1/8, made into loaves 100. What is the basis of a unit of the loaves therefrom in meal? What is the pefsu of them?

ir-hr · k w:h-tp m 7 2̄ 4̄ 8̄ r gm-t 100
 Make thou the operation on 7 1/2 1/4 1/8 for the finding of 100.

| | | |
|---|---|------------|
| | 1 | 7 2̄ 4̄ 8̄ |
| | 2 | 15 2̄ 4̄ |
| ∖ | 4 | 31 2̄ |
| ∖ | 8 | 63 |
| ∖ | 3 | 5 4 |

dmd 99 2̄ 4̄ d̄i-t 4̄
 The total is 99 1/2 1/4, the remainder is 1/4.

63 8
 k̄i-b⁵ ty-t r 4̄
 Double the fraction for 1/4.

42 i26 4̄
 pfšw m 12 3̄ 42 i26
 The pefsu is : 12 2/3 1/42 1/126.

| | | |
|---|---|--------------------------|
| ∖ | 1 | 12 3̄ 42 i26 |
| ∖ | 2 | 25 3̄ 21 63 |
| ∖ | 4 | 50 3̄ i4 21 i26 |
| ∖ | 2 | 6 3̄ 84 252 |
| ∖ | 4 | 3 6 ⁶ 168 504 |
| ∖ | 8 | 1 2̄ i2 336 i008 |

dmd 2520⁷
 Total

ir-hr · k w:h-tp⁸ m 100 r gm-t 2520
 Make thou the operation on 100 for the finding of 2520.

| | | |
|---|----|------|
| | 1 | 100 |
| | 10 | 1000 |
| ∖ | 20 | 2000 |
| ∖ | 5 | 500 |
| ∖ | 5 | 20 |

ir hr-t w't n-t t̄-w m nd i6 64 5 pw
 As for the basis of a unit of the loaves in meal, 1/16 1/64 1/8 this is.

| | | |
|-----|----------------------|---------------|
| | 1 | i6 64 5 |
| | 10 | 2̄ 4̄ 32 2 r: |
| | | ro |
| 100 | nd hk̄i-t 7 2̄ 4̄ 8̄ | |
| | meal, hekat | |

¹ A special hieratic sign is used here and in Problems 75 and 84 for 7 hekat, and in Problem 53 for 7 setat.
² This is the word which we have translated *share* in Problems 63 and 66. See Problem 63, footnote 2.
³ An adverb derived from the preposition m. It occurs also in Problems 69, 76, and 78. Compare Problem 56, footnote 2. In the present case im is really superfluous since t̄-w, the word for which it would stand, is repeated.
⁴ See Problem 65, footnote 2. The sign read k̄i-b here and in Problem 65 has the value p̄hr in šp̄hr on the title page, line 2, and the value dbn in Problems 41-43, 47, 50, and 62.
⁵ See Problem 61, footnote 2.
⁶ See note to this problem in Volume 1. In the writing of 500 in 2520 one would expect to see the top of the 100-sign to the right of the dot at the bottom of the line, but it is not clear on Photographs XXIV and XXV and does not appear in the British Museum Facsimile.
⁷ The short vertical stroke below and to the left of the tp-sign seems accidental.

PROBLEM 70

-e- -d- -b- -a-

Handwritten cuneiform script in four columns, labeled -e-, -d-, -b-, and -a-. The script is dense and includes some red ink markings.

Transliterations and phonetic notations for the cuneiform above:

5 46 6i 1 pt-h3w k-nh-ni
 3n2 23 4 2 0i 0252 t-mg n 001 m
 8 4 2 7 t3kh dn 001 t-n t-w trh ni
 wp 5 46 6i dn m w-st
 62i 24 3 21 m wsfp
 62i 24 3 21 1
 36 12 3 52 2
 62i 12 4i 3 05 4
 25 2 48 3 6 2 4 t-3d 4 2 99 dmd 4 5 3
 405 86i 6 3 4
 800i 63 3 2i 2 1 8
 4 n t-qt b3k 8 36
 4 62i 24
 02 5 02 5,2 dmd

8 4 2 7 1 001 w-st m ni 8 4 2 7 t-3kh dn
 4 2 5i 2 001 t-mg n ni 001 t-n t-w trh ytp
 2 13 4 dn m mi w-st t-n t-w trh ytp
 36 8 k-nh-ni ns wsfp ytp
 4 n t-qt b3k 8 36
 4 62i 24

Problem 71

ḥk·t¹ dsy² 1 4 · f št·w³ ḥ·n⁴ · f dn⁵ m mw dp·n·tw⁶ · f r pšw⁷ m⁸
Beer, des 1; ¼ of it has been poured off, then has been it diluted with water. Has been weakened it to pefsu what?

ir·hr · k p⁹ ds 1 m bš¹⁰ ḥpr·hr bš¹⁰ 2¹⁰ ḥb·hr · k 4 · f m š d¹¹·t m 4 š
Make thou the des 1 in besha; there becomes besha ½. Take away thou ¼ of it, namely, ⅛; the remainder is : ¼ ⅛.

ir·hr · k 4 š r gm·t 1 ḥpr·hr 2 š pšw⁷ m¹¹ 2 š pw
Make thou ¼ ⅛ for the finding of 1; there become 2 ⅔; a pefsu of 2 ⅔ this is.

¹ In late times the word for beer was masculine and had the consonants ḥ, n, k. The n may either have intruded into the stem or have existed from the beginning, being for some reason omitted in the writing. However, the calligraphic reasons applying in other cases of omitted letters, as in *rm* (Problem 65), have little force here, as it seems to us. But see Gardiner 1927, page 52, § 59, and page 53, § 63.

² A vessel of fixed capacity used as a liquid measure (Peet, page 117). The ordinary writing of the word is *ds*; for another occurrence with the two diagonal strokes of the y see *Wörterbuch*, volume 1, page 552, under *pšw*.

³ The stem is *šty* but the y is omitted as is usual in most forms of verb-stems ending in y. The form appears to be the pseudo-participle (old perfective).

⁴ This verb, which we have met in Problems 32 and 64 (see the general note to each of these problems), is often used as an auxiliary and is followed by various forms of the principal verb, in this case the pseudo-participle (old perfective.) See Gardiner 1927, page 391 § 476, and page 394, § 482.

⁵ Griffith (1924 [1923], page 104) cites another occurrence of this stem in *Papyrus Anastasi V*, of a date some 400 years later than the Rhind papyrus (*Select Papyri . . . in the British Museum*, Plate CI, line 5). He suggests that the meaning there may be something like *mature*. The liquid determinative is absent from the word in *Anastasi V*.

⁶ We have followed Gunn (pages 135–136) in translating this rare word.

⁷ We have rendered the determinative of *pšw* here and in Problems 73, 74 (first occurrence), 75, and 77 by plural strokes only instead of by the loaf with strokes found on Peet's plates U and V.

⁸ The interrogative m is not an adjective and it must be considered here as in apposition to *pšw* (Gunn, page 136; see also Gardiner 1927, page 406, § 496).

⁹ The sign generally read *š*, as in this word and in *š*, *granary* (Problems 41–47), has the value *ḥ* in *ḥ·t* (Title-page, line 2, and Number 87), the name of the first season of the Egyptian year, but the hieratic sign in *ḥ·t* in this papyrus differs sharply from the sign when read as *š*, the three lotus blossoms being represented by a horizontal line in the former case. This difference appears also in earlier papyri but is not noticeable after the time of the Rhind.

¹⁰ As Peet points out (page 117), the scribe, after writing the determinative of *bš*, forgot that he ought to repeat the sign for the word *ḥk·t*. Moreover, he used the ordinary sign for ½ instead of the Horus-eye notation.

¹¹ As Gunn shows (page 135, middle), this is the use of m which is equivalent to the English *consisting of* and does not serve to introduce the predicate of a verbless sentence as does the m in the phrase *d¹¹·t m 4 š* above.

PROBLEM 71

1
 2
 3

1
 2
 3

m wsfp r f.wt.n.pd wmm nd f.n.chc wyts f.41 ysd t.kh
 k.rh.bh z 3 5 b rh.rph 3 5 b m l sd 3p k.rh.ni
 wp 3 2 m wsfp 3 2 rh.rph l t.mq r 8 4 k.rh.ni 8 4 m t.3d 8 t.kh m f.4

Problem 72

tp n db¹ t¹·w² m t¹·w my dd n · k t¹·w 10 r 100⁴ db¹ m 'h¹·t⁵ t¹·w 45
Example of exchanging loaves with³ loaves. If is said to thee, Loaves of 10, 100, exchanged with a number of loaves of 45.

ir·hr · k 'w⁶ n 45 r 10 hr·hr 35 ir·hr · k 10 r gm·t 35 hr·hr 3 2 ir·hr · k 100 r sp·w⁷ 3 2 hr·hr 350
Make thou the excess of 45 as to 10; there become 35. Make thou 10 for the finding of 35; there become 3 ½. Make thou 100 up to times 3 ½; there become 350.

w¹·h·hr · k 100 hr·ś⁸ hr·hr 450 dd·hr · k db⁹ pw t¹⁰ t¹·w 10 r 100 m t¹·w 45 r 450 ir¹¹ m wdy·t¹² 10.
Add thou 100 to it; there become 450. Say thou, The exchange this is: the loaves of 10, 100, with loaves of 45, 450, making in wedyet-flour 10 hekat.

¹ When a bi- or tri-literal sign is followed by one or more alphabetic complements the complementary letter corresponding to the last of the consonants represented by the sign is generally present. But this is not always the case when the last of the consonants represented by the sign is one of the weak consonants i, y, w, and r. In the case of db¹ there is no complementary i. Similarly, in the cartouche on the Title-page, line 2, in 'i there is a complementary ' but no i; and in wsr there is a complementary ś but no r.

² See Problem 63, footnote 1. This is the method of writing this word employed by the scribe who wrote on the patches. See also Problem 73, line 1.

³ Here for 100 loaves of pefsu 10 is written loaves of 10, 100, with a dot or a sign like the letter r between the numbers. In the same way, near the end of this problem, loaves of 45, 450 stands for 450 loaves of pefsu 45. Similar expressions occur in Problems 73-78. In the text we have used the letter r, but in the transliteration on the plates we have left a blank space between the numbers. From later texts it appears that the full form of this phrase read t¹·w m pśw X m hki:t, loaves which in the baking are so many from the hekat, or hki:t ds pśw X m hki:t, a des of beer of a brewing: X from the hekat. Compare Wörterbuch, volume 1, page 552. In certain cases in the Rhind (Problems 77 and 78) and elsewhere (see Peet, page 118) this dot or sign is also found before the number indicating the pefsu. In the Golenishchev papyrus, except in Problem 9, line 2, the number of loaves is placed immediately after the word for loaves, and the pefsu-indicator follows with the r-like sign or dot between. See Struve, 1930, Problems 5, 8, and 20, lines 1 and 2.

⁴ The third sign of this word here and in Problems 76 and 78 seems much more like a feminine t than like the heap of material used as determinative of the word 'h' which occurs in Problems 24-27, 30, 34 and 36. See Wörterbuch, volume 1, page 221. Peet (Plates V and W) reads the sign as the determinative found with 'h' in the earlier problems.

⁵ There may be an erased vertical stroke after sp as Peet suggests (Plate V, note b) but in any case there seem to be plural strokes written with a ligature which Peet has not transcribed.

⁶ The feminine suffix is used here because its antecedent is thought of as 100 (a feminine noun) multiplied 3½ times. The literal meaning of the preposition hr, as we have seen elsewhere, is upon.

⁷ Peet (page 118, bottom) and Gunn (page 136), in discussing db¹ pw t¹·w, etc., as a nominal sentence, translate *This is the exchange of the 100 loaves* . . . , as though t¹ were a direct genitive after db¹. Whether or not this construction is implied in their translations, we do not believe that it occurs here. While examples may be found of pw intervening before a direct genitive, in this papyrus the genitive after pw is elsewhere preceded by the genitive adjective n (originally ny). Compare "3 pw n mh 6" in Problem 43, "2 pw n pr-m-ws" in 59, "wnm pw n pi s 7" in 65, and "rht pw n pśw X" twice in 74. The sense seems to be *This is the exchange, namely, the 100 loaves, etc.*

⁸ Note that the complementary w follows the wd-sign instead of preceding it as would normally be the case with an alphabetic complement to the first consonant of a bi-literal sign. See Gardiner, 1927, page 51, §56, and references given. It should be borne in mind that the ordinary hieratic w is merely an abbreviation of the quail-chick which occurs in Problem 68 (śn-nw, lines 4, a2, and l2, and tsw-w, line e2) and on the Title-page (śfdw, line 2, and h¹w, line 3), and the hieratic abbreviation gave rise to the hieroglyphic form used here to transcribe it. Peet states (page 119) that the determinative of wdy·t (grain-measure with plural strokes) has been omitted by confusion with the hekat-sign (grain-measure alone) which he believes the scribe actually wrote to go with the vertical stroke for 10 hekat below. But the position of the stroke below is against this. Moreover, though the plural strokes are appropriate in wdy·t (which seems not to be known outside the Rhind) and do occur with it in Problems 73 line 2, 74 line 2 and a1, 75 line 1, and 78 line 3, they are absent in Problems 75 line 3, 76 lines 3 and 5, and 77 lines 2 and a1, as Peet has noted. Compare also the absence of plural strokes with śm' in Problem 74 line 1. In only one of these instances (Problem 77 line 2) or possibly two (Problem 75 line 3) does there seem any likelihood of confusion with a following hekat-sign resulting in omission. Finally, the vertical stroke for 10 hekat often stands alone without the grain-measure, not only where the word hekat may have occurred earlier in the Problem, but also, as in Problems 73 and 78, where the word hekat does not appear at all.

⁹ Peet (page 118, bottom) and Gunn (page 136), in discussing db¹ pw t¹·w, etc., as a nominal sentence, translate *This is the exchange of the 100 loaves* . . . , as though t¹ were a direct genitive after db¹. Whether or not this construction is implied in their translations, we do not believe that it occurs here. While examples may be found of pw intervening before a direct genitive, in this papyrus the genitive after pw is elsewhere preceded by the genitive adjective n (originally ny). Compare "3 pw n mh 6" in Problem 43, "2 pw n pr-m-ws" in 59, "wnm pw n pi s 7" in 65, and "rht pw n pśw X" twice in 74. The sense seems to be *This is the exchange, namely, the 100 loaves, etc.*

¹⁰ Compare footnote 8 above and see Problem 65, footnote 6.

¹¹ See Problem 66, footnote 4.

Problem 73

my dd n · k t'·w¹ 10 r 100² db: m pšw³ 15 wr⁴ pw r db: · š⁵
If is said to thee, Loaves of 10, 100, exchanged with pefsu 15; how many is this for the exchange of them?

ir·hr · k hr·t t'⁶ t'·w r 100 m wdy·t m (ky t'·w 10)⁷ ir·hr · k 10 r sp 15 hr·hr 150
Make thou the basis of the loaves 100 in wedyet-flour, namely, [10 hekat] Make thou 10 up to times 15; there become 150.

dd·hr · k db: · š pw
Say thou, The exchange of them this is.

| | | |
|--------------------------------|---|------------------|
| ir·t · my hr | t'·w 10 r 100 <u>db</u> : m t'·w 15 [r] 150 | 10 |
| <i>The doing as it occurs:</i> | <i>Loaves of 10, 100, exchanged with loaves of 15, 150;</i> | <i>10 hekat.</i> |

¹ See Problem 63, footnote 1, and 72, footnote 2.

² See Problem 71, footnote 7.

³ See Problem 72, footnote 8, and compare Problem 65, footnote 6.

⁴ This word occurs also in Problem 45, line 1.

⁵ See Problem 65, footnote 6.

⁷ The words in the parenthesis do not belong here. On the plate the parenthesis should include the number 10. Peet ingeniously suggests (page 119) that in the papyrus from which the Rhind was copied the words "m wdy.t m" came at the end of a line and that the first line of Problem 76 was very close at the left so that the copyist wrote on into 76 before realizing his mistake, and then forgot to erase these words and to insert "10 hekat." In this omission he was perhaps influenced by the presence of the abstract number 10 copied from Problem 76.

PROBLEM 73

1. $\tau \cdot n h$ $k \cdot n h \cdot n i$ $\acute{s} \cdot \acute{s} b d$ n $w p$ $n w$ $s i$ $w \acute{s} p$ m $\acute{s} b d$ $o o i$ $o i$ $w \cdot \acute{s} t$ $k \cdot n$ $d d$ $y m$

2. $o s i$ $n h \cdot n p h$ $s i$ $p s$ n $o i$ $k \cdot n h \cdot n i$ $o i$ $(w \cdot \acute{s} t$ $y k)$ m $t \cdot y d w$ m $o o i$ $w \cdot \acute{s} t$ $\acute{s} t$

3. $o i$ $o s i$ $s i$ $w \cdot \acute{s} t$ m $\acute{s} b d$ $o o i$ $o i$ $w \cdot \acute{s} t$ $n p h y m t \cdot n i$ $w p$ $\acute{s} \cdot \acute{s} b d$ $k \cdot n h \cdot d d$

Problem 74

ky t¹·w 5 r 1000¹ db² m 10 r 20² pty db² · f³
Another. Loaves of 5, 1000, exchanged with 10 and 20; what is the exchange of them?

pśy⁴·hr · k p⁵ t¹·w 5 r 1000 ḥpr·hr šm⁴ 200 ḥk¹·t dd·hr · k wdy·t pw
 Value thou the loaves of 5, 1000; there becomes, Upper Egyptian barley, 200 hekat. Say thou, The wedyet-flour this is.

ir·hr · k 2 n 200 ḥk¹·t m 100 ḥk¹·t ir·hr · k 100 ḥk¹·t sp 10 ḥpr·hr 1000 rḥt pw n pśw⁶ 10
 Make thou ½ of 200 hekat, namely, 100 hekat. Make thou 100 hekat times 10; there become 1000; the amount, this is, of pefsu 10.

ir·hr · k p⁷ 100 ḥk¹·t r sp 20 ḥpr·hr 2000 rḥt pw n pśw 20
 Make thou the 100 hekat up to times 20; there become 2000; the amount, this is, of pefsu 20.

ir·t my ḥpr
 The doing as it occurs:

t¹·w 5 r 1000 ir⁸ m wdy·t 200 ḥk¹·t
 Loaves of 5, 1000, making in wedyet-flour 200 hekat;

db² 10 “ 1000 100 “
 the exchange:
 “ 20 “ 2000 100 “

¹ See Problem 72, footnote 4.

² 10 r 20 here evidently means *loaves of pefsu 10 and 20*; not 20 loaves of pefsu 10 as might be thought.

³ Masculine singular suffix and article to agree with the number 1000. Compare Problems 72, footnote 8, and 65, footnote 6.

⁴ This appears to be the verb which ordinarily means *to cook*, from which the word pśw is derived, but having here a special reversed meaning, *to reduce to grain*. On the plate read y for w as the last consonant. It is unnecessary to write f in the stem here since the alphabetic sign does not occur in the original.

⁵ This is the equivalent of the more common it šm⁴. Compare it mḥ in Problem 83, lines 5 and 6.

⁶ See Problem 71, footnote 7.

⁷ The scribe wrote the masculine article here although both the numeral and the noun following are feminine. He perhaps still had in mind the article in line 1, which agrees with the masculine numeral 1000. See footnote 3 above.

⁸ See Problem 66, footnote 4.

PROBLEM 74

Handwritten script in three lines, numbered 1, 2, and 3 on the right. The script consists of various symbols and characters, some of which are red.

Facsimile transcription of the handwritten script, showing the symbols and their corresponding phonetic or alphanumeric values. The transcription is organized into three rows, numbered 1, 2, and 3 on the right.

Row 1: t:skh 002 t·y d w m ni 0001 5 w:st t:skh 002 (mš nh·rph 0001 5 w:st 3p k·nh·wšfp f:3bd ytp 02 n 01 m 3bd 0001 5 w:st yk

Row 2: t:skh 001 000,1 01 3 b d n wp thv 000,1 nh·rph 01 ps t:skh 001 k·nh·ni t:skh 001 m t:skh 002 n 2 k·nh·ni wp t·y d w k·nh·dd

Row 3: t:skh 001 000,2 02 3 b d rph ym t:ri 02 wšfp n wp thv 000,2 nh·rph 02 ps n t:skh 001 3p k·nh·ni 01 wšfp

Problem 75

ky t·w¹ 20 r 155² db: m pšw³ 30

Another. Loaves of 20, 155, exchanged with pefsu 30.

ir·hr · k p:⁴ t·w 20 r 155 m wdy·t hk̄i·t 7 ½ ¼ pw ir r sp 30 hpr·hr 232 ½
 Make thou the loaves of 20, 155, in wedyet-flour; hekat 7 ½ ¼ this is. Make up to times 30; there become 232 ½.

ir-t my · hpr
 The doing as it occurs:

t·w 20 r 155, ir⁵ m wdy·t 7 ½ ¼
 Loaves of 20, 155, making in wedyet-flour 7 ½ ¼.

db: m 30 " 232 ½, 7 ½ ¼.
 exchanged with

¹ The horizontal stroke in the hieratic representing the plural strokes is omitted in the British Museum Facsimile and Peet was thus led to omit the strokes on his Plate V.

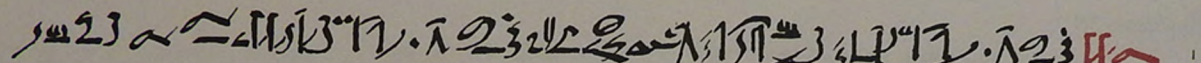
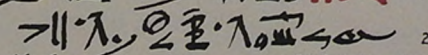
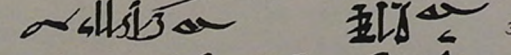
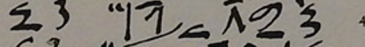
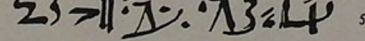
² See Problem 72, footnote 4.

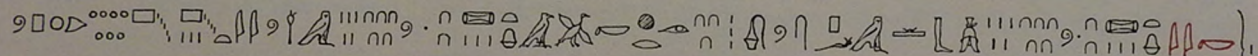
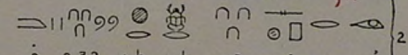
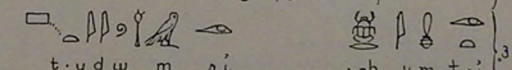
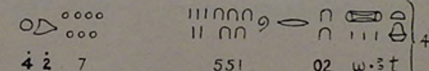
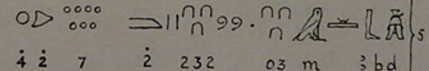
³ See Problem 71, footnote 7. The phrase pšw 30 here stands for a number of loaves of pefsu 30.

⁴ See Problem 65, footnote 6.

⁵ See Problem 66, footnote 4.

PROBLEM 75

1  1
 2  2
 3  3
 4  4
 5  5

1  1
 2  2
 3  3
 4  4
 5  5

wp 4 2 7 t.3kh t.ydw m 551 02 w.3t 3p k.lh.li 03 wsf p m 3bd 551 02 w.3t yk
 2 232 lh.lph 03 ps l li
 t.ydw m li lph ym t.li
 4 2 7 551 02 w.3t
 4 2 7 2 232 03 m 3bd

Problem 76

ky t¹-w 10 r 1000¹ db: m 'h¹-t² t¹-w 20 30 šdm · f
Another. Loaves of 10, 1000, exchanged with a number of loaves of 20 and 30. Shall hear he³.

| | | | | | | | | | | |
|-------|------|----|--|------------------------------------|---|------|----|------|---------|------|
| | 20 | 30 | | ir | r | gm-t | 30 | | 1 | 2 2̇ |
| | 1 2̇ | 1 | | <i>Make for the finding of 30.</i> | | | | \ 10 | | 25 |
| dmd | 2 2̇ | | | | | | | \ 2 | | 5 |
| Total | | | | | | | | | dmd 12. | |
| | | | | | | | | | Total | |

ir-hr · k hr-t p⁴ t¹-w 1000 m wdy-t m h̄k̄i-t 100 h̄k̄i-t ir sp 12 h̄pr-t⁵ im pw 1200
Make thou the basis of the loaves 1000 in wedyet-flour, in hekat: 100 hekat. Make times 12; what results therefrom this is: 1200.

db: · f⁴ m 20 30 t¹-w 10 r 1000 ir⁶ m wdy-t 100 h̄k̄i-t
The exchange of it is : 20 and 30. Loaves of 10, 1000, making in wedyet-flour 100 hekat.

| | | | |
|----|------|----|-------------------|
| 20 | 1200 | 2̇ | 10 |
| 30 | 1200 | 4̇ | 15 ⁷ . |

¹ See Problem 72, footnote 4.

² That is, *the scribe*, although none has been mentioned.

⁴ See Problem 74, footnote 3.


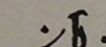



⁷ The diagonal stroke at the base of the sign for 5 *hekat* is a mistake.

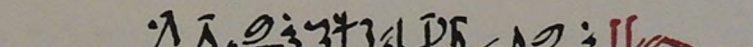
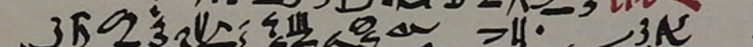
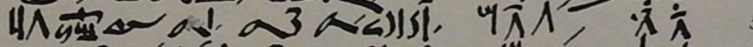
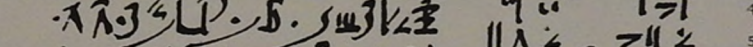
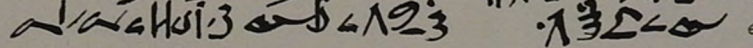
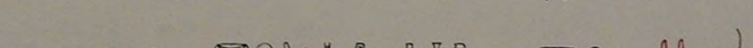
² See Problem 72, footnote 5.





























⁵ Participle.

⁶ See Problem 66, footnote 4.

PROBLEM 76

17.  .  .  .
 11x.  .  .

 1
 2
 3
 4
 5
 6

| | | | | |
|---|--|---|--|---|
|  .
01 2 |  .
002,1 |  .
02 |        |  |
|   .
5 01 4 |  .
002,1 |  .
03 |         |  |
| | | | 03 02 w-st t.ch(m 3 b d 000) 01 w-st | 4k |
| | | | m 000,1 w-st sp t.nh k.nh.ni | 2 2 1 |
| | | | 21 p5 ni t:3kh 001 t:3kh m t.y d w | 5 2 01 |
| | | | 03 02 m f.3 b d 002,1 wp mi t.nph | 1 2 1 |
| | | | t:3kh 001 t.y d w m ni 000) 01 w-st | 21 dmd 2 2 dmd |
| | | |    |  |
| | | | 03 t.mg n ni | 6 |

Problem 77

tp n db' h̄k-t m t̄i-w my dd n · k̄ h̄k-t ds 10 db' m p̄fšw¹ 5
Example of exchanging beer with loaves. If is said to thee, Beer, des 10, exchanged with pefsu 5.

ir-ḥr · k p̄i² h̄k-t ds 10 m wdy-t 5 pw ir-ḥr · k h̄k̄i-t 5 sp-w 5 ḥpr-ḥr 25 dd-ḥr · k db' · f³ pw
Make thou the beer des 10 in wedyet-flour, 5 this is. Make thou the hekat 5 times 5; there become 25. Say thou the exchange of it this is.

| | | | | | |
|--------------------------------|---------------------------------|---------------------|------------------------------|-----------------|-----------|
| ir-t my ḥpr | h̄k-t | ds 10 | wdy-t | h̄k̄i-t 5 | |
| <i>The doing as it occurs:</i> | <i>Beer,</i> | | <i>des 10, wedyet-flour,</i> | <i>hekat 5,</i> | |
| | db' m t̄i-w | 5 r 25 ³ | | | 5 |
| | <i>exchanged with loaves of</i> | <i>5, 25,</i> | | | <i>5.</i> |

¹ See Problems 71, footnote 7, and 75, footnote 3.
² Masculine to agree with ds. See Problem 65, footnote 6.
³ See Problem 72, footnote 4.

Problem 78

tp n dbi¹ t·w m hk·t my dd n·k t·w 10 r 100² dbi m 'h't³ hk·t 2
Example of exchanging loaves with beer. If is said to thee, Loaves of 10, 100, exchanged with a quantity of beer of 2.

ir·hr·k 10 r 100 m wdy·t 10 pw ir sp 2 hpr·t im pw 20. dd·hr·k
Make thou the loaves of 10, 100, in wedyet-flour; 10 hekat this is. Make times 2; what results therefrom this is: 20. Say thou

dbi⁴ · š⁵ pw
the exchange of it this is.

¹ The scribe first omitted the word dbi and then added it above the line.

² See Problem 72, footnote 4.

³ See Problem 72, footnote 5.

⁴ The British Museum Facsimile omits the curved stroke of the db i-sign.

⁵ Feminine to agree with the number 100, a feminine noun. See Problem 65, footnote 6.

Problem 79

| | | | |
|-------------------|---------------------------|--------|--------------------|
| w'.t ¹ | imy.t-pr (?) ² | pr-w | 7 |
| A | house-inventory (?) | houses | |
| 1 | 2,801 | myw-w | 49 |
| 2 | 5,602 | cats | |
| 4 | 11,204 ³ | pnw-w | 343 |
| | | mice | |
| dmd | 19,607. | bd-t | 2,301 ⁴ |
| Total | | spelt | |
| | | hk:t | 16,807 |
| | | hekat | |
| | | dmd | 19,607. |
| | | Total | |

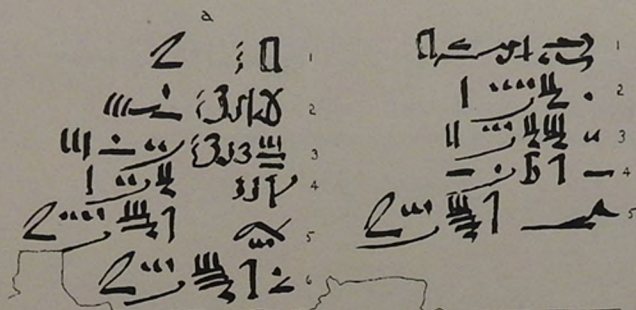
¹ This heading is very corrupt. The phonetic part of w'.t is clear but either the usual stroke determinative is absent or the imy-sign is not here. We agree with Peet (page 122) that w'.t imy.t-pr is as likely a reading as anything that can account for the hieratic as it stands, but we do not see how the stroke and the imy-sign can both be present as on Peet's Plate W. When the word w', *one*, precedes its noun the two are always connected at this period by the genitive n and one wonders whether the light horizontal stroke of the sign tentatively read imy is possibly an n added later. This would, of course, make the reading imy.t-pr impossible while it would restore the stroke to w'.t. The form used here would be most unusual for imy at this time. Elsewhere in the Rhind (Problems 65, 82-84, and 86, where it has the value wnm) the sign has two vertical strokes.

² The compound means *that which is in a house* and came to be the regular word for an *estate* in the legal sense. The first part of the word is an adjective from the preposition m.

³ Note the sign for 10,000.

⁴ Mistake for 2,401.

PROBLEM 79



| | |
|------------------|--------------------|
|
7 w-rp |
np-t-y-mi t-cw |
|
94 w-wym |
108,2 |
|
343 w-wnp |
206,5 |
|
103,2 t-db |
402,11 |
|
708,61 t-3kh |
706,91 dmd |
|
706,91 dmd | |

Problem 80

ir dbḥ¹ ḥ'y-w² im · f n iry-w-⁴wt³ n šn' ir m hnw
As for the vessel, it is measured with it for the functionaries of the granary, done in hinu:

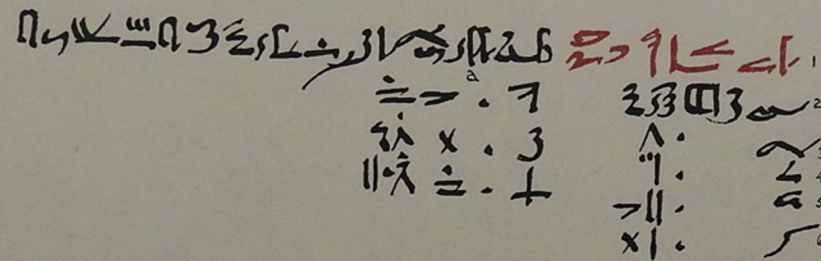
| | |
|---------|------|
| ḥk:t | 10 |
| a hekat | |
| 2 | 5 |
| 4 | 2 2 |
| 8 | 1 4 |
| 16 | 2 8 |
| 32 | 4 16 |
| 64 | 8 32 |

¹ As Gunn says (page 136, middle) the vessel known as dbḥ may have contained a *hekat*, which would give point to the heading of the problem. It may be the name for the cylindrical *hekat*-measure which appears in the old and middle kingdom tomb-reliefs and funerary models, and in the hieroglyphic writing of the word *hekat* and many other words. That the dbḥ is of wood is shown by its determinative, which represents the limb of a tree with lopped branches. This sign has also the phonetic value ḥt in many words, as, for example, in the name of the linear unit in Problems 49-52.

² This is probably the impersonal use of a finite passive form without expressed subject. See Gardiner, 1927, page 337 bottom and page 340 top. A passive participle might also be used here (Gardiner, 1927, page 293, § 376, and page 286, § 369), but it should be the imperfective (ḥ'y-w) of customary action. See Gunn, page 136, footnote 1. In the normal English word-order the phrase would read, *the vessel with which it is measured* or *with which one measures*. For the last sign in ḥ'y-w, as Gunn suggests (page 136, footnote 2), one would expect the arm as determinative, but what the scribe has actually written (influenced doubtless by the frequency of their occurrence under the grain-measure) seems to be the plural strokes.

³ The y of the adjective iry should have been written on the opposite plate. The title means literally, *those who are attached to the rooms or offices*. Compare iry-⁴ in Problem 65.

PROBLEM 80



 1. $\frac{3}{2} \cdot 7$ $\frac{3}{2} \cdot 3$

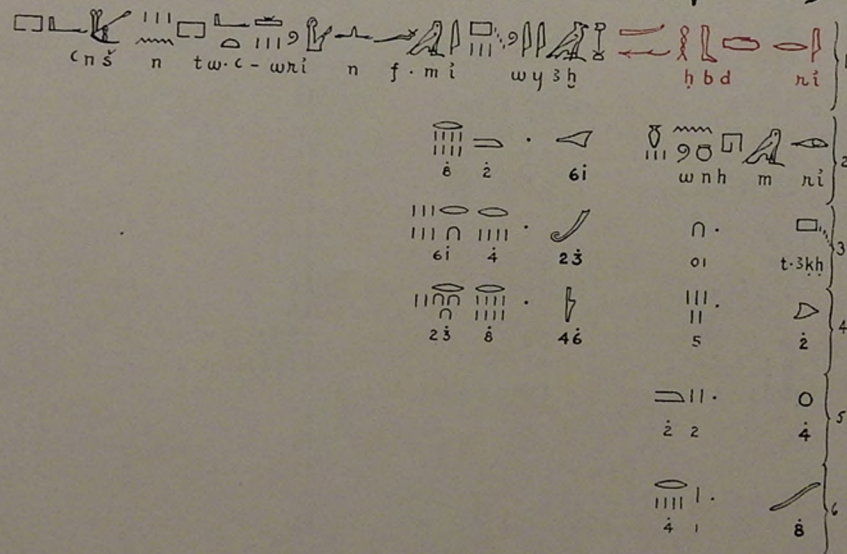
 2. $\frac{3}{2} \cdot 3$ $\frac{3}{2} \cdot 3$

 3. $\frac{3}{2} \cdot 3$ $\frac{3}{2} \cdot 3$

 4. $\frac{3}{2} \cdot 3$ $\frac{3}{2} \cdot 3$

 5. $\frac{3}{2} \cdot 3$ $\frac{3}{2} \cdot 3$

 6. $\frac{3}{2} \cdot 3$ $\frac{3}{2} \cdot 3$



 1. $\text{cns} \quad \text{n} \quad \text{tw.c-wri} \quad \text{n} \quad \text{f.mi} \quad \text{wysh} \quad \text{hbd} \quad \text{ni}$

 2. $\text{é} \quad 2 \quad 6i \quad \text{wnh} \quad \text{m} \quad \text{ni}$

 3. $6i \quad 4 \quad 23 \quad \text{oi} \quad \text{t-3kh}$

 4. $23 \quad 8 \quad 46 \quad 5 \quad 2$

 5. $2 \quad 2 \quad 4$

 6. $4 \quad 1 \quad 8$

Problem 81

ky hsb hnw
Another reckoning of the hīnu.

ir 2
As for 1/2 hekat
4
8
16
32
64

5
this is 5 hīnu
2 2
1 4
2 8
4 16
8 32

ir 8 16 4 r:
As for 1/8 1/16 4 ro
16 32 2 "
32 64 r:
ro
64 3 "
16 r: 3'

hnw 2 pw
hīnu 2 this is
" 1 "
" 2 "
" 4 "
" 3 "

5 pw n hkt
1/2 this is of a hekat
10 " " "
20 " " "
40 " " "
30⁵ " " "

ir¹ hkt 2 4 8
As for hekat 1/2 1/4 1/8

m hnw 8 2 4 pw
in hīnu 8 1/2 1/4 this is
7 2 "
6 2 16

32
64⁶
2
4
2 4
2 4 8
2 8
4 8
2 8 32 3 " 3
4 16 64 r: 3
ro

n hnw 3 pw
of a hīnu 1/3 this is
" 5 "
" 5 "
2 2 "
7 2 "
8 2 [4] "
" 6 4 "
" [3] 2 4 "
" 6 3 "
" 3 3 "
" 1 4 "
" 2 8 "
4 16 pw n hnw
this is of a hīnu
8 32 "
8 " " "
16 " " "
32⁷ " " "
64 " " "

60 " " "
50 " " "
2 " " "
4 " " "
2 4 " " "
2 4 8 " " "
2 8 " " "
4 8 " " "
3 " " "
3 " " "
8 " " "
16 " " "
32⁷ " " "
64 " " "

3 pw n hkt
2/3 this is of a hekat:
5 " " "
3 " " "
7 " " "
4 " " "
5 " " "
[6] " " "

2 8 32 3 r: 3
ro
2 8
4 8
2 32 64 r: 3
ro
4
8 16 4 "
[8] 32 3 " 3

2 2
2
1 [3]

8
16
32
64

There are many numerical mistakes in the original and they remain uncorrected here. For probable corrections see volume 1, pages 113-115.

¹ Just to the right of this word on Photograph XXVI appears what looks like an oblique pen-stroke. It is impossible to state what it is without an examination of the original. That it is not a hole seems likely from its non-appearance in Photograph IV.
² The scribe seems clearly to have written here the sign for 1/2 hekat rather than a "hybrid between 1/4 and 1/2", as Peet (Plate W, note d) describes the sign.
³ See note to Problem 47.
⁴ Below this expression at the edge of the papyrus, Peet observed (page 123, footnote 2) what may be the upper part of the signs for 1/16 hekat and 1/8, perhaps originally a repetition of the expression above. These signs may be seen in Photograph XXVI at the lower edge near the left, and they have been copied in the hieratic facsimile on the opposite plate.
⁵ Peculiar form. Perhaps the scribe first wrote 20 and then corrected to 30.
⁶ Following this the scribe first wrote r:3 and then crossed it out.
⁷ The scribe omitted the fractional dot.

PROBLEM 81

a

Handwritten cuneiform text in red ink, arranged in several columns. The text is partially obscured by a white line.

b

Handwritten cuneiform text in black ink, arranged in several columns. The text is partially obscured by a white line.

c

Handwritten cuneiform text in red ink, arranged in several columns.

d

Handwritten cuneiform text in black ink, arranged in several columns.

e

Handwritten cuneiform text in red ink, arranged in several columns.

Legend for cuneiform signs:

- t-3kh n wp 23
- t-3kh n wp 46
- wp 2 w n h
- wp 1 w n h
- wp 2 w n h
- wp 3 w n h
- wp 4 w n h
- wp 5 w n h
- wp 6 w n h
- wp 7 w n h
- wp 8 w n h
- wp 9 w n h
- wp 10 w n h
- wp 11 w n h
- wp 12 w n h
- wp 13 w n h
- wp 14 w n h
- wp 15 w n h
- wp 16 w n h
- wp 17 w n h
- wp 18 w n h
- wp 19 w n h
- wp 20 w n h
- wp 21 w n h
- wp 22 w n h
- wp 23 w n h
- wp 24 w n h
- wp 25 w n h
- wp 26 w n h
- wp 27 w n h
- wp 28 w n h
- wp 29 w n h
- wp 30 w n h
- wp 31 w n h
- wp 32 w n h
- wp 33 w n h
- wp 34 w n h
- wp 35 w n h
- wp 36 w n h
- wp 37 w n h
- wp 38 w n h
- wp 39 w n h
- wp 40 w n h
- wp 41 w n h
- wp 42 w n h
- wp 43 w n h
- wp 44 w n h
- wp 45 w n h
- wp 46 w n h
- wp 47 w n h
- wp 48 w n h
- wp 49 w n h
- wp 50 w n h
- wp 51 w n h
- wp 52 w n h
- wp 53 w n h
- wp 54 w n h
- wp 55 w n h
- wp 56 w n h
- wp 57 w n h
- wp 58 w n h
- wp 59 w n h
- wp 60 w n h
- wp 61 w n h
- wp 62 w n h
- wp 63 w n h
- wp 64 w n h
- wp 65 w n h
- wp 66 w n h
- wp 67 w n h
- wp 68 w n h
- wp 69 w n h
- wp 70 w n h
- wp 71 w n h
- wp 72 w n h
- wp 73 w n h
- wp 74 w n h
- wp 75 w n h
- wp 76 w n h
- wp 77 w n h
- wp 78 w n h
- wp 79 w n h
- wp 80 w n h
- wp 81 w n h
- wp 82 w n h
- wp 83 w n h
- wp 84 w n h
- wp 85 w n h
- wp 86 w n h
- wp 87 w n h
- wp 88 w n h
- wp 89 w n h
- wp 90 w n h
- wp 91 w n h
- wp 92 w n h
- wp 93 w n h
- wp 94 w n h
- wp 95 w n h
- wp 96 w n h
- wp 97 w n h
- wp 98 w n h
- wp 99 w n h
- wp 100 w n h

Problem 82

htr 'kw n nmt-t-;pd-w (?)¹ ir m t'-w m hr-t² hrw
Estimate of the food of a fowl-yard, made in loaves as the portion of a day.

| | | |
|--|--------------|------------|
| r' šd ³ wnm ⁴ ;pd 10 | wdy-t | 2 2̇ |
| Goose fatted eats, bird 10, | wedyet-flour | 2 1/2; |
| ir ⁵ n hrw 10 | | 4 |
| Making for day 10 | | 25; |
| ir n hrw 40 | | 100 hk':t |
| Making for day 40 | | 100 hekat. |

| | | |
|---|--------------------------------------|-----------------------|
| nt-t ⁶ r nđ (?) ⁷ f bd-t ⁸ (?) hk':t | 100 hk':t 2 10 6 2 8 33 | 3 r' 3 |
| That which is to be ground to produce (?) it is spell | hekat 100 hekat 50 10 6 1/2 1/8 1/32 | 3 ro 1/3, |
| šw-t ⁹ " 3 4 8 ¹⁰ | 4 16 64 | r' 3 |
| wheat | 33 1/3 25 8 | 1/4 1/16 1/64 ro 3/8. |

| | | | |
|---|---|--------------|-----------|
| nt-t r hb-t hft 10 | 6 | 2 8 32 | 3 r' 3 |
| That which is to be taken away according to 1/10 is | 6 | 1/2 1/8 1/32 | 3 ro 1/3. |

| | | | |
|---|------------------------|---------------|---------|
| d':t nt-t r rd-t | 2 10 ¹¹ 4 8 | 4 16 64 | r' 3 |
| The remainder, which is to be given, is | 50 10 25 8 | 1/4 1/16 1/64 | ro 3/8; |

| | | | |
|---------------------------|------------------------|---------------|---------|
| ir m šš m hk':t, | 2 10 ¹¹ 4 8 | 4 16 64 | r' 3 |
| Making in grain in hekat, | 50 10 25 8 | 1/4 1/16 1/64 | ro 3/8; |

| | | | |
|-------------------------|----------------------|--------------|----------------------|
| ir m 2-hk':t | 20 ¹¹ 4 2 | 2 4 64 | 3 r' 3 ¹² |
| Making in double hekat, | 20 25 2 | 1/2 1/4 1/64 | 3 ro 1/3. |

Problem 82B

rht šd wnm-t¹³ f ;pd 10 1 4̇
Amount of a fatted bird, the food of it, bird 10 1 1/4;

| | |
|--------------------------|----------------------|
| ir ⁵ n hrw 10 | 10 2 4 ¹² |
| Making for day 10 | 10 2 1/4; |
| | 40 |
| | 2 |
| | 40 |
| | 50; |

| | |
|----------------------------------|--|
| ir n šš m 2-hk':t | 10 10 3 2 4 8 4 r' 4 6 6 ¹² |
| Making of grain in double hekat, | 10 10 3 1/2 1/4 1/8 4 ro 1/4 1/8 1/8. |

¹ Literally *walk* (that is, *walking-place*) of fowls. The reading nmt-t-;pd-w was suggested by Griffith (in his review listed in the Bibliography under Peet, 1923, 1). As we know from the tomb-reliefs the fowl-yard was a rectangular enclosure of poles, between which netting was presumably hung. In the center was a pool of water, whence, probably, the water determinative of nmt-t.

² Translated *share* and *basis* in other Problems. See Problem 66, footnote 2.

³ Literally *nourished*. The stem is actually šdy. We know from the tomb-reliefs that geese were often fattened by forcible feeding.

⁴ Pseudo-participle (old perfective).

⁵ See Problem 43, footnote 3. The word also occurs in Problem 62, line 3.

⁶ One wonders whether the document from which the Rhind was copied can have had the verb ir-t at this point, and, preceding it, the arm holding a tool, determinative of nđ, with the preposition r beneath it, the latter two signs having been made as a ligature which was misread as part of the writing of nđ. We should then have had nđ r ir-t.f.

⁷ If bd-t was intended the ligature following the word-sign is perhaps t over two diagonal strokes, although that without more is unusual. Peet's reading of the ligature (given also in Gardiner, 1927, page 198, example 17) is a small circle over plural strokes. The word hk':t following bd-t and šw-t has been omitted from the transliteration on the opposite plate.

⁸ This word was originally written sw-t, with the other s.

⁹ Note that in these places the sign for 10 hekat precedes the 1/4-sign used for 25 hekat.

¹⁰ Here and in lines 9, 10, and 15 below occurs the special sign for 8 hekat.

¹¹ Mistakes in lines 11, 13, and 15 are corrected in volume 1.

¹² Or the relative n-form of the verb from the same stem, *which it eats*, in which case one would expect for determinative the man with hand at his mouth which Peet suggests was intended here.

PROBLEMS 82 AND 82B

82

(?) w.dp3-t.tmn n w.kc n.t.h

t.y.d.w w.n.h t.n.h m w.3.t m n.i

oi dp3 m.n.w d.s 3.n

oi w.n.h n.n.i

oi w.n.h n.n.i

t.w.s

oi t.f.h t.b.h n.t.tn

t.d.n n.t.tn t.3.d

t.3.kh m s.s m n.i

t.3.kh-2 m n.i

oi dp3 f.t.m.n.w d.s t.h.n

oi w.n.h n.n.i

oi

t.3.kh-2 m s.s n.n.i

6 6 4 3.n.4 8 4 2 3 oi oi

82

82 B

15

14

13

12

11

10

9

8

7

6

5

4

3

2

1

Problem 83

ir 'kwn r: 4 htmy-t¹ it mh hnw pw
 As for the food of goose 4 of those that are shut up, barley Lower-Egyptian², a hînu this is;

hr-t³ w'w⁴n r: 64 3 r:
 the portion of one of goose is 1/64 hekat 3 ro.

ir 'kwn r: 'k·f r sš⁵ it mh hk:t⁶ 16 32 2 r:
 As for the food of a goose goes it into the pond, barley Lower-Egyptian hekat 1/16 1/32 2 ro,

hnw pw n r: 1
 a hînu this is for goose 1;

ir⁷ n r: 10 it mh hk:t⁶
 Making for goose 10 barley Lower-Egyptian a hekat;

hrw⁸ 10 hk:t 10
 For day 10 hekat 10;

ibd⁹ 4 5.
 For a month 25 5

hr-t hrw m 'kwn r: šd¹⁰ wnm¹¹
 The portion of a day in food for a goose fattened, it eats

| | | | |
|-------------------|-------|----------------|-------------------|
| | 8 32 | 3 r: 3 | pd 1 |
| | | hekat 3 ro 1/2 | bird |
| trp ¹² | 8 32 | 3 " 3 | " 1 |
| A terp-goose | | | |
| d:t | 8 32 | 3 " 3 | 1 |
| A crane | | | |
| sr ¹³ | 32 64 | r: | 1 |
| A ser-goose | | ro | |
| š-t ¹³ | 64 | 3 " | 1 |
| A set-duck | | | |
| mnw-t | | 3 " | 1 |
| A dove | | | |
| p'r-t | | 3 " | 1. |
| A quail | | | |
| | | | dmd ¹⁴ |
| | | | Total |

¹ From a stem htm meaning *to close, seal*. The above word appears to be a collective noun, but, as Gunn says (page 136), it may mean *pen* or *coop*. The reference is presumably to geese fattened in a coop and not allowed the freedom of the fowl-yard.

² That is, of the Delta. The writing of the compound word is evidently corrupt here. It is on a patch.

³ The word for *one* when written phonetically sometimes precedes its noun and in that case is connected with it, as here, by the genitive adjective. On the third sign in the word see Problem 69, footnote 1.

⁴ It is perhaps more likely that the stick and grain-measure in these two lines represent the word hk:t than that they are part of the writing of it mh, as suggested on the plate. This is borne out in the second line, where we should certainly expect hk:t to end the statement. The first grain-measure in this line must then be considered a part of the word it.

⁵ See Problem 66, footnote 4.

⁶ See Title-page, footnote 3, and Gardiner, 1927, page 475.

⁷ A goose is used as general determinative in the names of birds, and even of insects.

⁸ The scribe has transposed the first consonants in these two words, which are properly šr and s-t.

⁹ A total, probably of *hekat*, has been omitted by the Rhind scribe, and perhaps was lacking also in the text from which he copied.

¹⁰ See Problem 66, footnote 2.

¹¹ The sign shows ducks' heads protruding from a pond.

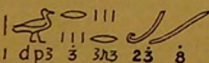
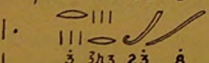
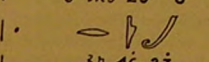
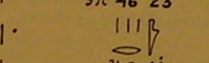
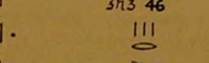
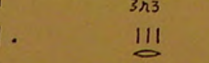
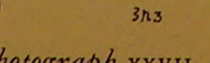
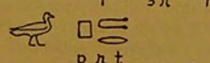
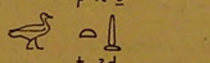
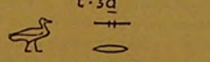
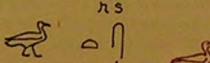
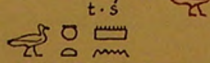
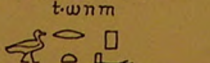
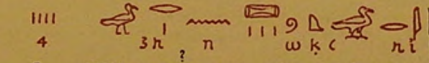
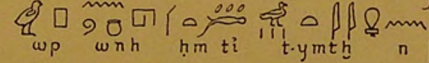
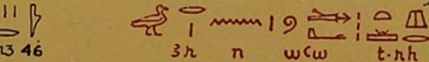
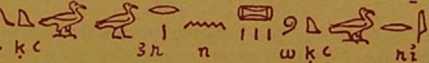
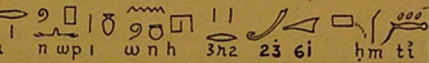
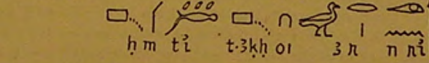
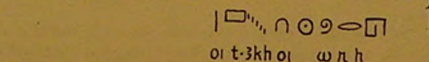
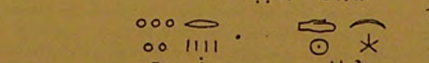
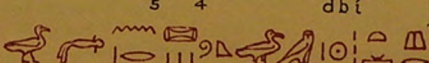
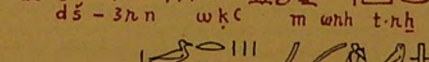
¹² The sun-disk has been omitted by Peet in his transcription of this word (Plate X).

¹³ See Problem 82, footnote 3.

¹⁴ Pseudo-participle (old perfective).

PROBLEM 83

1. IIII 215 215
 2. 215 215 215
 3. 215 215 215
 4. 215 215 215
 5. 215 215 215
 6. 215 215 215
 7. 215 215 215
 8. 215 215 215
 9. 215 215 215
 10. 215 215 215

| | | |
|--|--|--|
| <p> 
 1 dp3 3 3n3 23 8
 
 3 3n3 23 8
 
 3n 46 23
 
 3n3 46
 
 3n3
 
 3n3
 
 3n3 </p> | <p> 
 p n t
 
 t.3d
 
 ns
 
 t.s
 
 t.wnm
 
 t.ncp </p> | <p> 
 4 3n ? n w k c n i
 
 w p w n h h m t i t y m t h n
 
 3n3 46 3n n w c w t n h
 
 s s n f . k c 3n n w k c n i
 
 3n n w p i w n h 3n2 23 6i h m t i
 
 h m t i t 3 k h o i 3n n i
 
 o i t 3 k h o i w n h
 
 o o o 1 1 1 1 1 d b i
 
 d s - 3n n w k c m w n h t n h
 
 1 dp3 3 3n3 23 8 m n w </p> |
|--|--|--|

Photograph xxvii, Registers 4-5. B. M. Facsimile, Plates XIX-XX

Problem 84

ḥtr 'kw md-t n-t iw:w
 Estimate of the food of a stable of oxen.

d¹ :t² t¹-w ḥk:t
 Put down (?), loaves³ of a hekat.

d 'š: ḥk:t
 Put down common food by the hekat.

| | | | | | |
|--------------------------|----|-----------------------------|-----------------|------------------------|-------------------|
| iw: wnm ⁴ | 4 | nfr | šm' | 20 4 | 2 |
| Ox, that which eat | 4 | fine one, Upper Egyptian ox | | 20 4 hekat | 2 hekat |
| | 2 | nfr | šm' | 20 2 | 6 ⁵ |
| | 2 | fine one, Upper Egyptian ox | | 20 2 " | 6 " |
| | 3 | 'š: 6 | (?) | 20 | 2 |
| | 3 | common one, foreign (?) ox | | 20 " | 2 " |
| nn wnm ⁷ | 1 | (?) | | 20 | |
| That which eats | 1 | foreign (?) ox | | 20 " | |
| dmd | | | | 8 ⁸ 6 | 10 |
| Total | | | | 8 6 " | 10 " |
| ir ⁹ m bd-t | | | ḥk:t | 9 ¹⁰ | 7 ¹¹ 2 |
| Making in spell | | | hekat | 9 " | 7 1/2 " |
| ir n hrw-w ¹² | 10 | | " ¹³ | 2 4 10 5 | 2 4 |
| Making for days | 10 | | | 50 25 10 5 | 50 25 |
| ir n ibd ¹⁴ | | | " | 200 ḥk:t ¹⁵ | 2 4 10 5 |
| Making for a month | | | | 200 hekat | 50 25 10 5 |
| ir m 2-ḥk:t | | | | 2 10 1 2 8 3 r: | 4 5 |
| Making in double hekat | | | | 50 10 1 1/2 1/8 3 ro | 25 5 |

One can only agree with Peet (page 127) that "with this problem the papyrus reaches its limit of unintelligibility and inaccuracy." We have in the main followed Peet's readings and explanations, but have made certain guesses which differ from his.

¹ This form is conceivably from wdy, *put*, which is often written with alphabetic d alone. It is perhaps an imperative or an infinitive with passive meaning. Masculine infinitives of this verb are known, although it belongs to the class of verbs having for their third radical a weak consonant, which normally have a feminine infinitive. If d is a form from wdy these two sentences might be freely rendered in English as *Given X . . . Given Y* for the alternative kinds of food. ² Perhaps the name of a special kind of food.

³ If the reading *loaves* is correct it is in line with Problem 82, where another kind of grain-eating domestic animal receives what is called *loaves* or *bread* prepared from flour.

⁴ This is likely to be the relative form of the verb, though one would expect the feminine t to be present since there is no definite antecedent.

⁵ The special sign for 6 hekat.

⁶ It is likely that 'š: is parallel with nfr in the last two lines preceding and that another word is to be read which corresponds to šm' above. On the plate the letters of 'š: should be placed under the lizard and an interrogation mark should represent the transliteration of the unknown word written with the stick and the ox.

⁷ From his translation, *Total of this food*, it would seem that Peet reads the phrase nn wnm after dmd in the line below. There seems no evident reason for the scribe's having intended this, since he had room to write nn wnm in the same line with dmd; moreover, nn wnm, though unnecessary, is parallel with wnm in line 2.

⁸ This 8 was obtained by mistakenly adding up the 10-hekat strokes as units. The units of hekat were added separately and their total is recorded by means of the special sign for 6 hekat.

⁹ For this and the three similar forms in succeeding lines see Problem 66, footnote 4.

¹⁰ The special sign for 9 hekat.

¹¹ The plural ending has been omitted in the transliteration on the plate.

¹² The hieratic sign here and in the line below is the equivalent of *ditto*. It is found also in Number 86 and in other papyri. Its hieroglyphic counterpart is not known. On the plate we have followed Peet as to the form used in the hieroglyphic transcription.

¹³ See Problem 83, footnote 9.

¹⁴ The figures for a month and in the resolution into double hekat are obviously incorrect.

PROBLEM 84

2. 1. 2. 3. 4. 5. 6. 7. 8. 9. 10.
 2. 1. 2. 3. 4. 5. 6. 7. 8. 9. 10.
 2. 1. 2. 3. 4. 5. 6. 7. 8. 9. 10.
 2. 1. 2. 3. 4. 5. 6. 7. 8. 9. 10.
 2. 1. 2. 3. 4. 5. 6. 7. 8. 9. 10.
 2. 1. 2. 3. 4. 5. 6. 7. 8. 9. 10.
 2. 1. 2. 3. 4. 5. 6. 7. 8. 9. 10.
 2. 1. 2. 3. 4. 5. 6. 7. 8. 9. 10.
 2. 1. 2. 3. 4. 5. 6. 7. 8. 9. 10.
 2. 1. 2. 3. 4. 5. 6. 7. 8. 9. 10.

t-3kh 35c ? d t-3kh w-3t t-3 d w-3wi t-n t-dm wkc nth
 oo 42 (m5 nfn 4 m n w 3wi
 2 oo 22 (m5 nfn 2
 6 oo 02 3 3 c 3
 2 oo 02 m n w n n
 | 01 6 8 d m d
 2 7 9 t-db m ni
 4 2 5 01 4 2 n 01 w n h n ni
 5 01 4 2 t-3kh 002 3 d b i n ni
 5 4 3n3 8 2 1 01 2 (t-3kh-2 m ni

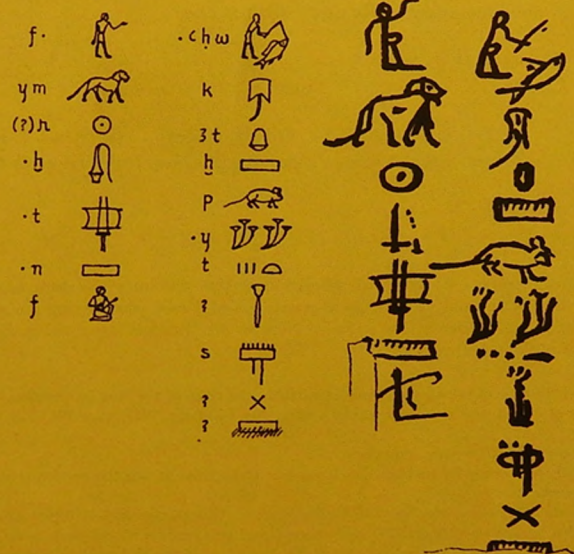
Photographs xxvii-xxviii, Registers 1-3 B. M. Facsimile, Plate xx

Number 85

wh' · k t: ḥpy:t . . . s . . . f my rḥ·t·n · f
Interpret thou the strange thing he, according to what knew he.

The text is written in what is known as "cursive hieroglyphic," with signs made more carefully than in hieratic. Gunn seems to have rightly recognized it as an example of the so-called "enigmatic writing." It appears to be the only known inscription of the kind which is earlier than the XVIII dynasty. The other known examples belong to the XVIII-XXI dynasties. The existence of this "secret writing" was first discovered between 1825 and 1830 by J. F. Champollion, the decipherer of Egyptian hieroglyphic writing, when he noticed such inscriptions in the tombs of the kings at Thebes, and he published in his *Grammaire égyptienne*, Paris, 1836, a list of seven of the signs used, with a correct statement of their secret values. Other students of the writing have been T. Devéria, who made his observation at least as early as 1866 (see his *Mémoires et Fragments*, volume 2, Paris, 1897, pages 49-80, *Bibliothèque égyptologique*, volume 5), Brugsch (see his *Index des hiéroglyphes phonétiques*, Leipzig, 1872), Le P. Renouf (*Zeitschrift für ägyptische Sprache*, volume 12, 1874, pages 101-105), and Sethe, "Die aenigmatischen Inschriften," (in Northampton, *Report on some Excavations . . .*, London, 1908, pages 3*-12*). Decipherers of these texts were aided by the fact that certain of the inscriptions in the royal tombs at Thebes are accompanied by parallel versions in the ordinary hieroglyphic writing. For detailed commentary see Gunn, pages 136-137. It is impossible to say just how long is the lacuna in Number 85 caused by the application of a patch, but Photograph XXIX shows that it could not have been more than half as long as the surviving portion of the first line. In general it may be said that the enigmatic writing is partly ideographic and partly phonetic, using a system whereby signs normally standing for a group of two or three consonants are used to represent only the first consonant of the group, or only a strong consonant, disregarding weak ones.

NUMBER 85



Number 87

h:t-sp 11 ibd² 2 šmw 'k·tw 'Iwnw
 Year¹ 11, month 2 of Shômu³, was entered Ônu⁴.

ibd 1 ;h·t⁵ ššw 23 twn mr mš'⁶ r T:rw
 Month 1 of Akhet, day 23, attacked (?) the commander of the army against Zaru.

ššw 25 šdm·tw r dd 'k T:rw
 Day 25, heard one to say, is entered Zaru.

h:t-sp 11 ibd 1 ;h·t 3 mšw·t Sth rd·t [šdm]·tw hrw·f in hm n ntr pn
 Year 11, month 1 of Akhet, [day] 3, birth of Seth; there was a causing [that hear] one voice his by the majesty of god this.

mšw·t ;š·t ir·t⁸ p·t hw·t⁹
 Birth of Isis; made heaven rain.

Regarding the text see volume 1, page 43 and footnote 4. Nearly all scholars agree that this entry was made not long after the completion of the mathematical part of the papyrus, and that the military and meteorological events recorded took place during the period of the Hyksos domination. Möller (1909, volume 1, page 18) suggests that it was written by the scribe of Number 86. Readers interested in Egyptian calendrical problems are referred to Peet's discussion of the implications of the text (pages 129-131).

¹ Literally, *Beginning of time* 11, that is, the 11th time of taking the census of cattle in the reign of the king in question. This was an event which occurred yearly and the expression became the equivalent of *official year* or *regnal year* of a king. See Gardiner, 1927, page 204.

² See Title-page, footnote 3.

³ The third and last season of the Egyptian year. See Title-page, footnote 4.

⁴ This is the Biblical Ôn. The place is generally referred to by its later Greek name of Heliopolis. It was the ancient center of the cult of the sun-god Rê.

⁵ See Title-page, footnote 4 and Problem 71, footnote 9.

⁶ Originally imy-r: mš', *he who is in the mouth of the army* (see Number 86, footnote 3). The phrase imy-r: (often abbreviated to mr as here) is common in titles and is equivalent to *overseer*, *chief*, etc. Peet's translation (page 129) is of course based on a reading mr mš' such as we have adopted, and he refers also in his footnote 2 to a little-known king Mr-mš' whose statues were usurped by one of the Apophises of the Hyksos rule. On his Plate Y, however, Peet's transcription reads, not mr mš', but pn-ršy (?), a rendering equally likely to be correct so far as the hieratic is concerned; in fact, the beginning of the name or title looks more like pn than it does like mr. Compare the certain pn at the end of line b 2.

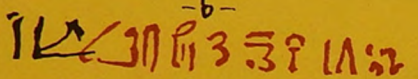
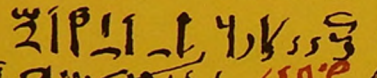
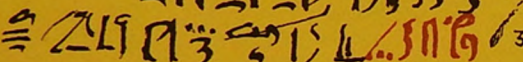
⁷ Photograph XXX seems to show the short stroke which is to be expected at the top of the mš-sign in line b 1. It is absent from the British Museum Facsimile from which the hieratic on our plate was copied. Compare the same sign at the beginning of line b 3.

⁸ This is one of the less common and less well understood verbal forms (Gardiner, 1927, pages 316-322, §§ 401-409). Its principal feature is the letter t added to the stem of the word. In normal English word-order the sentence would read, *Heaven made rain*.

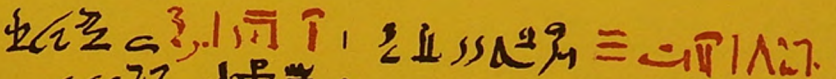
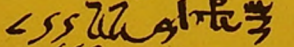

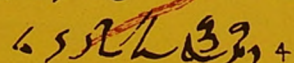
⁹ This word is perhaps to be read hy·t at the time of the Rhind papyrus.

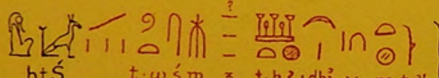
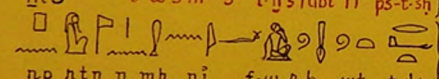
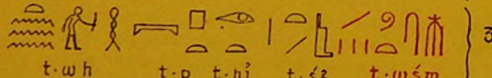
NUMBER 87

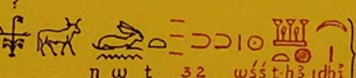

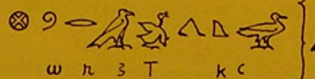
-b-

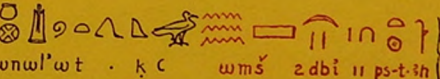
 1
 2
 3

-a-

 1
 2
 3
 4

 1
 htš t-wšm š t-hš dbi || ps-t-šh
 2
 n-p n-t n m-h n i f-w h wt t-d n
 3
 t-w h t-p t-h i t-š t-wšm

 1
 n w t š 2 wšš t-hš dbi
 2
 w n š T n š m n m
 3
 d d n w t . m d š š 2 wšš
 4
 w n š T k c

 1
 wnwl'wt . k c wšš z dbi || ps-t-šh

Number 86

- ... 'nh d-t¹ rht wnm m Hbnty . . .
living forever. Amount of the food in Hebenty
- ... [p¹]y-f² sn mr-pr³ K¹-mšw⁴ . . .
his brother the steward Ka-mosè
- ... n rnp-t · f hḏ 50 sp 2 n rnp-t . . .
of year his; silver 50 times 2 to a year
- ... iw¹(?) 2 m hḏ 3 m rnp-t . . .
ox 2; in silver 3 in a year
- ... w'w (?) sp 2 m ḥ ḥ⁵ iw⁶ ir w'w n (?) . . .
one times 2, namely (?) 1/2 and 1/6. As for one
- ... [h]nw 12 m hḏ 4 w'w n h[nw] . . .
hīnu 12; in silver 1/4 one hīnu
- ... hḏ 5 sw-n-t · sn iry rm-w (?) 120 sp 2 . . .
silver 5 price their therefor fish 120 times 2
- ... rnp-t it 4-hk¹:t ḏ 4 10 5 bd-t 100 hk¹:t . . .
year barley quadruple hekat 50 25 10 5; spell 100 hekat
- ... [rnp-t(?)] it ḏ 4 10 5 bd-t 100 hk¹:t⁷ ḏ 4 10 5 2 . . .
[year] barley [quadruple hekat] 50 25 10 5; spell 100 hekat 50 25 10 5 2
- ... 14Ḗ ḏ it 100 hk¹:t ḏ 4 10 bd-t 300 hk¹:t (?) . . .
146 1/2; barley 100 hekat 50 25 10; spell 300 hekat
- ... ḏ sy(?)·tw⁸ irp ; 1 . . .
1/2 was brought wine, donkey(-load) 1
- ... hḏ ḏ (?) 4 m hḏ . . .
silver 1/2 4; in silver
- ... 14 'd hnw 36 m hḏ . . .
1/4, fat hīnu 36; in silver
- ... 100 hk¹:t ḏ 4 20 1 bd-t⁹ it 400 hk¹:t 10 . . .
100 hekat 50 25 20 1; spell barley 400 hekat 10

This fragmentary text has been made up from three strips, part of a disused memorandum of accounts, which in ancient times were pasted on the back of the papyrus near its left end to strengthen it. Griffith (volume 16, plate opposite page 230) has incorrectly indicated the place of these fragments on his sketch-plan of the papyrus, and Peet in reproducing Griffith's sketch (page 3), and on page 128, has accepted Griffith's statement regarding their place (see our diagram on page xvi and notes thereto). The relative position of these fragments as they were when the papyrus was discovered is shown in the British Museum Facsimile. They have since been replaced in the relation which they originally bore to one another before they were used as patches. The last four lines of the original are mere repetitions of the preceding line and are ignored in our text above. On the sign used for ditto in those lines see Problem 84, footnote 13.

¹ This is an epithet that follows kings' names. The word 'nh is probably the pseudo-participle (old perfective); d-t is the noun *eternity* used adverbially.

² The possessive adjective, composed of the demonstrative p¹, t¹, n¹, and the suffix pronouns. The first part agrees in gender and number with the noun modified, the suffix agrees with the possessor. This word is an exception to the rule that the adjective follows its noun.

³ The ordinary abbreviated writing of imy-r¹ pr he who is at the mouth of the house, who has control over the house. See Number 87, footnote 6.

⁴ The name would mean *A* (or perhaps *My*) *spirit* or *personality is born*, a remark probably made by the father at his first view of the new-born child. Such remarks were the basis of many personal names in ancient Egypt. In the first part of the name a better vocalization than the more familiar *Ka* is probably *Ku*.

⁵ The apparent writing of 1/2 twice here, and the same thing at the end of Problem 82, suggests the earlier writing of 1/2 referred to in Problem 61, footnote 2; but there is no evidence that 1/2 only was intended in either place, and the double ligature is not used in any other of the numerous occurrences of 1/2 in this papyrus. In Problem 82 both 1/2 and 3/4 are incorrect.

⁶ See Problem 62, footnote 4.

⁷ At this point may be seen in Photograph XXXI a small fragment of papyrus with two horizontal lines, which properly belongs below, where the double horizontal line appears above line 14.

⁸ We are not quite sure which number of *hekat* Peet intends to associate with bd-t in his translation, page 129. He has, moreover, interchanged the words *spell* and *barley*, for, whether or not the word it occurs, bd-t is the first word in this line for a kind of grain. It may be that the word following bd-t is not it but 4-hk¹:t, with one of the grains lost. This would account more easily for the presence of the stick following bd-t, for the stick in this position is impossible as a part of bd-t, and we know of no writing of the word it with the stick.

⁹ Perhaps a better reading for the verb-stem is sby, if our transcription is correct.

BIBLIOGRAPHY
OF
EGYPTIAN AND BABYLONIAN
MATHEMATICS

SUPPLEMENT
TO THE BIBLIOGRAPHY
IN VOLUME I

The following material consists of notes assembled during the past two and one-half years which, for one reason or another, seemed appropriate as a Supplement. The recent notable extension of our knowledge of Babylonian mathematics will enable us more adequately to characterize the mathematical achievement of the Egyptians.

RAYMOND CLARE ARCHIBALD

August, 1929.

1854

HINCKS, E., "Cuneiform inscriptions in the British Museum," *The Literary Gazette*, vol. 38, 5 August 1854, p. 707.

One paragraph of this article, on various documents, is devoted to an Akkadian tablet numbered K90 in Bezold's *Catalogue of the Cuneiform Tablets in the Kouyunjik Collection of the British Museum*, vol. 1, 1889, p. 24. Hincks believed that it contained estimates of the portions of the moon visible on each of the first 15 days of the month: 5, 10, 20, 40, 80, 96, 112, . . ., 224, 240. The first five of the numbers are in geometric, the last ten in arithmetic progression.¹ Further details are given by Hincks in Royal Irish Academy, *Polite Literature, Transactions*, vol. 22, 1855, p. 407. With reference to this source Cantor 1907 (1880) repeats the above mentioned interpretation. Other writers such as Karpinski (1926) and Tropske 1924 (1902) have noted the same interpretation. Nevertheless a very different one, given by Sayce over 50 years ago, pointed out that the tablet contained a table of the lunar longitudes for each of the 30 days of the month the last 15 (not given by Hincks) being a record of the retrograde motion. The tablet was discussed by Lenormant (1868) in "Notes" pp. 104-111, 144-148. See also F. Lenormant, *Choix de textes cunéiformes inédits ou incomplètement publiés*, fasc. 1, Paris, 1873, no. 22, pp. 80-81. A. H. Sayce's interpretation was first given in his article "The astronomy of the Babylonians," *Nature*, vol. 12, October 7, 1875, p. 490. See further "Table of lunar longitudes," *Zeitschrift für Assyriologie*, vol. 2, 1887, pp. 337-340. [Quotations: (p. 337) "As Lenormant's copy is not quite accurate, and he has omitted the last 6 lines which are written in Neo-Babylonian characters, I give the whole inscription." (P. 340) "It is clear from this text that the circle was divided into 480 parts. The moon's daily motion is reckoned at 16 parts as is roughly really the case."] See also R. H. M. Bosanquet and A. H. Sayce, "Babylonian astronomy," Royal Astronomical Society, *Monthly Notices*, vol. 40, 1880, "Division of the circle.—Reckoning of longitude," pp. 108-110. Quotation: "The divisions of the circle which we find employed are those into 8, 12, 120, 240, and 480 parts. It has been assumed that the division of the circle into 360 parts was commonly practised by this ancient people. There is, however, no authority in the inscriptions for this assumption. It seems to have been derived originally from Achilles Tatius [about 450 A.D.]; and the preconceived idea thus introduced appears to have caused even those most conversant with the inscriptions to see the division of the circle into 360 in matters which do not involve it. An example of this is in the sexagesimal reckoning of numbers, which is one of the common methods used in the inscriptions. It is hardly doubtful that the division of the circle as practised by Ptolemy, and in modern times, was an outgrowth of the sexagesimal method of the inscriptions. But the latter does not contain the former."

¹ A series of numbers in geometric progression determined by divisors of what is possibly Plato's geometric number 12,960,000, on a tablet of about 2200 B.C., is described in Hilprecht (1906), p. 28, no. 23 (phototype plate IX).

1868

LENORMANT, F., *Essai sur un document mathématique chaldéen, et à cette occasion sur le système [sic] des poids et mesures de Babylone*, Paris, 1868. Lithographed, 5 + 179 + "Notes," 148 pp.

The document in question is a British Museum tablet, no. 92680 (or K3168 in C. Bezold's *Catalogue* . . . vol. 2, 1891, p. 510), dating back, possibly, to 1900 B.C. It was found in a tomb at Senkereh by W. W. Loftus and a part of it was translated by H. C. Rawlinson, in Royal Asiatic Society, *Journal*, vol. 15, 1855, pp. 218-220. See also H. C. Rawlinson, *Cuneiform Inscriptions of Western Asia*, London, vol. 4, 1875, plate 40 (there is also a table of cube roots on this plate; in the second edition, 1891, the contents of the plate, now no. 37, are somewhat modified); F. Lenormant, *Choix de textes cunéiformes inédits ou incomplètement publiés*, no. 84, in fasc. 3, Paris, 1875, pp. 219-220 (more exact text than in the *Essai*); A. H. Sayce, "Babylonian augury by means of geometrical figures," Society of Biblical Archaeology, *Transactions*, vol. 4, 1876, pp. 311-314; and G. Rawlinson, *The five great monarchies of the Ancient Eastern World*, London, 1862, vol. 1, pp. 129-131; fourth ed. New York, 1880, pp. 103-104. The tablet evidently contained originally the results of squaring all the integers 1, 2, 3, . . ., 60; or rather it was stated that these numbers are the square roots of certain numbers given. In introductory matter Lenormant gives considerable material of mathematical interest, although some of it is naturally out of date. See also Oppert (1872) pp. 418-419. Reference may be given also to another article by Oppert, "Six cent cinquante-trois: les carrés mystiques chaldéens," Académie des inscriptions et belles lettres, *Comptes Rendus*, Paris, 1902, pp. 457-468; also "Sechshundert drei und fünfzig. Eine babylonische magische Quadrattafel" *Zeitschrift für Assyriologie*, vol. 17, 1903, pp. 60-74.

1872

OPPERT, J., "L'étalon des mesures Assyriennes, fixé par les textes cunéiformes," *Journal Asiatique*, series 6, vol. 20, August-September, 1872, pp. 157-177; series 7, vol. 4, October-November, 1874, pp. 417-486. Reprinted as a separate, Paris, 1875, 90 pp.

The long review by M. Cantor (*Zeitschrift für Mathematik und Physik, Historisch-literarische Abtheilung*, vol. 20, 1875, pp. 149-165) dwells particularly on the features of the monograph which are of special interest to the mathematician.

1882

BERTIN, G., "The assyrian numerals," *Transactions of the Society of Biblical Archaeology*, vol. 7, 1882, pp. 370-389.

First paragraph: "In this paper I have tried to bring together all that is now known about the Assyrian numerals, comparing them with those of other Semitic dialects, without having in view any special theory, and though I

have done my best to make the list as complete as possible, it is to be feared that some forms have been overlooked, but I hope that, notwithstanding any omission, any one taking up the subject will find in this attempt a basis for his researches."

1889

AMIAUD, A., "Les nombres ordinaux en assyrien," *Journal Asiatique*, s. 8, vol. 18, 1889, pp. 297-312. Note by Barbier de Meynard.

1898

THUREAU-DANGIN, F., "Les chiffres fractionnaires dans l'écriture babylonienne archaïque," *Beiträge zur Assyriologie*, Leipzig, vol. 8, 1898, pp. 588-589.

Signs for $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{6}$, $\frac{1}{8}$, $\frac{1}{10}$, $\frac{1}{12}$, $\frac{1}{15}$, $\frac{1}{20}$, $\frac{1}{30}$, $\frac{1}{40}$, $\frac{1}{60}$. Supplementary to the material which the author gave earlier in *Revue Sémitique*, vol. 5, April, 1897, pp. 172-173.

1901

ZIMMERN, H., "Das Princip unserer Zeit- und Raumteilung," *Sächsische Gesellschaft der Wissenschaften. Berichte, philologisch-historische Klasse*, vol. 53, 1901, pp. 47-61.

See also K. Sethe, *Gesellschaft der Wissenschaften, Göttingen, Nachrichten, Philologisch-historische Klasse*, "Die Zeitrechnung der alten Aegypter im Verhältnis zu der der andern Völker. Eine entwicklungsgeschichtliche Studie," 1919, pp. 287-320; 1920, pp. 28-55, 97-141; an especially important treatment of the subject. A more recent work is R. Weill, *Études d'Égyptologie. Bases, Méthodes, et Résultats de la Chronologie Égyptienne*. Paris, 1926. 216 pp.; *Compléments*, Paris, 1928. 64 pp. In this connection a reference should also be given to the first volume (Leipzig, 1906) of the monumental work of F. K. Ginzel, *Handbuch der mathematischen und technischen Chronologie. Das Zeitrechnungswesen der Völker*.

1906

CLAY, A. T., *Documents from the Temple Archives of Nippur. Dated in the Reigns of Cassite Rulers* (The Babylonian Expedition of the University of Pennsylvania. Series A: Cuneiform Texts, vols. 14, 15). Philadelphia, 1906. 4to.

These tablets are mostly records of payments of salaries, and of collections of taxes. They are discussed at length by H. Torczyner in "Altbabylonische Tempelrechnungen . . . umschrieben und erklärt," *Akademie der Wissenschaften, Vienna, Denkschriften*, vol. 55, 1913, 135 pp.

1908

CANTOR, M., "Babylonische Quadratwurzeln und Kubikwurzeln," *Zeitschrift für Assyriologie*, vol. 21, 1908, pp. 110-115.

1909

PINCHES, T. G., "Some mathematical tablets of the British Museum," *Assyriologische und Archaeologische Studien. Hermann V. Hilprecht zu seinem fünfundsiebenzigsten Doctorjubiläum und zu seinem fünfzigsten Geburtstage gewidmet*, Leipzig, 1909, pp. 71-78.

These are cuneiform documents numbered 80150 (formerly Bu.: 91-5-9, 263) and 77951 (formerly 85-4-30, 144) translated by the aid of similar tablets explained in Hilprecht (1906). It consists of a table of various fractional parts of 1,296,000; compare Hilprecht (1906). Pinches refers to another possible mathematical inscription described in *British Museum, Assyrian Antiquities, Guide to the Nimroud Central Salon*, London, 1886, p. 74, no. 44, now no. DT72 (C. Bezold's *Catalogue*, vol. 4). On pages 304-309 of the same *Studien* is an article by F. X. Kugler on "Die Symbolik der Neunzahl bei den Babyloniern."

1911

DELAPORTE, L., "Document mathématique de l'époque des rois d'Our," *Revue d'Assyriologie et d'Archéologie Orientale*, Paris, vol. 8, 1911, pp. 131-133.

References to Hilprecht (1906), to Pinches (1909) and to a similar tablet K2069 in the library of Assurbanipal (C. Bezold, *Catalogue of the Cuneiform Tablets in the Kouyunjik Collection of the British Museum*, London, vol. 1, 1889, p. 400). The tablet in question, dating from about 2200 B.C., was found at Tello in 1898 and is no. MIO 7375 in vol. 3 of *Inventaire des tablettes de Tello conservées au Musée impérial ottoman*. It contains the result of dividing 60 successively by the integers 1, 2, 3, 4, . . . , 60; 7, 11, . . . , 59 are indicated as impossible divisors.

GARDINER, A. H., *Egyptian Hieratic Texts Transcribed, Translated and Annotated. . . . Series 1: Literary Texts of the New Kingdom. Part 1, The Papyrus Anastasi I and the Papyrus Koller together with the parallel texts*. Leipzig, 1911. Pp. *1-34 + 1-81.

The papyrus Anastasi I, purchased by the British Museum in 1839 from Anastasi, Swedish consul in Egypt, is numbered Pap. Br. Mu. 10247, and dates from the reign of Sethos II, about 1200 B.C. It was translated by F. J. Lauth in his *Moses der Ebräer*, Munich, 1868; and earlier studied by J. F. Chabas in his *Voyage d'une Égyptien en Syrie, en Phénicie, en Palestine, etc. au XIV^{me} Siècle avant notre ère; traduction analytique, d'un papyrus du Musée Britannique, comprenant le fac-simile du texte hiéroglyphique et sa transcription complète en hiéroglyphes et en lettres coptes . . . Avec la collaboration de Ch. Wicliffe [sic] Goodwin*.

Châlon-sur-Saône, 1866. 8 + 420 pp. + 13 plates. Folio. This was reviewed by H. Brugsch in *Revue Critique d'Histoire et de Littérature*, Paris, vol. 2, 1867, pp. 97-105, 145-154. [Quotation, p. 97: "Nous aurons même à démontrer que M. Chabas a méconnu entièrement l'arrangement du texte et la vraie intention de son auteur."] In reply to this there followed F. J. Chabas, *Voyage d'un Égyptien en Syrie . . . Réponse à la critique*, Châlon-sur-Saône, 1868, 104 pp. folio. [Also in F. J. Chabas, *Œuvres Diverses*, Paris, vol. 3, 1903, pp. 203-340 (Bibliothèque Égyptologique, vol. 11). English translation by S. M. Drach, *Records of the Past*, London, n. d., v. 2, pp. 107-116.]

The parts of Anastasi I of particular interest to us are the technical problems (14. 2-17, 2), pp. 31^a-34^a, discussed by Gardiner in an Appendix. These problems are: 1. The building of a brick ramp, compare Bibliography, Ungnad (1916), of unusually large dimensions; 2. The number of men needed to transport an obelisk; 3. The erection of a colossal statue or obelisk by the removal of a great quantity of sand. Indeed all of these questions may have arisen in connection with the erection of a single obelisk, although Gardiner's reading seems opposed to this. Compare also F. M. Barker, "An ancient Egyptian mechanical problem. Papyrus Anastasi I. About 1300 B.C.," *The Open Court*, Chicago, vol. 26, December, 1912, pp. 705-716. There are quoted here some remarks made in this connection, in 1903, by Erman. "This is the oldest known instance of the use of sandboxes which are now often utilized for sinking and transferring heavy weights." In this connection a reference may be given to an interesting and authoritative work by an Englishman, the director of the Egyptian Museum at Cairo, R. Engelbach, *The Problem of the Obelisks from a Study of the Unfinished Obelisk at Aswan*, London, 1923. There are numerous illustrations and diagrams in the volume.

1915

KEWITSCH, G., "Zur Entstehung des 60-Systems," *Zeitschrift für Assyriologie*, vol. 29, 1915, pp. 265-283.

Headings in the article are "Zählen geht vor Messen," "Wie zählt der Urmensch?," "Zählen geht vor Schreiben," "Zählen geht vor Richten," "Zählen geht vor Rechnen," "Das Zählen ist eine ethnologische Frage, keine mathematische." There are references in the article to: G. Kewitsch, "Die Entstehung des 60-Systems," *Unterrichtsblätter für Mathematik und Naturwissenschaften* vol. 15, 1909, pp. 122-128 (a lecture, with 30 items in a Bibliography); E. Hoppe, "Das Sexagesimalsystem und die Kreisteilung," *Archiv der Mathematik und Physik*, series 3, vol. 15, 1909, pp. 304-313 (comment on this by G. Kewitsch, "Zur Entstehung des 60-Systems, vol. 16, 1910, p. 277; E. Hoppe, "Bemerkungen zu der vorstehenden Arbeit des Herrn Kewitsch," pp. 278-299); E. Löffler, "Die arithmetischen Kenntnisse der Babylonier und das Sexagesimalsystem," *Archiv der Mathematik und Physik*, s. 3, vol. 17, 1911, pp. 135-144; F. Thureau-Dangin, [part of a review of a work by Halévy], *Revue d'Assyriologie, et d'Archéologie Orientale*, vol. 10, 1913, pp. 195-196. A quotation, without footnotes, from the first page of this article is as follows: "Bien des hypothèses ont été proposées pour expliquer l'origine de ce système.

La plus ancienne et la plus généralement adoptée le rattache au nombre des jours de l'année moins des épagomènes. Kewitsch a montré d'un façon que je crois irréfutable, l'invraisemblance et même l'impossibilité de cette hypothèse, comme de toutes les hypothèses attribuant au système sexagésimal une origine astronomique. Comme il le dit fort bien, "Zählen geht vor Messen." Le système sexagésimal existait dans la numération avant d'être appliqué à la division du cercle, à celle du jour et à la métrologie. Fait bien singulier, les Assyro-Babyloniens avaient deux systèmes de numérations: ils avaient, comme tous les Sémites, un système strictement décimal et ils avaient en outre un système sexagésimal. S'ils avaient été les inventeurs des chiffres qu'ils employaient, leur écriture aurait eu le chiffre 100 et le chiffre 1000, comme leur langue avait le nombre cent et le nombre mille. Or leurs chiffres appartiennent au second système qui, étant sexagésimal, exclut le cent et le mille. {100 = 60 + 10 X 4; 1000 = 600 + 60 X 6 + 10 X 4} . . . Le système sexagésimal est l'un des traits les plus originaux de la civilisation assyro-babylonienne. Or il n'est pas, il ne peut pas être une invention sémitique."

References may be given to another article, by G. Kewitsch, "Zweifel an der astronomischen und geometrischen Grundlage des 60-Systems," *Zeitschrift für Assyriologie*, vol. 18, 1904, pp. 73-95; and to F. F. K. Lehmann-Haupt, "Ueber protobabylonische Zahlwörter," *Zeitschrift für Assyriologie*, vol. 1, 1886, pp. 222-228. For Babylonian astronomy, and hence somewhat for mathematics, the following work is of importance: F. X. Kugler, *Die Babylonische Mondrechnung. Zwei Systeme der chaldäer über den Lauf des Mondes und der Sonne*, Freiburg in Breisgau, 1900. 15 + 215 pp. + 13 plates. Also P. Schnabel, "Kidenas, Hipparch und die Entdeckung der Präzession," *Zeitschrift für Assyriologie*, n. s., vol. 3, April, 1926, pp. 1-60; see also F. Cajori, *Science*, n. s. vol. 65, Feb. 18, 1927, p. 184.

1925

ERMAN, A. and GRAPOW, H., editors, *Wörterbuch der Aegyptischen Sprache, im Auftrage der deutschen Akademien*. Leipzig, Lieferungen 1-6, vols. 1-3, 1925-1929. 20 + 583 + 16 pp.; 506; 489; most of the text being lithographed. Vol. 1 complete, dated 1926.

This great work is the result of contributions from more than 30 scholars of Europe and America. It will be completed in 8 Lieferungen or 4 volumes, with supplementary volumes containing "Belegstellen" and other material. Part of the Belegstellen already issued is of value for its references to documents (in particular, those which are mathematical) where different characters may be found. A comparatively small *Aegyptisches Handwörterbuch* (8 + 232 pp.) by Erman and Grapow was published at Berlin in 1921. In 1920 appeared the large work of E. A. W. Budge, *An Egyptian Hieroglyphic Dictionary with an Index of English words, King list and Geographical list with indexes. List of hieroglyphic characters, coptic and semitic alphabets, etc.*, London, 154 + 1356 pp. The ms. of Budge's work was ready for printing in 1914. The method of transliteration here employed is not generally used by egyptologists and it is difficult to identify the consonants.

PRATT, I. A., *Ancient Egypt; Sources of Information in the New York Public Library*. New York, 1925. 15 + 486 pp.

In this admirable general bibliography, of material owned by the Library in May, 1924, Miss Pratt has brought together, among hundreds of others, 65 titles under the heading "astronomy," 24 under the head of "mathematics," 69 under "metrology," 16 under "numerals," and 103 under "calendar." In her *Assyria and Babylonia, a List of References in the New York Public Library*, (New York, 1918. 4 + 143 pp.) there are titles under "calendar and chronology" (pp. 27-30), and "astronomy, astrology, and mathematics" (pp. 57-61).

SPELEERS, L., *Recueil des Inscriptions de l'Asie Antérieure des Musées Royaux du Cinquantenaire à Bruxelles. Textes sumériens, babyloniens et assyriens*. Brussels, 1925, nos. 268-274, pp. 29, 94-95.

Seven multiplication tables from cuneiform inscriptions acquired at Brussels within the past twenty years. 268 is a table of $1\frac{1}{6}$ times 5, 6, . . . , 20, 30, 40, 50; 269 is a table of 7 times 1, 2, 3, 4, . . . , 20, 30, 40, 50; 270-274 are tables of the same series of numbers multiplied successively by 10, $12\frac{1}{2}$, 16, 24, and 25. The tables of Tablets 269 and 271 are identical with those in the Royal Ontario Museum of Archaeology; compare Mercer (1928).

1926

REY, A., (1) "Coups d'oeil sur la mathématique égyptienne"; (2) "Nouveau coup d'oeil sur la mathématique égyptienne," *Revue de Synthèse Historique*, (1) vol. 41, June, 1926, pp. 19-62; (2) vol. 43, June, 1927, pp. 27-35.

The first paper is a popular review of material contained in Peet (1923, 2). There are a number of minor slips in statements and nothing especially new is suggested. The second paper is a sort of supplement to the first with special reference to Karpinski (1926), and nos. 40, 64, 79 of the Rhind papyrus.

Reviewed by K. Vogel in *Mitteilungen zur Geschichte der Medizin und der Naturwissenschaften*. vol. 27, 1928, pp. 378-383.

1927

CHACE, A. B., MANNING, H. P., BULL, L. S., and ARCHIBALD, R. C., *The Rhind Mathematical Papyrus, British Museum 10057 and 10058. Volume I: Free Translation and Commentary* by A. B. Chace with the assistance of H. P. Manning. *Bibliography of Egyptian Mathematics* by R. C. Archibald. *Volume II: Photographs, Transcription, Transliteration, Literal Translation* by A. B. Chace, L. S. Bull and H. P. Manning. *Bibliography of Egyptian Mathematics, Supplement* by R. C. Archibald. *The Mathematical Leather Roll in The British Museum* by S. R. K. GLANVILLE. Oberlin,

Ohio, vol. 1, [July] 1927, 10 + 210 pp. Royal 8vo. Vol. II, 1929. 288 unnumbered (except i-xvi) pp. Oblong folio.

This sumptuous work is a publication of The Mathematical Association of America. It contains the first published photographic facsimile of the Rhind papyrus (31 pages, on one of which is the reproduction of a photograph of end parts of the papyrus in the British Museum with the New York fragments in place between them.)¹ The major part of the second volume enables the reader to trace back from the literal translation through the transliteration and hieroglyphic transcription to the original hieratic. In this work are to be found: the first transliteration since Eisenlohr's of more than 50 years ago; the first literal translation since Eisenlohr's; new readings of nos. 4 and 5; the first correct publication of no. 9 on which all other writers have gone wrong through omissions in the B. M. "facsimile." The Bibliography occupies 86 pp. in volume I and 22 pp. (of similar size) in volume II.

GLANVILLE, S. R. K., "The mathematical leather roll in the British Museum," *Journal of Egyptian Archaeology*, vol. 13, [November], 1927, pp. 232-238 + plates LVIII-LXII.

There is an addendum, pp. 238-239, by Dr. Alexander Scott, director of scientific research at the British Museum. This addendum is practically identical with Scott's article listed below. Glanville's paper is a study of the leather roll 10250 briefly described in the "Prefatory Note" of my Bibliography; it was acquired by the British Museum in 1864. The plates picture the roll before and after unrolling, its fragments, and its hieroglyphic transcription. See also Glanville 1929 [1927].

NEUGENAUER, O., "Zur Entstehung des Sexagesimalsystem," *Gesellschaft der Wissenschaften, Göttingen, Abhandlungen, Mathematisch-physikalische Klasse*, n.s., vol. 13, no. 1, 1927, 4 + 55 pp.

"Einleitung," pp. 1-5; "Die natürlichen Zahlen," pp. 6-20; "Die Masssysteme," pp. 20-43; "Über den Aufbau des 'Sexagesimalsystems'," pp. 43-50; "Geschichtliche Überblick," pp. 51-52; "Literaturverzeichnis," pp. 53-55. This monograph is the basis of the following article by F. Thureau-Dangin, "L'origine du système sexagésimal," *Revue d'Assyriologie et d'Archéologie Orientale*, vol. 25, 1928, pp. 115-118; "Un post-scriptum," vol. 26, 1929, p. 43. Stripped of footnotes the following is a quotation from page 115: "À propos de la numération sumérienne, j'ai essayé de montrer (dans R. A. X, 195 et XVIII, 123 ss.) comment se pose le problème de l'origine du système sexagésimal, mais

¹ Photograph IX shows practically all of about 40 fragments, in the New York Historical Society's library, appropriately placed. This is the first published photograph of the fragments. In Peet's edition of the papyrus 24 fragments are placed. Several fragments which came into the possession of the Society with the Rhind fragments appear not to belong to the papyrus. The authors have placed a dozen more fragments than Peet (who had no opportunity for examining the originals), including several not reproduced among the misplaced fragments on Peet's Plate E.

n'ai pas cru pouvoir en suggérer une solution. La question vient d'être reprise, au point où je l'avais laissée, par O. Neugebauer qui, dans un mémoire fort intéressant et instructif, intitulé, 'Zur Entstehung des Sexagesimalsystems,' cherche dans la métrologie l'origine de la numération sexagésimale. Ce mémoire, plein de vues pénétrantes et ingénieuses, éclaire certains aspects du problème et ouvre une voie nouvelle où peut-être il sera possible d'en trouver la solution; mais, à mon sens, il laisse un résidu inexpliqué." This article is followed immediately (pp. 119-121) by another of Thureau-Dangin, "Le système ternaire dans la numération sumérienne." The "post-scriptum" is mainly a quotation from a communication of Neugebauer to the author. The first of the articles referred to above by Thureau-Dangin (in "R. A. X") is listed above under Kewitsch (1915) and the second under 1906 in the Bibliography.

SCOTT, A. and HALL, H. R., "Laboratory notes: Egyptian leather roll of the seventeenth century B. C.," *The British Museum Quarterly*, vol. 2, September, 1927, pp. 56-57 + 1 plate.

See under Glanville (1927) above. Scott's paper occupying one and two thirds pages describes the interesting method, by means of a celluloid solution and butter muslin, of unrolling the excessively brittle leather roll. The plate contains a photograph of the roll (without the fragments) before and after unrolling. It is curious that in an official publication of this kind there should occur an error in the statement of the date of the Museum's acquisition of the roll, "1875" for 1864. Except for the omission of its last sentence the note of Dr. Hall, keeper of Egyptian and Assyrian Antiquities in the British Museum, is as follows: "The roll, now that it has been unrolled by Dr. Scott, has not justified the hope that it might prove to contain material of importance. The text is simply a series of sums of additions of fractions, repeated twice over; apparently a scholar's exercise. In one place at least the scribe has committed an error of addition. The roll is said to have been found with the great Rhind papyrus, and this account is confirmed by the fact that the writing is of the same period as that of the papyrus, and that the contents are of a character found in it. Probably it is connected in some way with the papyrus. Both were bought together by Mr. Rhind, from whom they came to Mr. Bremner, and from him to the British Museum."

1928

CIPRIANI, P., *Nuove rivelazioni sulle grandi piramidi di Giza. Cheope e Chefnen. Notevole relazione ciclotometrica scoperta nel quadrato di Ahmes*. Rovigo, 1928, 83 pp.

Another item in the literature of mysticism associated with Egyptian mathematics and monuments. There are among others references to: Smyth (1867), Brugsch (1868), Cantor (1875), Günther (1876), Schiaparelli 1876 [1875], Favaro 1876 [1875], Eisenlohr (1877), Günther (1878), Favaro (1879), Petrie (1883), Fazzari 1907 [1903], Kleppisch 1921 [1910], Borchardt (1922). There

are also several references to K. Kleppisch, *Willkür oder mathematische Überlegung beim Bau der Cheopspyramide?* Munich, 1927. 5 + 38 pp.

If in a triangle ABC , $AB = 5$ units, $BC = 3$, $CA = 4$, and if, furthermore, the perpendicular from C on AB meets AB in D , then AD is equal to $\frac{1}{2}$ of the diameter of the circle with BD as radius; or, the area of the square on AD (the "quadrato di Ahmes") is approximately equal to that of the circle.

FRANK, C., "Strassburger Keilschrifttexte in sumerischer und babylonischer Sprache," *Schriften der Strassburger Wissenschaftlichen Gesellschaft in Heidelberg*, neue Folge, 9. Heft, Berlin and Leipzig, 1928. 36 pp. + 20 plates.

The 50 documents here dealt with are in the Bibliothèque universitaire et régionale at Strasbourg. Of these, six (numbered 362-364, 366-368, in the collection, and, 6-11 in Frank's article, are mathematical texts from Warka, Babylonia, and date back to about 2000 B.C.; they are transcribed and translated on pages 19-23 and plates IV-IX. The lack of commentary prevented a clear understanding of the details of the problems. This has been partly supplied by O. Neugebauer, in his "Zur Geschichte der babylonischen Mathematik," *Quellen und Studien zur Geschichte der Mathematik, Abteilung B: Studien*, Berlin, March, 1929, pp. 67-80. The results are of great interest. Problem 6, in Frank's numbering, deals with the division of a certain quantity of silver among 10 brothers; in problem 7 there are calculations of areas; problems 8 and 10 may be regarded as calculations in connection with a triangle or parts of a triangle, and it is with them that Neugebauer's article deals. He believes that these calculations show that nearly four thousand years ago the Babylonians were in possession of what was equivalent to our formula for one root of a certain type of a three-term quadratic equation.

GILLAIN, O., "La notation fractionnaire clef de l'arithmétique égyptienne," *Mathesis*, vol. 42, November and December, 1928, pp. 405-413.

Last paragraph: "En réalité, l'application des méthodes égyptiennes à certains résultats grecs demeurés obscurs, jette une grande clarté sur les procédés qui ont dû y conduire. Et non seulement le calcul fractionnaire, tel que nous le révélèrent les papyrus, est la clef de l'arithmétique des scribes, mais elle est aussi celle des mystères encore insondés de la science hellénique."

MERCER, S. A. B., "Two Babylonian multiplication tables," *Bulletin of the Royal Ontario Museum of Archaeology*, no. 7, 1928, pp. 3-6. Reprinted in *Art and Archaeology*, Washington, D. C., vol. 26, 1928, pp. 145-146, with a change in an illustration.

Bab. Tab. 767 and 711 in the Royal Ontario Museum of Archaeology, Toronto; photographic reproduction, transcription, translation and commentary. These are tables of 7 and $12\frac{1}{2}$ multiplied by 1, 2, 3, . . . , 20, 30, 40, 50. Both tables

were published earlier in Speleers (1925) to which Mercer refers; but Mercer's comment is not such as to lead one to suspect that nothing new was contained in his own article. Not only that, but such a statement as the following has no foundation in known facts: "As early as 3000 B.C. there existed two separate and highly developed systems of mathematics, the Babylonian and the Egyptian." Presumably the tablets are no older than those described by Speleers.

NEUGEBAUER, O., "Zur Geschichte des Pythagoräischen Lehrsatzes," *Gesellschaft der Wissenschaft, Göttingen, Nachrichten, mathematisch-physikalische Klasse*, 1928, pp. 45-48.

This paper is based upon Weidner (1916), Zimmern (1916), and Ungnad (1916). Since I wrote the note on the first of these Doctor Weidner has kindly informed me that the document he discussed was a part of no. VAT6597 in the Vorderasiatische Abteilung of the Prussian State Museum in Berlin. He stated also that the original had not yet been published.

THUREAU-DANGIN, F., "La division du cercle," *Revue d'Assyriologie et d'Archéologie Orientale*, vol. 25, 1928, pp. 187-188.

Sets forth the idea that the division of the circle into 360 parts by the Babylonians was "natural," but that the further sexagesimal division of the degree, minute, and second, was for them unnatural. It is argued that the Babylonians made use of the division of the circle as learned from the Sumerians. D. Sidersky in "La division de la circonférence en 360 parties," *Revue d'Assyriologie*, vol. 26, 1929, pp. 31-32, surmises how the Sumerians with ruler and compasses might have divided a circle, with center O and radius OA , into 360 equal parts. Having placed the cord $AC = AO$ he bisects it in F , and OF produced meets the circumference in E . Drawing the cord $AG = AF$ the author remarks that GE is to a high degree of approximation the arc subtending one degree at O .

VETTER, Q. *Z minulosti Počtárskych Základů*. (Zvláštní otisk z cyklu přednášek Počtárské Profily.) [About the past history of mathematical principles. (Reprint from the series of mathematical sections.)] Brünn, 1928. 16 pp.

Unimportant in this connection.

1929

HALL, H. R., Egypt—Sciences: "Astronomy," "Mathematics," *Encyclopaedia Britannica*, 14th ed., London and New York, 1929, vol. 8, pp. 56-57.

NEUGEBAUER, C., "Über vorgriechische Mathematik," *Hamburgische Universität, Abhandlungen aus dem mathematischen Seminar*,

vol. 7, 1929, pp. 107-124. Also as no. 8 of *Hamburger mathematische Einzelschriften*, 18 pp.

The mathematics of the Egyptians and Babylonians before 600 B.C. is here considered under three main headings: 1. Number-systems; 2. Arithmetic technique; 3. Geometry.

NEUGEBAUER, O., "Zur ägyptischen Bruchrechnung," *Zeitschrift für Ägyptische Sprache*, vol. 64, 1929, pp. 44-48.

First paragraph: "In Bd. 13 des *Journal of Egyptian Archaeology* (S. 232 ff.) hat Glanville einen auf einer Lederrolle des British Museum stehenden mathematischen Text publiziert, der (in doppelter Ausfertigung) eine Reihe von Rechnungen mit Brüchen enthält, allerdings ohne jeden erklärenden Text. was den Herausgeber zur der resignierten Bemerkung veranlasst hat: 'From the scientific point of view it can hardly be denied that the dissemination of the knowledge of this chemical treatment of the leather (zum Zwecke der Aufrollung) is of greater value than the publication of the contents inscribed on it.' Ich möchte im folgenden zu zeigen versuchen, dass ein so pessimistisches Urteil vielleicht doch nicht ganz am Platze ist."

NEUGEBAUER, O. and STRUVE, V. V., "Über die Geometrie des Kreises in Babylonien," *Quellen und Studien zur Geschichte der Mathematik, Abteilung B: Studien*, vol. 1, part 1, March, 1929, pp. 81-92.

In the discussion of chords of a circle, with special reference to part IX of *Cuneiform Texts from Babylonian Tablets, &c.*, in the *British Museum*, see Ungnad (1916), it seems to be definitely suggested that Babylonians were familiar not only with the Pythagorean theorem but also with the fact that the angle in a semicircle is a right angle. For a brief article based mainly on the present article, on Frank (1928), and on Neugebauer 1929 (1928) see R. C. Archibald, "Babylonian mathematics," *Science*, n. s., vol. 69, July 19, 1929, pp. 66-67.

Review by H. Wieleitner of *Studien*, part 1, *Archiv für Geschichte der Mathematik der Naturwissenschaften und der Technik*, vol. 12, Aug., 1929, pp. 105-107.

PERPELKIN, J. J., "Die Aufgabe 62 des mathematischen Papyrus Rhind," *Quellen und Studien zur Geschichte der Mathematik, Abteilung B: Studien*, vol. 1, part 1, March, 1929, pp. 108-112.

First paragraph, except for the omission of a footnote: "Wie schon T. E. Peet in seiner Neubearbeitung des mathematischen Papyrus Rhind sagt, bereitet die Interpretation der Ausgabe Nr. 62 dieses Textes in mathematischer Hinsicht keine Schwierigkeiten (S. 105). Aber es erscheint auch ihm noch nicht möglich zu sein, zu einer 'endgültigen und absolut sicheren Übersetzung' zu gelangen. Es soll nun im folgenden versucht werden, diese noch ausstehende inhaltliche Kommentierung nachzutragen, die übrigens auch geeignet scheint, zu unseren geringen Kenntnissen der Tauschverhältnisse in alten Ägypten einen kleinen Beitrag zu liefern, der meines Wissens neu ist."

VOGEL, K., "Erweitert die Lederrolle unsere Kenntnis ägyptischer Mathematik?," *Archiv für Geschichte der Mathematik, der Naturwissenschaften und der Technik*, vol. 11, May, 1929, pp. 386-407.

Quotation: "Ich möchte . . . den Inhalt als höchst bedeutsam ansehen, trotzdem er lediglich in 26 Stammbruchsummen (in doppelter Ausführung) besteht." Detailed references to the literature are given in the discussion. Q. Vetter has a brief note in his "Kozensyvitek matematického obsahu v Britském museu rozvinut" [Leather roll of mathematical content unrolled in the British Museum], *Časopis pro Pěstování Matematiky a Fysiky*, vol. 58, p. 382, 1929. There are references to Glanville (1927), Neugebauer (1929), and Vogel (1929).

1930

STRUVE, V. V. [The Golenishchev Mathematical Papyrus of the Moscow Museum of Fine Arts transcribed and translated into German with commentary and notes], *Quellen und Studien zur Geschichte der Mathematik, Abteilung A: Quellen*. Berlin, 1930. About 144 pp. + 25 plates.

An edition of an extraordinarily interesting papyrus of about 1850 B.C. which appears to have been copied from an older work, possibly as early as 2000 B.C. Certain facts connected with the papyrus have been already discussed in my notes on Turaev (1917) and Tsinslerling (1925). Only five of its 25 problems had been previously published, and four of these (6, 7, 14, 17) were geometrical. Of the remaining geometrical problems, nos. 4 and 10, no. 10 seems to be just as remarkable as no. 14 which, as we have seen, appeared to suggest that the Egyptians certainly knew the formula for the volume of the frustum of a square pyramid in terms of the lengths of the sides of the square bases and the distance between the bases. No. 10 seems with like certainty to indicate that the Egyptian of 2000 B.C. knew the formula for the area of a hemisphere, a result supposed till recently to have originated with Archimedes. This problem is to find the area of a hemisphere whose diameter is $4\frac{1}{2}$ and the successive steps are equivalent to substituting in the formula

$$((2d - \frac{1}{2}d) - \frac{1}{6}(2d - \frac{1}{6}d))d = 2 \cdot \frac{256}{81} r^2,$$

if d is the number of units in the diameter of the hemisphere and r the number of units in the length of the radius. The number $\frac{256}{81}$ is exactly the value which we would think of as corresponding to π in the calculations of no. 41 of the Rhind mathematical papyrus.

Problems 5, 8, 9, 12, 13, 15, 16, 20, 22, 24, have their parallel in the papyrus problems of nos. 69-78 of the Rhind papyrus. No. 4 is identical in conditions and similar in expression to no. 51 of the Rhind. There are also rule-of-three questions (nos. 11 and 23).

No. 7 contains a special word, ldb, for ratio, an idea of which Peet (1923, 2), p. 60 believed the Egyptians innocent; and no. 11 has an expression for the square of a quantity, sn. In no. 14 the square of a number is indicated by a pair of legs which are also used for addition in no. 28 of the Rhind papyrus. In no.

44 of the Rhind and in nos. 7 and 17 of the Golenishchev papyrus the words iw and wsh are respectively used for length and breadth, or sides, where a rectangle or a right angled triangle is in question. Since different Egyptian words mry-t and tp-r¹ are used, possibly for altitude and base, in no. 51 of the Rhind and in no. 4 of the Golenishchev papyrus, Struve argues with force, as Gunn 1926 [1923] did, that the terms no longer refer to two sides, and that the area of an isosceles triangle is being considered in each one of these problems; the drawings alike bear out this interpretation. The sign for square root used in nos. 6, 7, and 17 of the Golenishchev papyrus is also found in other contemporary documents. I am greatly indebted to Professor Struve for generously supplying me with the detailed information given above concerning the papyrus, long in advance of its publication. This unpublished work is the only publication listed in my Bibliography which I have not personally inspected.

It is not without interest to add that the Rhind and Golenishchev mathematical papyri both seem to have been found in Thebes and very near to one another. We are told that the Rhind papyrus was found in a small building near the Ramesseum. The following statement made by Golenishchev on 25 June 1929, in a letter to Doctor L. S. Bull, suggests that his papyrus was found only a few hundred yards away:

"En réponse à la demande, que vous m'adresser, je ne puis malheureusement vous donner qu'un bien maigre renseignement. À un voyage, que je fis en Égypte, si je ne me trompe, en 1892/3 (ou bien en 1893/4), j'ai eu l'occasion d'acheter le petit papyrus mathématique chez Abd el-Rasoul, un des frères, qui autrefois avaient détenu le secret de la cachette royale de Deir el-Bahari. C'était, si je m'en souviens bien, l'aîné des frères, notamment celui qui, après une bonne bastonnade, avait dévoilé le secret, du temps de Mr. Maspero, et qui, ayant plus tard reçu, pour le petit dérangement subi, une somme d'argent de la part du Gouvernement Égyptien, s'était bâti une maisonnette au pied de la colline de Sheikh Abd el-Qourna. Un jour, en revenant d'une visite aux tombeaux de Qourna, je m'arrêtai chez Abd el-Rasoul, que je connaissais de longue date, et c'est lui qui, au moment des adieux, m'offrit pour une somme assez modique ce petit manuscrit. Lorsque je m'en rendis acquereur, le papyrus n'était pas encore déroulé et c'est en relevant légèrement l'extrémité libre du petit rouleau, que dès le premier moment j'ai pu me rendre compte de l'intérêt exceptionnel qu'il présentait. Au dire du vendeur, ce manuscrit devait provenir de la nécropole de Dra Abou'l Negga, ce qui était assez plausible autant par rapport à la paléographie du papyrus, que par rapport à l'âge de la nécropole de Dra Abou'l Negga. Mais, comme ordinairement dans des cas analogues, il ne faut pas prendre à la lettre les assertions des fellahs, car tout naturellement ils tâchent de dissimuler l'endroit de leurs fouilles clandestines et ils cherchent à dépuister celui qui leur achète des antiquités.

"Voilà . . . ce que je puis vous dire sur la provenance du papyrus mathématique qui m'avait appartenu autrefois et qui, avec toute ma collection d'objets égyptiens a passé en 1912 à Moscou, contre une rente viagère, que le Gouvernement Russe s'était engagé de me payer ma vie durant."¹

¹ We understand that the "rent viagère" has not been paid since the fall of the Imperial Government in 1917.

ADDITIONS AND CORRECTIONS

¶ In the 1923 edition of Erman (1885), for "pp. 423-428" read "pp. 396, 420-428."

¶ Under Hulstsch (1895) for "*Gesellschaft der Wissenschaft*" read "*Gesellschaft der Wissenschaften*." Corresponding changes are to be made in the Index.

¶ In line 15 of the commentary on Grenfell (1903) for "equal to 3" read "equal to 3;".

¶ In Hilprecht [1906] there is a reference to "Hilprecht (1903, 1906):" for this read "Hilprecht (1906)," since the 1903 publication was only a general lecture (German ed. 1903, English ed. 1904) containing comparatively little of mathematical interest.

¶ In Griffith (1907) I referred to the fact that a sign for square root had been first found in Kahun papyri, plate VIII, line 40. It was this same sign which was the subject of the note Ruska (1908). The hieroglyphic sign in question is $\sqrt{\quad}$, which reminds one of our modern symbol for square root but there is no connection (see F. Cajori, *History of Mathematical Notations*, vol. 1, 1928, pp. 360-369). In shape the symbol is a gnomon discussed at length in Cantor (1907) p. 161 f; and Heath (1921), vol. 1, pp. 77-82. The same sign for square root is used in the Berlin papyrus 6619 (Shack-Schackenburg (1900), p. 136, plate IV, and Schack-Schackenburg (1902), p. 65), and, in the Golenishchev mathematical papyrus (problems 6, 7 and 17). These three papyri all belong to the period about 1850 B. C.

¶ Of Möller (1909) there was in 1927 a "2. verbesserte Auflage" of vols. 1 (8 + 76 pp.) and 2 (4 + 74 pp.). In reality, however, the new edition is nothing but a reprint, (on both sides of each sheet instead of on one side only), with a few listed corrections. In the second last line of the note on Möller (1909) substitute "pp. 16-18" for "pp. 18."

¶ Of Löffler (1912) there is a third edition: *Ziffern und Ziffernsysteme*. I. Teil: *Die Zahlzeichen der alten Kulturvölker*. 3. durchgesehene Auflage. Leipzig, 1928, 54 pp.

¶ Add to the Subject Index: "Goettingische gelehrte Anzeigen 1916 [1916]." Also: "Gesellschaft der Wissenschaft, Gelehrte Anzeigen, see Goettingische gelehrte Anzeigen." Add also: Smith, S. [1916].

¶ In connection with Gunn's review of Peet (1923, 2) I referred to a forthcoming publication of Gunn; a more exact reference is as follows: Service des Antiquités de l'Égypte. *Excavations at Saqqara, Teti Pyramid Cemeteries* by C. M. Firth and B. Gunn. Cairo, 1926. Vol. 1, text, pp. 147-148, 271-272; vol. 2, plates, plate 3. These references are only to Gunn's part of the work. The particular document here is a mastaba tomb of the sixth dynasty (about 2500 B.C.), part of inscriptional material excavated at Saqqara during the seasons 1920-22.

¶ In my comment on Tsinserling (1925) I referred to five problems by numbers occurring in the article. They seem to have been the numbers assigned by Turaev. These numbers, together with the corresponding columns of the papyrus, were given as follows: 1 (col. I), 2 (col. II), 9 (col. XX-XXI), 12 (col. XXV-XXVI), and 15 (col. XXIX-XXX). In Struve's standard edition of 1930, however, these numbers are respectively: 6 (col. VIII), 7 (col. IX), 14 (col. XXVII-XXIX), 17 (col. XXXIII-

XXXIV), and 21 (col. XXXVIII-XXXIX). Struve's no. 4 (cols. I-II) was regarded by Turaev as a fragment; Struve's no. 5 (cols. VI-VII) and 20 (col. XXXVII) were not listed by Turaev at all. According to Struve's present count there are in the Golenishchev mathematical papyrus 45 columns containing 25 problems. The text and foot-notes in this Bibliography for both Turaev (1917) and Tsinserling (1925) will need to be revised, as indicated above, in order to be in conformity with the Struve edition.

But furthermore, in Tsinserling (1925) I called special attention to the fact that $\frac{1}{8} \frac{1}{16} \frac{1}{240}$ was used in problem 17 (cols. XXXIII-XXXIV), instead of $\frac{1}{8} \frac{1}{15}$, as the equivalent of 2 divided by 5. Struve now gives $\frac{1}{8} \frac{1}{15}$ as the translation; how the other one was ever arrived at is a mystery.

In the last foot-note, line 3, the words *mryt* and *tp-r* should be interchanged, if they are to correspond respectively to "length" and "breadth." Moreover to conform with the forms used in [1930] and elsewhere they should be *tp-r* and *mry-t*.

¶ Of Neugebauer (1926) there is an interesting review by Wieleitner in *Archiv für Geschichte der Mathematik, der Naturwissenschaften und der Technik*, July, 1927, vol. 10, pp. 233-237. Last two sentences: "Man kann nicht nur zu viel in alte Texte und Verfahren hineinlesen, sondern auch zu wenig. Ich glaube, dass Neugebauer das letztere in etwas weitgehendem Masse getan hat."

¶ Under Gardiner (1927) there is a reference to the third edition of the *Ägyptische Grammatik* of Erman, the father of scientific Egyptian philology. The fourth edition appeared in 1928 as volume 15 in "Porta linguarum orientalium," and with the following title: *Ägyptische Grammatik. Mit Schrifttafel, Paradigmen und Übungsstücken zum Selbststudium und zum Gebrauch in Vorlesungen. 4. völlig umgestaltete Auflage*. Berlin, 1928. 16 + 309 lithogr. pp. + 10 pp. The sections on numbers, paragraphs 240-247 are much more condensed than Gardiner's, as indeed the whole grammar is, but there is further information and there are certain points of disagreement with Gardiner.

The principal Coptic grammars are the following: A. Mallon, *Grammaire Copte avec Bibliographie, Chrestomathie et Vocabulaire*. Third edition, Beyrouth, 1926; 18 + 325 + 192 pp. + 1 plate with the cursive forms of the coptic numbers (numerals and calendrical matters are treated pp. 72-84). G. Steindorff, *Koptische Grammatik mit Chrestomathie, Wörterverzeichnis und Literatur*. ("Porta linguarum orientalium," vol. 14.) Zweite gänzlich umgearbeitete Auflage, Berlin, 1904; 20 + 242 + 104 pp. (numerals treated, paragraphs 81-82, 175-184). W. Till, *Achmimisch-Koptische Grammatik mit Chrestomathie und Wörterbuch*. Leipzig, 1928, autographed; 3 + 21 + 312 + 29 pp. (numerals treated pp. 98-104).

¶ For the entry Gillain (1927) the following is to be substituted:

GILLAIN, O., *La Science Égyptienne. L'Arithmétique au Moyen Empire. Avec une préface de H. Bosmans*. Brussels, 1927. 16 + 326 pp.

The preface by Bosmans (pp. v-xvi), dated October, 1927, was published also as a supplement to *Mathesis*, vol. 42, January, 1928. In Gillain's bibliography pp. 321-324 are 58 of the titles given in my bibliography, which, except for the

ARCHIBALD

supplement, was printed but not issued to the public, before the appearance of Gillain's work.
 Review by R. C. Archibald, *Isis*, vol. 11, December, 1928, pp. 395-398 (containing a new solution of no. 64 of the Rhind papyrus).
 Review by T. L. Heath, *Nature*, vol. 122, August 11, 1928, pp. 195-197.
 Review by [F. Petrie], *Ancient Egypt*, December, 1928, pp. 123-125.
 Review by D. E. Smith, *Bulletin of the American Mathematical Society*, vol. 35, May-June, 1929, pp. 407-408.
 Review by H. Wieleitner, *Mitteilung zur Geschichte der Medizin und der Naturwissenschaften*, vol. 27, May, 1928, p. 150.

¶ In the "Chronological List of Documents Discussed:" (a) under date "1315 B.C.," for "Anastasy papyrus" read "Papyrus;" (b) of course the words "wholly unpublished" in the first footnote 3 are not true at the present time.

CHRONOLOGICAL LIST OF DOCUMENTS
 TO WHICH REFERENCE IS MADE

| <i>Approximate Dates</i> | <i>Documents</i> | <i>Locations</i> |
|--------------------------|--|------------------|
| 2500 | Tomb inscription (hieroglyphic) | Cairo |
| 2200 | Tablet M. I. O. 7375 (cuneiform) | Constantinople |
| 2000 | Clay tablet VAT 6597 from Akkad (cuneiform) | Berlin |
| 2000 | Tablets 362-368 (cuneiform) | Strasbourg |
| 1900 | Tablet of Senkereh, no. 92680 (cuneiform) | London |
| 1900 | Tablets Bu.: 91-5-9, 263 (now no. 80150) (cuneiform) | London |
| 1850 | Golenishchev mathematical papyrus (hieratic) | Moscow |
| 1850 | Kahun papyri (hieratic) | London |
| 1850 | Thebes papyrus 6619 (hieratic) | Berlin |
| 1650 | Rhind mathematical papyrus 10057, 10058 (hieratic) | London |
| 1650 | Leather Roll (hieratic) | London |
| 1460 | Tablets 268-274 (cuneiform) | Brussels |
| 1460 (?) | R. O. M. A. Bab. Tab. 711 and 767 (cuneiform) | Toronto |
| 1200 | Papyrus Anastasi I (hieratic) | London |
| 650 | Tablet BU85-4-30, 144 (now no. 77951) (cuneiform) | London |
| 650 ¹ | Tablet K90 from Akkad (cuneiform) | London |

¹ This date was kindly furnished to me, in a letter dated 26 September 1929, by Mr. C. J. Gadd of the Department of Egyptian and Assyrian Antiquities in the British Museum: "K90 is in the Kuyūnjik collection, the remains of Ashur-bani-pal's library, and therefore of the 7th century B.C." Most writers who refer to the matter placed the date much earlier, about 2000 B.C.

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INDEX

The abbreviations are similar to those used in the main part of the Bibliography. AC preceding a reference in the present index indicates that it refers to the Additions and Corrections of this Supplement. The authors and subjects are here combined in one index.

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THE MATHEMATICAL LEATHER ROLL

BRITISH MUSEUM 10250

THE MATHEMATICAL LEATHER ROLL IN THE BRITISH MUSEUM¹

By S. R. K. GLANVILLE, M.A.



THE hieratic leather roll, B.M. 10250, of which a photograph is shown on the opposite page, is published in full in the *Journal of Egyptian Archaeology*. The following note will explain the photograph. The roll was acquired by the Trustees of the British Museum, with a number of others from the collection of Mr. A. H. Rhind, in 1864. Owing to its extremely brittle state it was impossible to unroll it at the time, and its contents have necessarily remained inaccessible till the present day. The process by which Dr. Alexander Scott, F.R.S. succeeded in unrolling the manuscript is fully described elsewhere.²

The roll is said to have been found with the Rhind papyrus, and by its writing is shown to have been of much the same date.

It consists of a series of sums in addition of fractions, in duplicate. This reduplication makes possible the almost certain restoration of the right-hand column, the great part of which has been broken away. Certain errors in the second copy of the series all appear to have occurred in the first, indicating that the former was copied, figure for figure, from the latter, without reference to the calculations.

Some of the sums are too complicated to have been worked out without some preliminary jottings—to judge from our experience of the Rhind papyrus and other extant mathematical works—and we may therefore assume that these examples are abbreviated statements of problems which were stated more fully elsewhere. Now in essence our sums exhibit the same mathematical processes as those involved in the *skm*-examples of the Rhind papyrus; and as a matter of fact the twelfth sum in our list exactly corresponds to Peet's Number 11. We may therefore conclude that the scribe of the leather roll was making himself a table (in duplicate—perhaps eventually to be cut in half) from a series of *skm*-examples contained in some larger text-book. In other words the leather roll is a small book of tables for practical reference in the hands of the student or scribe; in contradistinction to which the papyrus is seen to be a text-book for the teacher.

Undoubtedly the chief interest of the leather roll is in its relationship to the Rhind papyrus.

*. Mr. Glanville's note was written in September, 1927. That the roll may have greater significance than he at first thought is suggested in papers by Neugebauer and Vogel, listed in the Bibliography under 1929.—R. C. A.

¹ The roll is discussed at length by me, with transcription and translation in the *Journal of Egyptian Archaeology*, vol. 13, Nov., 1927.

² *British Museum Quarterly*, vol. 2 (1927) no. 2; *J.E.A.*, *ibid*. The photograph on the opposite page is similar to the one reproduced in the *Quarterly*. In the reproduction in the *Journal* a number of fragments have been added, especially in column 1.

Fragment of a leather roll containing handwritten text in an ancient script, likely Hebrew. The text is arranged in several columns and includes various symbols, including the letter 'א' (Aleph) and the number '11'. The script is highly stylized and appears to be a form of shorthand or a specific dialect. The fragment is heavily damaged, with significant portions missing, particularly in the center and right-hand side. The remaining text is written in black ink on a yellowish-brown, aged leather surface.

LEATHER ROLL, B.M. 10250

INDEX OF SELECTED EGYPTIAN WORDS

A number alone, or the first one of a reference, stands for the number of a problem. The Title-page of the Rhind papyrus is denoted by "T," and references to the table of the division of 2 by odd numbers are in the form, "2 divided by 3." References to the Preface and Introduction of this volume are by page (a small roman numeral). When a particular line of a problem is to be indicated the reference is in the form, "24.2" (for Problem 24, line 2), or sometimes "24a2." The line number always refers to the lines on the plate; the corresponding position on the opposite page, often with an explanatory footnote, is easily found. For "footnote" the abbreviation "ft" has been used; plural, "fts." For most of the words listed all of the occurrences in this papyrus are given. Only one or two references are given to the Supplementary Bibliography, as this has a full index of its own.

- iw*, length, 44; see Struve, 1930.
ih-t, area, land, field, 49-52, 54, 55.
ih-t, akhet, first season of the year, T, 87; see 71 ft 9.
i, y, use of in this book, xii; *y* represented by a man with hand forward, xii; *y* final, often omitted, 71 ft 3.
i-t, series of fractions, 38c4 ft 3.
ih, error, 15.
iy, come, (iy-n) 67.
iw, come, return, 35-38.
iw, be, 56-3, 58-1, 67-3, 68-2; auxiliary, T-1, 35-38, 62-2; the construction *iw* Ir X, Y *pw* occurs in 58a5, 62-4, and 86-5(?).
iw-t, ox, 67, 84, 86; written phonetically only in 84-2.
lwn, pillar, perhaps cone, 60.
lbd, month, T, 83-8, 84-9, 87.
lfd, rectangle, rectangular, from the same stem as *ldw*, 44, 49, 51b2, 52-3.
im, form of the preposition *m* before suffixes, 62, 66, 80.
im, therefrom, adverb from the preposition *m*, 69, 79, 76, 78.
lmy, preceded by *n* with suffix to express possession, 56-60; may be related to the preposition *m*, 56 ft 2.
lmy-t-pr, house-inventory, 79.
in, lo, T-3, 28-4; *in m*, then what? 35, 37.
iny, bring, 67 (in-n); buy, 62 (in-tw, iny-t).
ir, as for, 69c5, 70d3, 80-1, 81-2, a1, b1, 83-1, 4; *lw* Ir, 58a5, 62-4, 86-5(?); *ir*, if, 30, 47, 62 ft 8, 68.
ir(y), make, do; *ir-t my* hpr, 2, 6, 24, etc.; *ir-t myt-t* in 4 and 5, 4 ft 3; *ir m*, Ir n, construction, 66 ft 4; *ir-t*, finite form, 87 ft 8 (the infinitive *ir-t* occurs many times).
iry, adjective from the preposition *r*, 86-7; *iry-'i*, door-keeper, 65; *iry-w-'wt*, functionaries, 80.
irw, cattle-numbering, 67.
ih, cattle, 67 ft 4.
lky, reckon (?), 49-1; unknown elsewhere.
lat grt, now, now then, T, 67.
lt, barley, 64, 68c3, 83, 86; see 8m'.
'iw, excess, 22, 72.
'pr, supply, equip, 65-2.
'nd, few, small, 67-2.
'h', stand, stop, used apparently as marginal direction by the scribe, 32-14, 64 end of line 1, note; *'h'-n*, auxiliary verb, 71.
'h', quantity, 24-27, 30-34, 36.
'h'-t, number, quantity, 72, 76, 78.
'si, various, 62; great (cattle-amount) 67-3; common, ordinary, 84.
'k, enter, 83; passive, was entered (of a city), 87; accrue, be added, 28.
'kw, food, 82, 83, 84.
w, abbreviated sign, xii, 72 ft 12; plural ending, x; in *tw* often omitted, 38 ft 1, 62 ft 13.
wih m (instead of *wih-tp m*), multiply, 26, 44; operate on, 60; see 44 ft 4; *wih hr*, add to, 21-23, 64, 72; *wih-tp m*, multiply, 41, 43, etc.; operate on, 21, 22, etc.
wy, particle added to adjectives for emphasis, 'nd-wy, 67-2.
w'w, one, 63, 79 and ft 1, 83 ft 4, 86.
w't, unit, 69 ft 1, 70.
wnm, eat, 82-84.
wnm, food, 65, 86.
wnm-t, food, 82B.
wr, how much, how many, 45, 73.
wht-ib-t, ukha-thebet, line at the base of a pyramid, 56-59, see 56 ft 1.
wsh, breadth, 43, 44, see Struve, 1930.
wdy, see d.
wj', remain, 28.
wjy-t, wedjet, a kind of flour, 72-78, 82; position of *w*, plural strokes, 72 ft 12.
blk-w, dues, 67.
bsh, besha, a kind of grain, 71.
bd-t, spell, 79, 82, 84, 86.
pt, feminine *t'*, plural *n'*, weak demonstrative and definite article, precedes its noun, x, 30-3, 32-9, etc., see 53 ft 3; *pt pw*, that this is, 57-4, 58-4, 60-3.
pr-t, quail (?), 83.
pw, this, x, occurs many times; (this means) 38, 62.
plsw (plsw), pefsu, baking or brewing ratio, from *psy*, 69-78, 69 ft 2, 71 ft 7.
pn, this, feminine *tn*, plural *nn*, singular follows, plural precedes its noun, T, 28, 46, 66, 67, 87; cursive form, 56, 58, 67.
pnw, mouse, 79.
pr, house, 79.
pry, go out, be subtracted, 28; be issued, 66.
pr-m-ws, per-em-us, vertical height of a pyramid, 56-59, see 56 ft 1.
prw, excess, difference, 64.
psy, cook, with a special meaning: value what is baked or brewed in terms of the grain that went into it, 74.
plsw, see *plsw*.
psb, divide, 1, 64.
psb-t, share, 64.
fdw-nw, fourth, from the same stem as *lfd*, 68.
m, preposition, x; *in*, 64-2, 69c5, 70d4; of, consisting of, 71-3 end; *m* of equivalence, represented by a colon in the literal translation, x.
m, what? 30-1, 71 ft 8; see under *in*.
m, enclitic particle after imperatives, 21 ft 1.
my, like, as, 66; if, 49, 51, 52, 61B, 62, 64, 72, 73, 77, 78.
myt-t, the like, the same, (myt-t pw) 1, 3, 5, 46-5, see 4 ft 8.
myw, cat, 79.
mnw-t, dove, 83.
mr, pyramid, 56-59; its determinative, 59B ft 4.
mry-t, side of a triangle, 51, 52.
mh, cubit, 43, 46, 56-60; cubit-strip, 53-55; special sign (?) for 10 cubit-strips, 53 ft 2, 54.
mh, fill, (mh-kwy) 35-38.
mh(y), Lower Egyptian, (It mh) 83.
mtr, average, (in *psb-t mtr-t*), 64.
n, lo, for, written with arms, 1, 3, 4, 6, 39, 40, 60, 62, 63, 65, 66, 68, 80, 83.
n(y), genitive adjective, 62 ft 7; *n-t* (feminine), 51, 52, 68-2; *n-sw*, it is of, 45-1, 2, 46-2; *n-t*, noun, (*n-t pw*) 4 ft 8, 6.
n-form of verb (*ly*, 'h', *h'iy*, *hpr* 30, *sy*, *spbr*, *shn* (*shn*), *dp*, *dd* 67), generally indicates past time, x, 30 ft 1.
n', the, plural of *pt*; with *n*, 65-2; used absolutely, these, 67c2, d.
ny6 . . . *hnt*, call . . . out of, 2 divided by 3 ft 1, occurs at the top of each page of the table of the division of 2 by odd numbers, and in 35, 37, 38, 63-3, 66-3, 67a5; *ny6* . . . *hft*, 57-2.
ny6, reckoning, (*tp n ny6*) 44, 56.
ny6w, accountant, 67.
nw, ordinal ending (with *ldw*, *hmt*, *sn*).
nmt-t-tpd-w (?), fowl-yard, 82.

nn, *these*, plural of pn, 68, 84.
nt-f, *us belonging* (the same word as the pronoun ntl), 49a3 ft 5.
nty, *which*, 43 ft 3; fem. nt-t, *that which (is)*, T, 62, 82.
nđ, *grind*, 82.
nđ, *meal*, 69, 70.

r-like sign, *dillo*, xi, 47, 84 ft 13, 86.
r-like sign in *pefsu*-problems, 72-74, 76, see 72 ft 4.

ri, *part*, as in fractions; some write it r, x, xi.

r:, *ro*, unit of capacity, $\frac{1}{20}$ of a *hekat*, 35, 38, 43, 47, 66, 68-70, 81-84, method of writing, 47 note.

r:, *goose*, 82, 83.

ri-pw, *or*, placed after both of the words which it connects, 47.

R', the sun-god R6'; in proper names, T ft 5.

rmg, *people*, 65 ft 4.

rnp-t, *year*, 66, 86; see h:t-sp.

rht, *amount, content, dimensions*, 41, 43, 44, 46, 50, 52, 53, 62, 63, 69, 74, 82B, 86.

rdy, see dy.

h'iy, *go in, go down*, T (h'it), 35-38 (h'it-kwy), 41-44 (h'it), 45, 46 (h'it-n).
h'nw, *hinu*, $\frac{1}{10}$ of a *hekat*, 80, 81, 83, 86.

h'it-sp, *year of reign*, T, 87, see rnp-t.

h'k, *cut-off line* parallel to the base of a triangle, 52.

h'k-t, *truncated triangle or trapezoid*, 52.

h'sb, *reckon, count*, 67, 81; tp-h'sb, *accurate reckoning*, T.

h'k't, *hekat*, fundamental unit of capacity (about half a peck), 35, 37, 38, 41-47, 64, 66, 68-70, 72-77, 79-84, 86; Horus eye fractions of a *hekat*, 35, 37, 38, 43, 47, 64, 66, 68-71, 75, 80-84; special signs for *five*, 47, 68, 76, 77, 83, 84, 86, for *six*, 68, 82, 84, for *seven*, 70, 75, 84, for *eight*, 82, for *nine*, 84, for *ten*, 64, 66, 68, 72, 73, 76, 78, 82-84, 86; 2-h'k't, 82, 84; 4-h'k't, 41-47, 68, 86;

simple *hekat* written with stick and grain-measure, 64-1, 2, 66-1, 2, 69-1, 70-1, e3, 82-6, 7, 10, 83-5, 6, 84-1, 7; all the writings of double and quadruple *hekat* include these signs.
htr, *estimate*, 82, 84.

h'iy, *measure*, 80.

hb, *take away, subtract*, 41-43, 50, 53-55, 64, 71, 82.

hnt-nw, *third*, 68.

hr, with verbs, hortatory, x.

ht, *khet*, linear unit equal to 100 cubits, 49-52.

htmy-t, *cooped-up fowl* (collective), 83.

h, the alphabetic sign h does not occur in this papyrus, xiii.

h'r, *khar*, unit of capacity, equal to 20 simple *hekat*, 41, 43, 44.

hr, preposition, *under*, 62, 67.

hry, *the one under*, from the preposition hr, 64.

hr-t, *share, basis, portion*, from the preposition hr, 63, 66, 70, 73, 76, 82, 83.

s and š interchangeable, xiii.

snt-t (šnt-t) *sentel*, line at the base of a lwn, 60.

sr (šr), *ser-goose*, 83.

š, see s.

š-t (s-t), *set-duck*, 83.

šyp, *commil*, (šyp-n, šypy) 67.

šyty, *proof*, tp n šyty, 21, 32-35, 37, 38.

šw, *it*, dependent pronoun, 30, 32, 35-37; n-šw, see under n(y).

šw-t (sw-t), *wheat*, 82.

špjr, *copy, write*, (špjr-n) T; on the pljr-sign see 70 ft 5.

špd-t, *triangle*, 51.

šn-nw, *second* 68; *neighbor, next one*, 64.

šhwy, *list*, 68.

šhn (šhn), *ensfold, receive*, (šhn-n) 68.

škm-t (š instead of š in 42), *working-out*, occurs at the top of each page of the table of the division of 2 by odd numbers, and in 41-44, 46, 58, 60, 65, 66.

škd, *seked*, ratio in a pyramid, 56-60, see 56 ft 1.

škm, *complete*, 7, 21-23.

šty, *pour*, 71.

štwty, *content, result*, 45, 46, 60.

št't, *setat*, unit of area, a square *khet*, 48, 50-55; signs for $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$ of a *setat*, 53-55; special sign for *six*, 48, see 50 ft 2, for *seven*, 53, for *nine*, 48, 53; special way of writing *tens* of a *setat*, 48, 50-53.

š', *granary*, 41-47; on the š'-sign see 71 ft 9.

š'ty, *sha'ty*, unit of value (?), 62.

šm', *Upper Egyptian barley* (lt šm'), 74; *Upper Egyptian ox*, 84.

šmw, *šhōmu*, third season of the year, 87; see T ft 4.

šn', *granary*, 80.

šsp, *palm*, unit of length, 56-59.

šš (ššr?), *grain*, 35, 37, 38, 41-47, 68, 82.

šd, *nourish, fatten*, 82, 83.

šty-n-brw, *height of top*, 60; k'w, *height*, 43, 44.

štb, *double*, 65, 70; on the k'ib-sign see 70 ft 5.

ky, *fashion, method*, 41-43.

krl-t, *bag* (?), 62.

kwy, pseudo-participle ending, first person singular, 35-38, 67.

km, *be complete*, 21, 22, 67; *add*, 37.

gb, in ty-t gb-t, *uneven fraction*, 61B.

gm, *find*, used in the table of the division of 2 by odd numbers for all the numbers not multiples of 3 after 41 except perhaps 101, and with 93 and 99 (see 2 divided by 43, note), and in 43, 55, 67; r gm-t, *for the finding of*, 21, 22, 26, 30, 38, 55-60, 62, 65, 68-72, 76.

t and t interchangeable in some words, xiii.

t, feminine ending, x.

tt, *loaf, bread*, so write it t, x; occurs in 1-6 and in many other problems; tt-w may be singular, 3 ft 2; writing of tt-w on patches, 63 ft 1, 72 ft 2.

tt, *the*, feminine of pt, 38, 55, 65, 72, 73; *this*, 53.

ty, particle (in hpr-ty-šy), 61B.

ty-t, ty-t, *fraction*, 61, 70.

tw, passive particle or indefinite pronoun. T, 38, 61B ft 7, 62, 64, 86-11; the w sometimes omitted, 38 ft 1, 62 ft 13, 64 ft 8.

tw, *attack* (?), 87.

twnw, *difference of share*, 39, 40.

tp h'sb, *accurate reckoning*, T.

tp-r, *base* (of a triangle), 51, 52.

tpy, *first*, 68.

tn, feminine of pn, *this*, 62 twice.

t, see t; the t-sign occurs in the papyrus only in the words rmt, tny, and ttp.

tny, *where?*, 67.

trp, *terp-goose*, 83.

d and d interchangeable in some words, xiii.

d (from wdy ?), *put*, 84-1 and ft 1.

dy, abbreviated form of rdy, *give*, etc.; *endow*, T; *add*, 41, 42 (translated *put*); *assign*, 62; *cause*, 47, 56, 58-60, 63, 69, 87; *give*, 51, 52, 82; dd, reduplicated form, 62 (see fts 9 and 12).

dbn, *round*, 41-43, 47, 50; on the dbn-sign see 70 ft 5.

dbn, *deben*, a unit of weight, 62.

dhb, vessel for measuring, 80.

dp, *make mild, weaken* (?), (dp-n-tw) 71.

dn, *dilute*, 71.

ds, dšy, *des*, vessel of fixed capacity, 71, 77.

dd, reduplicated form of the verb dy, 62.

d, see d.

dj-t, *crane*, 83.

dj-t, *remainder*, 2 divided by 17, 19, 23, etc., many times.

djt, *exchange*, 72-78.

6 and $\frac{1}{6}$, special signs, 61 fts 2 and 4, 67 ft 12.

60 written for 80, 2 divided by 43, note. $\frac{1}{40}$ fractional dot sometimes omitted because 40 has already one dot, 2 divided by 21 note.

GENERAL INDEX TO VOLUME II

For the explanations see the beginning of the preceding index.

- Akhet*, first season of the year, T, 87.
 Alphabet, xii-xiii; alphabetic complement, ix, (with bi- and tri-literal signs) 72 ft 1.
 Area problems, 48-55; see also Circle, Hemisphere.
- Barley, 64, 86-8-10, 14; Lower Egyptian, 83, Upper Egyptian, 74 ft 5.
Beska, a kind of grain, 71-2.
- Circle, area, 41-43, 50.
 Collectives, written with plural strokes, 3 ft 2.
 Crane, 83.
 Cubit, unit of length, 43, 46 end, 56-60; cubit-strip, unit of area (100 square cubits), 53-55.
- Day, 66, 82-84, 87.
Des, vessel of fixed capacity, used for beer, 71, 77.
 Determinatives, ix.
 Diagram of the Rhind papyrus, xvi.
 Ditto, r-like sign for, xi, 47, 84 ft 13, 86.
 Dots used in hieratic, xi-xii, in the transliteration, xii; used to denote fractions, v, often omitted, xi, notes to 2 divided by 9, 17, 21; used by mistake with whole numbers, 32 ft 2; case of expressions representing two multiplications, 2 divided by 7 note; expressions with gm, 2 divided by 43 note.
- Dove, 83.
- Enigmatic writing, 85.
- Finger, $\frac{1}{4}$ of a palm, 57-59.
 Finger-prints, 68 ft 12.
 Fractions, method of writing in Egyptian and in our transliteration, v; fractions of a *hekat* and of a *setat*, special signs, xi.
 Fragments, New York, placing, 2 divided by 89-101 fts, Problems 1-5 fts.
- Gender of article or demonstrative with 100 and 1000, 65 ft 6, 72 ft 8, 74 fts 3 and 7, 78 ft 5.
 Genitive adjective, 51 ft 2, 62 ft 7; after w', 79 ft 1, 83 ft 4; after pw, 72 ft 9.
 Goose as a general determinative, 83 ft 12.
 Granary problems, 41-46.
- Hekal*, fundamental unit of capacity used for measuring grain (about half a peck, see volume I, page 31), 35, 37, 38, 41-47, 64, 66, 68-84, 86; double, 82, 84; quadruple, great quadruple, 41-47, 68, 86; hundreds of, 41-47, 68, 74, 76, 82, 84, 86; $\frac{1}{2}$ and $\frac{1}{4}$ of a hundred *hekat*, 42, 76, 82, 84, 86; Horus eye fractions, 35, 37, 38, 43, 47, 64, 66, 68-71, 75, 80-84; special signs for numbers and fractions, xi; see *ro*, *khar*, *hinu*.
- Heliopolis, 87 ft 4.
 Hemisphere, see Struve, 1930.
 Hieratic, hieroglyphic, x.
Hinu, $\frac{1}{10}$ of a *hekat*, 80, 81, 83, 86.
- Ideograms, ix.
- Khar*, $\frac{1}{20}$ of a *hekat* (see volume I, page 32), 41, 43, 44.
Khet, linear unit, equal to 100 cubits, 49-52.
- Loaves for feeding animals, 82, 84.
 Lower Egyptian barley, 83.
- Measures: area, see cubit-strip, *setat*; capacity, see *hekat*, *hinu*, *khar*, *ro*; length, see cubit, finger, *khet*, palm; time, see day, month, year.
- Month, T, 83-8, 84-9, 87.
 Multiplications, expressions representing two, 2 divided by 7 and 17 notes.
- Names with Rê', T fts 5 and 6.
 Numbering of problems, lines, etc., v.
 Numbers, hieratic and hieroglyphic, signs, xi; of *hekat* and *setat*, special signs, xi.
- Palm, unit of length, $\frac{1}{7}$ of a cubit, 56-59.
 Passive, impersonal use, 80 ft 2.
 Patches on the papyrus, 1 ft 3, 59 ft 4, 67 ft 6, 68 fts 6, 11, 13, and 14, 69 ft 4, 86 note.
- Pefsu*, baking or brewing ratio, *pefsu* problems, 69-78; special way of expressing the *pefsu*, 72 ft 4.
Per-em-us, vertical height of a pyramid, 56-59.
 Perfective, old, see pseudo-participle.
 Pillar, 60.
 Plural strokes, x, 3 ft 2, 71 ft 7, 72 fts 7 and 12.
 Pronunciation of Egyptian words, xii-xiii.
 Pseudo-participle or old perfective, x, 28 ft 2, 35 fts 1 and 2, 67 ft 11.
 Pyramid problems, 56-60.
- Quail, 83.
- Rectangle, rectangular, 44-47, 49, 51, 52.
 Relative form, 67 ft 9, 84 ft 4.
 Rhind papyrus, diagram, xvi.
Ro, $\frac{1}{320}$ of a *hekat*, 35, 38, 43, 47, 66, 68-70, 81-84.
- Seasons of the year, T ft 4, 87 ft 3.
Seked, ratio in a pyramid, 56-60.
Setet, line at the base of a pillar, 60.
Ser-goose, 83.
Sel-duck, 83.
Setat, unit of area, equal to a square *khet*, 48, 50-55; special signs for numbers and fractions, xi, 53-55; special way of writing *tenus*, 48, 50-53.
Sha'ty, unit of value, 62.
Shömu, third season of the year, 87, T ft 4.
 Signs, phonetic, non-phonetic, ix; special signs for 6 and $\frac{1}{6}$, 61 fts 2 and 4, 67 ft 12, see *hekat*, *setat*.
- Spelt, 79, 82, 84, 86.
- Terp*-goose, 83.
 Trapezoid (cut-off triangle), 52.
 Triangle, 51, 53, Struve 1930.
- Ukha-thebet*, line at the base of a pyramid, 56-59.
 Upper Egyptian barley, 74; ox, 84.
- Wedyet*-flour, 72-78, 82.
 Wheat, 82.
- Year, 86; 365 days, 66; of reign, T, 87.
- 100, 1000, gender of article or demonstrative with, 65 ft 6, 72 ft 8, 74 fts 3 and 7, 78 ft 5.

ADDITIONS AND CORRECTIONS

Numbers at the beginning of the paragraphs under volume I refer to pages; otherwise abbreviations are as explained at the beginning of the Index to Egyptian Words.

VOLUME I

- 4 ft 3, near the end. For "page 20, footnote 2," read "page 20, footnote 3."
 7 ft 2, end. The reference should be Baillet, 1892, page 19.
 9, fourth paragraph. The reference to Rodet should be 1881, 1, Reprint, page 37.
 35 ft. We should perhaps think of 57 as the inverse of 58, rather than 58 as the inverse of 57.
 47 ft 1. The first reference should be to Problem 35, footnote 4, not to Problem 41.
 52, 2 divided by 25. The last fraction should be $\frac{2}{5}$, not $\frac{1}{2}$.
 59, 2 divided by 93. Insert the word "Find" before " $\frac{1}{4}$ ".
 80, line 15. Omit the comma after "times."
 83, third line of the last paragraph of note. The Horus eye fractions $\frac{1}{4}$, $\frac{1}{10}$, and $\frac{1}{82}$ should be in black-faced type.
 95, line 2. For $\frac{63}{100}$ read $\frac{62}{100}$.
 96 ft 1. This footnote is not very clear. The quotient (multiplier) is obtained by adding certain of the trial multipliers as Peet says, and these are mere numbers. But first certain partial products are picked out that will make the given product, and these and the product may all be things of some kind. The chief fault, however, of Peet's logic is in his use of the word "Thus." There is no connection between the division of 3 *setat* by 5 *setat* and the marking of $\frac{1}{2} \frac{1}{10}$ as *setat*.
 112, last paragraph. The reference to Rodet should be 1881, 1, Reprint, page 111.
 113. Omit the footnote.
 117, Problem 84. Insert note, "See the literal translation and note in volume 2."

118, third paragraph. The first statement is true only of Number 86.

VOLUME II

- On the second title-page of the book there should be a comma after the word "Transcription."
 x, *Demonstratives*, second paragraph. Insert after "except," "in the phrase hr t: m rht in Problem 53, and"; and to the list of problems where Peet translates p: by *this* add Problem 46.
 xi, *Fractions*, third line. The reference should be Erman and Grapow 1925, not 1926.
 xii, paragraph beginning on line 4 at the left. To the list of cases where dots are used in the transliteration should be added, "before the ordinal ending nw (Problems 64 and 68)."
 xii, next to the last line at the right. In the word heseb for h read h.
 xiii. The second line at the right should read, "Originally y, Probably also long vocalic i. At the beginning of words it often became i."
 xiii. Add a footnote to the ξ -sign, "The hieroglyphic form of the alphabetic sign ξ used in the words ξ tr and ξ dw on Plate 1, and in the word ps ξ on Plate 34, is less appropriate to the period of this papyrus than the plain rectangle given here and used on Plates 86, 107, and 108. The two diagonal lines within the rectangle are a very late adaptation from hieratic forms."
 T-1. The word h-t is an infinitive with the feminine termination t. The stem is h'y. Triliteral verbs with a final y have a feminine infinitive, in the writing of which, as with most forms of such verbs, the final y is omitted. Compare Problem 71, footnote 3.

- T-1. On the word nt-t see Problem 43, footnote 3.
 T-2. On ξ phr-n-tw see Problem 30, footnote 1.
 T-2. On the word b-t-sp see Number 87, footnote 1. The ordinary word for year is rnp-t, which occurs in Problem 66.
 T-2. On the title *King of Upper and Lower Egypt* see Gardiner, 1927, page 51, §55.
 T-3. The stem of the word lsw-t was originally lsw with the other s, and the second sign of the word had the value is. Compare Problem 49, footnote 1.
 T ft 6. The royal name is perhaps more likely to mean *Of, Truth is, Rē*; that is, *Truth is of Rē*, the construction being similar to that of n(y)-sw in Problems 45 and 46. The stroke in the word [m]':t in the royal name should be oblique in the transcription on the plate as in the hieratic, instead of vertical. It perhaps was thought of as representing the seated female figure of the goddess of Truth, Ma'et. Compare the similar stroke in snt-t in Problem 60 and see footnote 2 to that problem.
 2 divided by 3, end of footnote. For "papyrus" read "Table of the division of 2."
 2 divided by 81. The number 162 appears as 182 on Peet's Plate C. It is correct in his text.
 1. On w-h-tp see Problem 44, footnote 4.
 15. To the note add, "In Problem 15 the scribe wrote 228, 456, 912, for 224, 448, 896."
 23. Footnote 3 should have been omitted. Peet made the correction referred to in his Errata, page 136.
 27. In the third multiplication the scribe wrote 15 for 14.

- 28-2. Add footnote, "In the phrase $\frac{1}{10}$ of this 10 the scribe first placed a fractional dot by mistake over the whole number 10 and then partly erased it. The traces of this dot are visible in Photograph XII but are not reproduced on our plate."
 30. On the writing of m, *what?*, see Problem 21, footnote 1, on the writing of the enclitic particle m.
 30-2. In regard to the scribe's erroneous statement $\frac{1}{30} \times \frac{1}{23} = \frac{2}{3} \frac{1}{10}$ see note to this problem in volume 1, page 72.
 31. In the third line of the first multiplication the scribe wrote 18 for 14
 31. In Peet's explanation (page 67, line 7), "multiply 1+2+ $\frac{1}{2}$ + $\frac{1}{4}$ to find 97" should be "multiply 97 to find 1+2+ $\frac{1}{2}$ + $\frac{1}{4}$."
 32-14. The scribe wrote $\bar{3}$ for 1.
 32-29. Peet on his Plate K reads the total in red as "128 sic," but reads 228 in his text. The dot near the hundred-sign is above it so that the number could be read as $\frac{1}{128}$ instead of 228, but it could scarcely be read as the whole number 128.
 33b8. The scribe wrote i184 for i164.
 33b9. The diagonal stroke of the red hieratic $\frac{2}{3}$ following 64 has been printed in black on our plate.
 33b13. Instead of 12 as in the original Peet reads 13 on his Plate K and in his text. 13 of course is mathematically correct.
 35. Add to footnote 1, "Doubling of the consonant is rare in the pseudo-participle (old perfective). See Gardiner 1927, page 237, §310.
 35. To the first iw add the footnote, "The suggestion is made by Gardiner (1927, page 35, §29) that the verb iw, *be*, is ultimately derived from the verb iw,

- return*, which occurs in the first lines of Problems 35-38.
- 37f6. The fractional sign has been placed in our transcription and transliteration on the first multiplier 9.f of this line. The scribe neglected to insert it in the original.
38. The word *ir-tw*, which occurs twice in this problem, might better be translated *one makes* or *one multiplies* rather than as a passive with the number as subject. It is unlikely that *pw* in this construction intervenes between the verb and its subject. In view of the above the word "passive" and the last three words should be deleted from footnote 1.
38. The first occurrence of the phrase *tp n syty* should have been printed in red as on the plate.
- 38c2. For *ó* read *6* as on the plate. See Problem 61, footnote 2.
- 38c5. The forms *hr-t* (originally *hry-t*) at the end of this line and *hry-w* in Problem 40, line 1, are adjectives; and *hrw* in Problem 60, line 1 (in *k:y-n-hrw*),

- is a noun. These words are derived from the preposition *hr*, *on*, *above*.
- 38g4. The dot following the 1 near the end of the line appears in the B. M. Facsimile, and Peet on his Plate M calls special attention to it with his "sic," but it is not visible on Photograph XV.
- 41 ft 2, last sentence. For "He notes" read "Note."
- 41-5 and 42 vertical line at the right. The word *ššm-t* (written *ššm-t* in Problem 42) should be translated *working out* as elsewhere in this papyrus. The use of *s* instead of *š* in this word in 42 shows the interchangeability of these letters. The word should have been written with an *s* on the page opposite Problem 42 also, to agree with this writing on the plate.
42. In the last two multiplications and in the statement that precedes the multiplications certain fractions were omitted by the scribe. See this problem in volume 1, page 87.
- 42 ft 2. For "footnote 4" at the end read "footnote 5."

- 45 ft 2. Add, "In writing this word the hyphen as in the text is preferable to a dot as on the plate."
- 47 ft 1. For "footnote 7" read "footnote 8."
- 47 ft 2. The reference to Griffith should be to page 236, not 336.
48. Before "Peet" at the end of the note there should be a semicolon instead of a period.
- 50-3. The plural ending of *sp-w* has been omitted in our text and on our plate.
- 58b4. The scribe wrote 1 4 instead of 1 2 4.
- 58 ft 1. For "footnote 3" at the end read "footnote 4."
- 61-14. On his Plate R Peet has omitted the preposition *m* near the end of the line.
- 64-1. Peet has omitted the three grains of the *it*-sign on his Plate S. He notes in his Errata his omission of the plural strokes in this word.
- 68c3. Peet has omitted the three grains of the *it*-sign on his Plate T.
- 70 ft 3. For "footnote 2" read "footnote 1."

71. Peet says (page 113), that the *pefsu* of beer in the Rhind is 2, 2 $\frac{3}{4}$, and 5. But the *pefsu* of beer is always 2 in this papyrus except for a certain diluted beer in Problem 71 for which it is 2 $\frac{3}{4}$.
- 72 ft 5, end of first line. Omit the comma after 30.
- 77-3. Peet omits the grain-measure in the word at the beginning of this line.
- 81d3. Peet has Horus eye $\frac{4}{4}$ on his Plate W instead of $\frac{2}{2}$. It is correct in his text.

VOL. II (BIBLIOGRAPHY)

- Hincks (1854), l. 16 of note, and Lenormant (1868), l. 8 of note, for "*incomplément*," read "*incomplément*."
- Gardiner (1911), l. 5-6 of note, for "*une*," read "*un*," for "*Sidcle*" read "*sidcle*"; and in l. 10 of note for "*Littérature*" read "*Littérature*."
- Kewitsch (1915), l. 8 from end of the first paragraph of note, for "*strictment*" read "*strictelement*."
- Erman and Grapow (1925), l. 5 of note, for "*characters*" read "*uses of words*."