BO1.1. History of Mathematics
Lecture XVI
Concluding miscellany

MT23 Week 8

Summary

- The exam (briefly)
- Points to ponder
- The history of the history of mathematics*
- Hilary Term reading course

Structure of the exam paper

Section A

- Six extracts given
- Choose two and comment on the context, content, and significance
- Each extract is worth 25 marks
- Each extract is typically one short paragraph — it will relate to a topic that we have studied, though you may not have seen the precise extract before
- By way of practice, choose any quotation or short extract that has appeared on the lecture slides

Section B

- Three essay topics given
- Choose one
- Answer worth 50 marks

Typical exam questions (Section B)

Q. Discuss, with reference to specific examples, how concept X (or terminology Y, or notation Z, ...) has developed between 1600 and 1900.

Q. Discuss with reference to specific examples, how attitudes towards X have changed between 1600 and 1900.

Q. Discuss the significance of text X.

Q. Describe some aspects of the work of major figure X.

Points to ponder (1)

What is the history of mathematics?

What does it mean to study the history of mathematics?

What is mathematics?

Points to ponder (2)

What do you think the words ‘mathematics’ and ‘mathematician’ have meant throughout this course?

Have they had the same meanings throughout?

More generally, have they had the same meanings throughout history?

Points to ponder (3)

If we choose to understand the word 'mathematics' differently, how does this change our view of the history of mathematics?

How could a revised definition of 'mathematics' change the selection of people and cultures who appear in the story?

What does the study of the history of mathematics have to tell us about the way in which we approach mathematics nowadays?

Historiography of mathematics

According to the *OED*:

historiography, *n.*

1. The writing of history; written history.
2. The study of history-writing, esp. as an academic discipline.

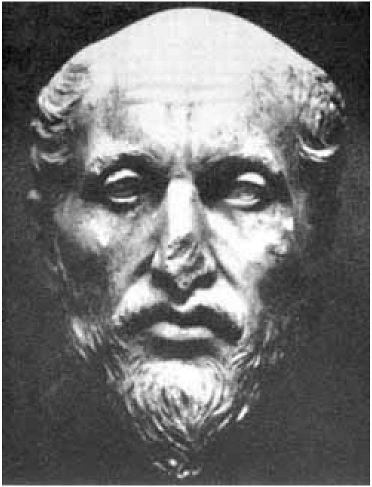
Ancient histories of mathematics

Aristotle (384–322 BC)

Eudemus (4th century BC)

- Student and editor of Aristotle
- *History of Arithmetic*
- *History of Geometry*
- *History of Astronomy*

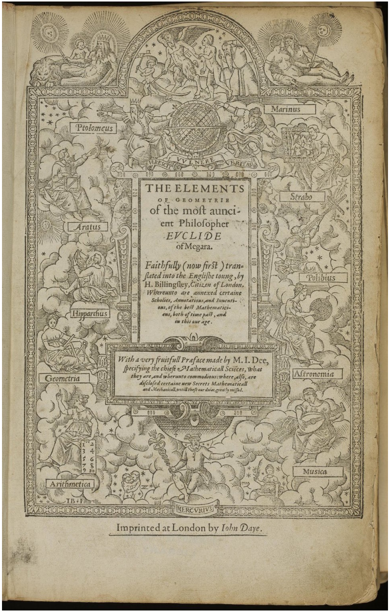
Biographical background



Proclus's commentary on Euclid's *Elements* (5th century AD)

- (Spurious?) biographical details
- Built on anecdotes provided by Pappus (4th century AD)

Later historical attributions



a full understanding of geometry "requireth diligent studie and reading of olde auncient authors"

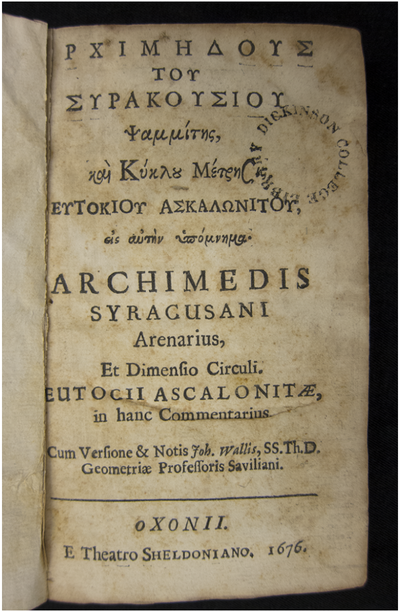
Renaissance humanist attitudes

Sir Henry Savile (1549–1622)

The teaching of mathematics should be founded on humanist principles:

- it should stem from the works of classical antiquity;
- scholars ought to have a concern for the history of their subject;
- they should actively seek to restore and edit surviving texts.

Renaissance humanist attitudes



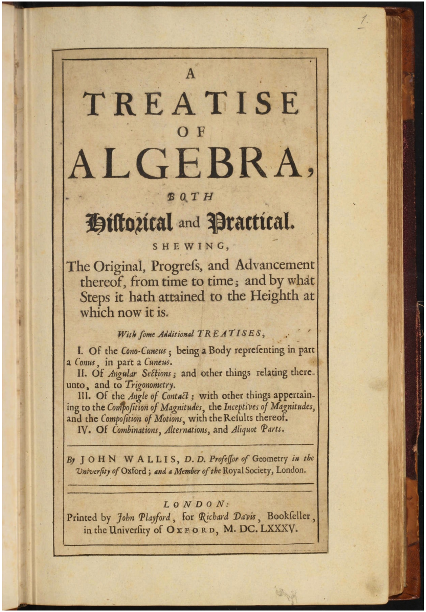
ΡΧΙΜΗΔΟΥΣ
ΤΟΥ
ΣΥΡΑΚΟΥΣΙΟΥ
Ψαμμίτης,
καὶ Κύκλου Μέτρησις,
ΕΥΤΟΚΙΟΥ ΑΣΚΑΛΩΝΙΤΟΥ,
εἰς αὐτὴν ὑπόμνημα.

ARCHIMEDIS
SYRACUSANI
Arenarius,
Et Dimensio Circuli.
EUTOCII ASCALONITÆ,
in hanc Commentarius.

Cum Versione & Notis *Joh. Wallis*, SS.Th.D.
Geometriæ Professoris Saviliani.

OXONII.
E Theatro SHELDONIANO. 1676.

Nationalist attitudes



A
TREATISE
OF
ALGEBRA,
BOTH
Hiſtorical and Practical.
SHEWING,
The Original, Progreſs, and Advancement thereof, from time to time; and by what Steps it hath attained to the Heighth at which now it is.

With ſome Additional TREATISES,

I. Of the *Cono-Cuneus*; being a Body repreſenting in part a *Conus*, in part a *Cuneus*.
II. Of *Angular Sections*; and other things relating thereunto, and to *Trigonometry*.
III. Of the *Angle of Contact*; with other things appertaining to the *Compoſition of Magnitudes*, the *Inceptives of Magnitudes*, and the *Compoſition of Motions*, with the Reſults thereof.
IV. Of *Combinations*, *Alternations*, and *Aliquot Parts*.

By JOHN WALLIS, *D. D. Profeſſor of* Geometry *in the Univerſity of* Oxford; *and a Member of the* Royal Society, London.

LONDON:
Printed by *John Playford*, for *Richard Davis*, Bookſeller, in the Univerſity of OXFORD, M. DC. LXXXV.

Comprehensive histories of mathematics

HISTOIRE

DES

MATHEMATIQUES,

DANS laquelle on rend compte de leurs progrès depuis leur origine jusqu'à nos jours; où l'on expose le tableau & le développement des principales découvertes, les contestations qu'elles ont fait naître, & les principaux traits de la vie des Mathématiciens les plus célebres.

Par M. MONTUCLA, de l'Académie Royale des Sciences & Belles-Lettres de Prusse.

Multi pertransibunt & augebitur scientia. *Bacon.*

TOME PREMIER.

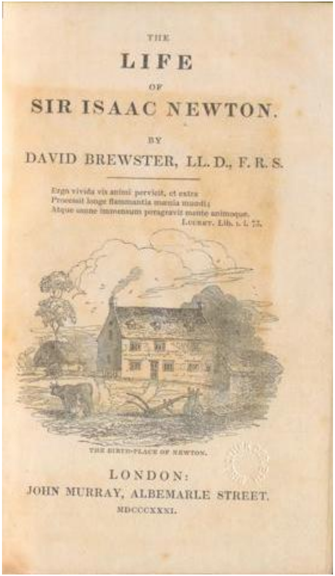
A PARIS,

Chez CH. ANT. JOMBERT, Imprimeur-Libraire du Roi pour l'Artillerie & le Génie, rue Dauphine, à l'Image Notre-Dame.

M. DCC. LVIII.

Avec Approbation & Privilege du Roi.

Lauding the great mathematicians



THE

LIFE

OF

SIR ISAAC NEWTON.

BY

DAVID BREWSTER, LL. D., F. R. S.

Ergo vivida vis animi pervicit, et extra
Processit longe flammantia mœnia mundi;
Atque omne immensum peragravit mente animoque.
Lucret. Lib. i. l. 73.

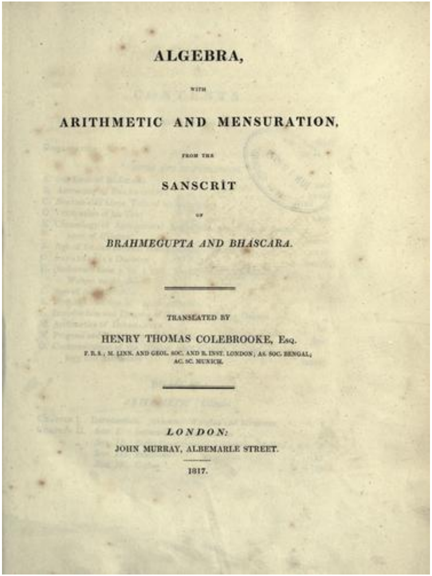
THE BIRTH-PLACE OF NEWTON.

LONDON:
JOHN MURRAY, ALBEMARLE STREET.
MDCCCXXXI.

Adding greater nuance

See: Adrian Rice, 'Augustus De Morgan: historian of science', *History of Science* 34 (1996), 201–240

Awareness of mathematics beyond Europe



ALGEBRA,

WITH

ARITHMETIC AND MENSURATION,

FROM THE

SANSCRIT

OF

BRAHMEGUPTA AND BHASCARA.

TRANSLATED BY

HENRY THOMAS COLEBROOKE, Esq.

F.R.S.; M. LINN. AND GEOL. SOC. AND R. INST. LONDON; AS. SOC. BENGAL; AC. SC. MUNICH.

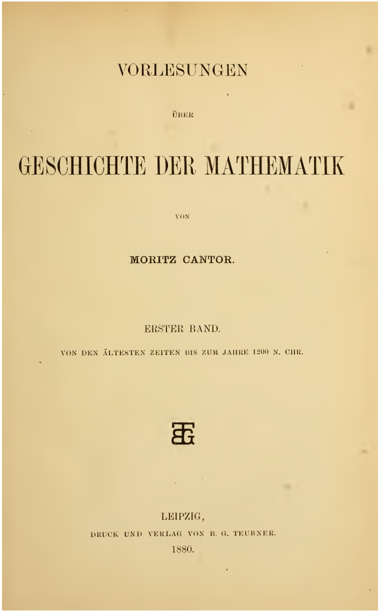
LONDON:

JOHN MURRAY, ALBEMARLE STREET.

1817.

See: Ivahn Smadja, 'Sanskrit versus Greek 'proofs' : history of mathematics at the crossroads of philology and mathematics in nineteenth-century Germany', *Revue d'histoire des mathématiques* 21(2) (2015) 217–349

Anecdotal history


VORLESUNGEN

ÜBER

GESCHICHTE DER MATHEMATIK

VON

MORITZ CANTOR.

ERSTER BAND.

VON DEN ÄLTESTEN ZEITEN BIS ZUM JAHRE 1200 N. CHR.

LEIPZIG,

DRUCK UND VERLAG VON B. G. TEUBNER.

1880.

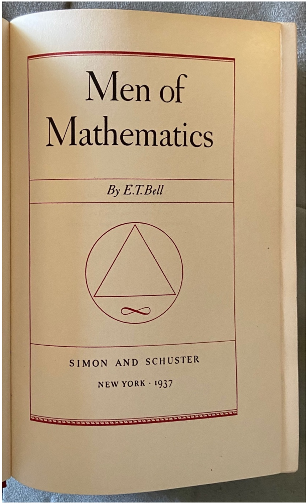
Who studies the history of mathematics?

- Mathematicians?
  - Because mathematical knowledge is key?
  - Because only mathematicians will read it?
  - Suitable retirement project?
- Historians?
  - Because only an understanding of historical context makes it history?
  - For better integration into wider historical scholarship?
- Scholars who are somewhere in between?

Professionalisation

Otto Neugebauer (1899–1990)

Popularisation



- Humanisation of mathematics
- Mathematical myth-making
- Mathematical anecdotes for community-building
- Drawback: reinforcement of a particular view of the subject

Rewriting the history of mathematics

until you obtain 2. It was therefore indeed a new idea to duplicate $\bar{n}$ by dividing 2 by n.

We do not know in whose brain this thought arose for the first time, nor when this happened. It certainly occurred long before the era of our texts, for the $(2:n)$-table of the Rhind papyrus, which includes all the odd numbers from $n = 3$ to $n = 101$, was not constructed all at one time; its separate parts were computed by different methods. The oldest section contains the denominators which are divisible by 3; without exception, they all proceed according to the same rule:

$$2:9 = \bar{6} + \overline{18}$$
$$2:15 = \overline{10} + \overline{30}$$
$$2:21 = \overline{14} + \overline{42}.$$

In these cases the division $2:3k$ is simply a confirmation of a known result. In the other cases (certainly from $n = 11$ on), the duplication appears to have been obtained by actually carrying out the division of 2 by n. The text exhibits the divisions more or less explicitly, as in the following examples ($2:5$ and $2:7$).

What part is 2 of 5? $\overline{\mathbf{3}}$ is $1 + \bar{\bar{3}}$, $\overline{\mathbf{15}}$ is $\bar{3}$,

i.e. a third of 5 is $1 + \bar{\bar{3}}$, a fifteenth is $\bar{3}$; these add up to 2. The result of the division is therefore $\bar{3} + \overline{15}$; the terms $\bar{3}$ and $\overline{15}$ are clearly visible because they are written in red. In our "translation" the red symbols have been printed in bold-face type.

Computation:

1	5
$\bar{\bar{3}}$	$3 + \bar{3}$
/ $\bar{3}$	$1 + \bar{\bar{3}}$
/ $\overline{15}$	$\bar{3}$

What part is 2 of 7? $\bar{\mathbf{4}}$ is $1 + \bar{2} + \bar{4}$, $\overline{\mathbf{28}}$ is $\bar{4}$.

Computation:

1	7		
$\bar{2}$	$3 + \bar{2}$	1	7
/ $\bar{4}$	$1 + \bar{2} + \bar{4}$	2	14
/4 $\overline{28}$	$\bar{4}$	/4	28.

In this manner the work proceeds. In dividing 2 by 5, 9, 11, 17, 23, 29 and a few of the larger integers, the $\bar{\bar{3}}$-sequence is used, i.e. the sequence of fractions $\bar{\bar{3}}, \bar{3}, \bar{6}, \overline{12}, \ldots$; but the division by 7 and 13 employs only the $\bar{2}$-sequence $(\bar{2}, \bar{4}, \bar{8}, \ldots)$. It turns out that only in these two cases the $\bar{2}$-sequence produces a simpler result than the $\bar{\bar{3}}$-sequence. For instance, the use of the $\bar{2}$-sequence would, in calculating $2:11$, lead to the result $2:11 = \bar{8} + \overline{22} + \overline{88}$, while the $\bar{\bar{3}}$-sequence gives $2:11 = \bar{6} + \overline{66}$, which, having fewer terms and smaller denominators, is obviously to be preferred.

The calculations which have been reproduced here certainly tell their own story. In the case $2:7$, the number 4, placed in front of $\overline{28}$, indicates where 28 comes from, viz. from 4×7, the further details being shown in an auxiliary column.

The results of the divisions $2:n$ are summarized in the following table, which does not include divisors that are divisible by 3, all of which follow the rule $2:3k = \overline{2k} + \overline{6k}$.

$2:5 = \bar{3} + \overline{15}$
$2:7 = \bar{4} + \overline{28}$
$2:11 = \bar{6} + \overline{66}$
$2:13 = \bar{8} + \overline{52} + \overline{104}$
$2:17 = \overline{12} + \overline{51} + \overline{68}$
$2:19 = \overline{12} + \overline{76} + \overline{114}$
$2:23 = \overline{12} + \overline{276}$
$2:25 = \overline{15} + \overline{75}$
$2:29 = \overline{24} + \overline{58} + \overline{174} + \overline{232}$

$2:31 = \overline{20} + \overline{124} + \overline{155}$
$2:35 = \overline{30} + \overline{42}$
$2:37 = \overline{24} + \overline{111} + \overline{296}$
$2:41 = \overline{24} + \overline{246} + \overline{328}$
$2:43 = \overline{42} + \overline{86} + \overline{129} + \overline{301}$
$2:47 = \overline{30} + \overline{141} + \overline{470}$
$2:49 = \overline{28} + \overline{196}$
$2:51 = \overline{34} + \overline{102}$

$2:53 = \overline{30} + \overline{318} + \overline{795}$
$2:55 = \overline{30} + \overline{330}$
$2:59 = \overline{36} + \overline{236} + \overline{531}$
$2:61 = \overline{40} + \overline{244} + \overline{488} + \overline{610}$
$2:65 = \overline{39} + \overline{195}$
$2:67 = \overline{40} + \overline{335} + \overline{536}$
$2:71 = \overline{40} + \overline{568} + \overline{710}$
$2:73 = \overline{60} + \overline{219} + \overline{292} + \overline{365}$
$2:77 = \overline{44} + \overline{308}$
$2:79 = \overline{60} + \overline{237} + \overline{316} + \overline{790}$
$2:83 = \overline{60} + \overline{332} + \overline{415} + \overline{498}$
$2:85 = \overline{51} + \overline{255}$
$2:89 = \overline{60} + \overline{356} + \overline{534} + \overline{890}$

$2:91 = \overline{70} + \overline{130}$
$2:95 = \overline{60} + \overline{380} + \overline{570}$
$2:97 = \overline{56} + \overline{679} + \overline{776}$

$2:101 = \overline{101} + \overline{202} + \overline{303} + \overline{606}$

Beginning with $2:31$, the form of presentation changes; the calculations are given in abbreviated form. But, what is more important, the method of calculation changes; another idea is introduced. While up to this point, all divisions were carried out by means of the $\bar{2}$-sequence and the $\bar{\bar{3}}$-sequence, the divisions $2:31$ and $2:35$ proceeded quite differently, as is seen from the following examples:

What part is 2 of 31? $\overline{\mathbf{20}}$ is $1 + \bar{2} + \overline{20}$, $\overline{\mathbf{124}}$ is $\bar{4}$, $\overline{\mathbf{155}}$ is $\bar{5}$.

Computation:

1	31
$\overline{20}$	$1 + \bar{2} + \overline{20}$
/4 $\overline{124}$	$\bar{4}$
/5 $\overline{155}$	$\bar{5}$

What part is 2 of 35? $\overline{\mathbf{30}}$ is $1 + \bar{6}$, $\overline{\mathbf{42}}$ is $\bar{\bar{3}} + \bar{6}$
6 7 5

Computation:

1	35
$\overline{30}$	$1 + \bar{6}$
$\overline{42}$	$\bar{\bar{3}} + \bar{6}$

The start of the computation of $2:31$ is easy to account for, since division of 31 by 10, and halving of the result shows that $^1/_{20}$ of 31 is $1 + \bar{2} + \overline{20}$. This fraction is to be increased so as to produce 2. How did the calculator hit upon the idea that this requires $\bar{4} + \bar{5}$? It checks; for the leather scroll has the relation

Rewriting the history of mathematics

On the Need to Rewrite the History of Greek Mathematics

SABETAI UNGURU

Communicated by W. HARTNER

'History is the most fundamental science, for there is no human knowledge which cannot lose its scientific character when men forget the conditions under which it originated, the questions which it answered, and the function it was created to serve. A great part of the mysticism and superstition of educated men consists of knowledge which has broken loose from its historical moorings.'
BENJAMIN FARRINGTON[1]

'It would not occur to the modern mathematician, who uses algebraic symbols, that one type of geometrical progression [*i.e.*, 1, 2, 4, 8] could be more perfect or better deserving of the name than another. For this reason algebraic symbols should not be employed in interpreting such a passage as ours [*i.e.*, Plato, *Timaeus*, 32A, B].'
FRANCIS M. CORNFORD[2]

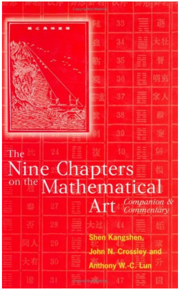
'Any historian of mathematics conscious of the perils and pitfalls of Whig history quickly discovers that the translation of past mathematics into modern symbolism and terminology represents the greatest danger of all. The symbols and terms of modern mathematics are the bearers of its concepts and methods. Their application to historical material always involves the risk of imposing on that material, a content it does not in fact possess.'
MICHAEL S. MAHONEY[3]

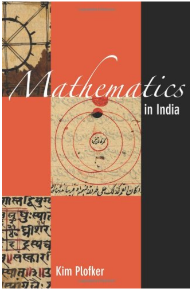
The previous string of quotations is (most certainly) **not** illustrative of the ways in which the history of mathematics has traditionally been written. The authors of the quotations themselves have not always practiced what they occa-

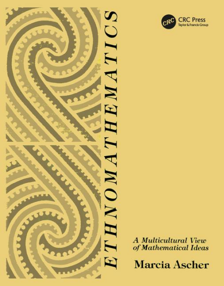
[1] *Greek Science Its Meaning For Us* (Harmondsworth: Penguin Books, 1953), 311.
[2] *Plato's Cosmology* (New York: The Liberal Arts Press, 1957), 49.
[3] *The Mathematical Career of Pierre de Fermat (1601–1665)* (Princeton, N.J.: Princeton University Press, 1973), XII–XIII.

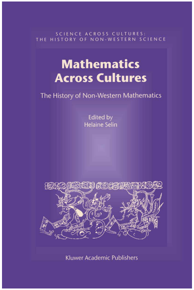
Sabetai Unguru, 'On the need to rewrite the history of Greek mathematics', *Archive for History of Exact Sciences* 15 (1975), 67–114

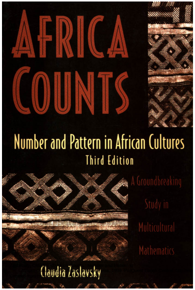
A broader perspective

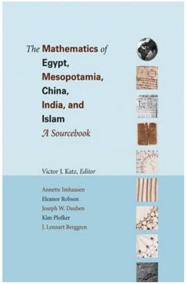








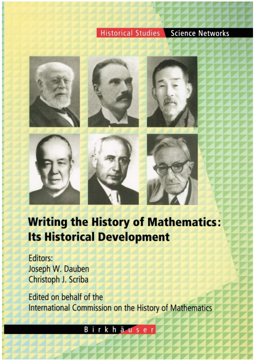


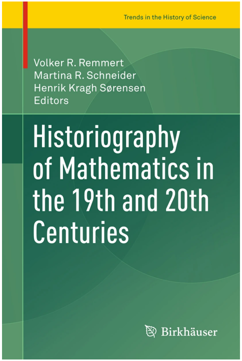


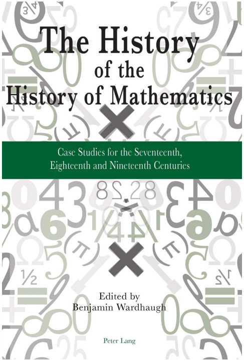
A broader perspective

Brigitte Stenhouse, *Mary Somerville: Being and Becoming a Mathematician*, PhD thesis, The Open University, 2021

Historiography of mathematics: references







How do we know what we know about ancient Egyptian mathematics?

numbers developed to the point where the same digit 1 represented 60 as well. We do not know why the Babylonians decided to have one large unit represent 60 small units and then adapt this method for their numeration system. One conjecture is that 60 is evenly divisible by many small integers. Therefore, fractional values of the "large" unit could easily be expressed as integral values of the "small" unit. The Babylonian base 60 place-value system is still in use in our units for angle and time measurement, units preserved over the centuries in astronomical contexts and today an irreplaceable part of world culture.

There is no record of the written number system of ancient India, but there is literary evidence that numerical symbols did exist. It is only from about the third century B.C.E. that examples of written numbers are available. Originally, the system was mixed. There was a ciphered system similar to the hieratic with separate symbols for the numbers 1 through 9 and 10 through 90. For larger numbers, the system was a multiplicative one similar to the Chinese. For example, the symbol for 200 was a combination of the symbol for 2 and that for 100, and the symbol for 70,000 combined the symbols for 70 and 1000. As will be discussed in Chapter 6, it was in or near India that the modern base 10 place-value system developed, but not until about the seventh century C.E.

1.3 ARITHMETIC COMPUTATIONS

Once their system of writing numbers came into existence, all of the civilizations under discussion devised rules for the basic arithmetic operations—addition, subtraction, multiplication, and division—and as a consequence of the last operation, rules for writing and operating with fractions. These rules may be considered as some of the earliest algorithms.

An **algorithm** is an ordered list of instructions designed to produce an answer to a given type of problem. Ancient peoples produced algorithms of all sorts to handle many different problems. In fact, ancient mathematics can be characterized as algorithmic in nature, as opposed to the Greek mathematics, which emphasized theory. In most of the available documents of ancient mathematics, the author describes a problem to be solved and then proceeds to use an algorithm, either explicit or implicit, to obtain the solution. There is little concern in the documents as to how the algorithm was discovered, why it works, or what its limitations are. Instead, we simply are shown many examples of the use of the algorithm, often in increasingly complex situations. Nevertheless, in our discussion of these algorithms, we will describe the possible origins and justifications of each one and will present the possible answers that the Babylonian, Chinese, or Egyptian scribes gave to their students who asked the eternal question "why?"

In the Egyptian hieroglyphic grouping system, addition is simple enough: Combine the units, then the tens, then the hundreds, and so on. Whenever a group of ten of one type of symbol appears, replace it by one of the next. Hence, to add 783 and 275, put |||∩∩∩∩∩∩∩∩𓍢𓍢𓍢𓍢𓍢𓍢𓍢 and |||||∩∩∩∩∩∩∩𓍢𓍢 together to get ||||||||∩∩∩∩∩∩∩∩∩∩∩∩∩∩∩𓍢𓍢𓍢𓍢𓍢𓍢𓍢𓍢𓍢. Since there are fifteen ∩s, replace ten of them by one 𓍢. This then gives ten of the latter. Replace these by one 𓆼. The final answer is ||||||||∩∩∩∩∩𓆼, or 1058. Subtraction is done similarly. In this case, of course, whenever "borrowing" is needed, one of the symbols would be converted to ten of the next lower symbol.

Such a simple algorithm for addition and subtraction is not possible in the hieratic system. For these operations, the mathematical papyri do not provide much evidence; the answers to addition and subtraction problems are merely written down. Most probably, the scribes had addition tables. At some point these would have existed in written form, but a competent scribe would, of course, have memorized them. The scribes presumably used the addition tables in reverse for subtraction problems.

The Egyptian algorithm for multiplication was based on a continual doubling process. To multiply two numbers a and b, the scribe would first write down the pair 1, b. He would then double each number in the pair repeatedly, until the next doubling would cause the first element of the pair to exceed a. Then, having determined the powers of 2 that add to a, the scribe would add the corresponding multiples of b to get the answer. For example, to multiply 12 by 13 the scribe would set down the following lines:

1	12
2	24
4	48
8	96

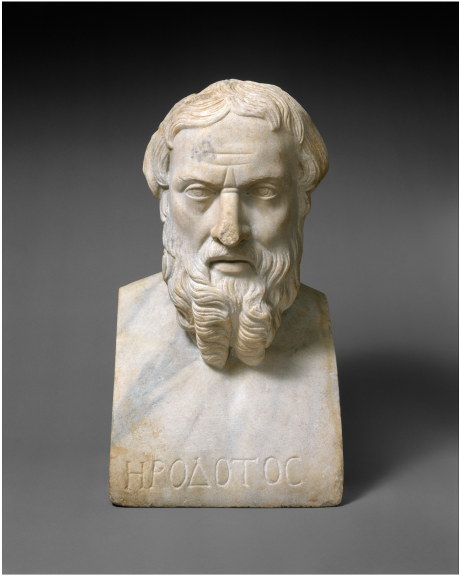
At this point, he would notice that the next doubling would produce 16 in the first column, which is larger than 13. He would then check off those multipliers that added to 13, namely 1, 4, and 8, and add the corresponding numbers in the other column. The result would be written as: Totals 13 156.

As before, there is no record of how the scribe did the doubling. The answers are simply written down. Perhaps the scribe had memorized an extensive 2 times table. In fact, there is some evidence that doubling was a standard method of computation in areas of Africa to the south of Egypt, so it is likely that the Egyptian scribes learned from their southern colleagues.[6] In addition, the scribes were somehow aware that every positive integer could be uniquely expressed as the sum of powers of 2. That fact provides the justification for the procedure. How was it discovered? Our best guess is that it was discovered by experimentation and then passed down as tradition.

Because division is the inverse of multiplication, a problem such as $156 \div 12$ would be stated as "multiply 12 so as to get 156." The scribe would then write down the same lines listed before. This time, however, he would check off the lines having the numbers in the right-hand column that sum to 156; in this case, 12, 48, and 96. Then the sum of the corresponding numbers on the left, namely 1, 4, and 8, would give the answer 13. Of course, division does not always "come out even." When it did not, the Egyptians used fractions.

The kind of fractions that the Egyptians used were unit fractions, or "parts" (fractions with numerator 1), with the single exception of $2/3$, perhaps because these fractions are the most "natural." The fraction $1/n$ (the nth part) is represented in hieroglyphics by the symbol for the integer n with the symbol 𓂋 above. In the hieratic a dot is used instead. Thus $1/7$ is denoted in hieroglyphics by 𓂋||||||| and in the hieratic by 𓂋. The single exception, $2/3$, had a special symbol: 𓂋 in hieroglyphics and ϒ in hieratic. (The former symbol is indicative of the reciprocal of $1\ 1/2$.) In the remainder of this text, however, the notation $\overline{n}$ will be used to represent $1/n$ and $\overline{\overline{3}}$ to represent $2/3$.

Herodotus (5th century BC)



Herodotus on Egyptian geometry

It was this king, moreover, who divided the land into lots and gave everyone a square piece of equal size, from the produce of which he exacted an annual tax. Any man whose holding was damaged by the encroachment of the river would go and declare his loss before the king, who would send inspectors to measure the extent of the loss, in order that he might pay in future a fair proportion of the tax at which his property had been assessed. I think this was the way in which geometry was invented, and passed afterwards into Greece . . .

Mediaeval Islamic Egypt

Montucla on ancient Egyptian geometry

HISTOIRE

DES

MATHEMATIQUES,

DANS laquelle on rend compte de leurs progrès depuis leur origine juſqu'à nos jours; où l'on expoſe le tableau & le développement des principales découvertes, les conteſtations qu'elles ont fait naître, & les principaux traits de la vie des Mathématiciens les plus célebres.

Par M. MONTUCLA, de l'Académie Royale des Sciences & Belles-Lettres de Pruſſe.

Multi pertranſibunt & augebitur ſcientia. *Bacon.*

TOME PREMIER.

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Chez CH. ANT. JOMBERT, Imprimeur-Libraire du Roi pour l'Artillerie & le Génie, rue Dauphine, à l'Image Notre-Dame.

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aſſigner à chacun une portion de terre égale à celle qu'il poſſédoit avant l'inondation. Telle fut, dit-on, l'origine de l'arpentage, premiere ébauche de la Géometrie, à laquelle néanmoins elle a donné le nom : car Géometrie, ſignifie en Grec, *meſure de la terre*, ou *des terrains*. Je remarque en paſſant que c'eſt aſſez gratuitement qu'on ſuppoſe que le Nil confondoit ainſi les limites des poſſeſſions; il n'étoit pas bien difficile de lui en oppoſer d'aſſez ſtables ou d'aſſez profondes pour ſubſiſter malgré l'inondation. On ne ſçauroit ſe perſuader que l'Egypte fût chaque année ravagée par les eaux : cela s'accorderoit mal avec l'idée d'un pays délicieux, comme celle que nous en donne l'antiquité.

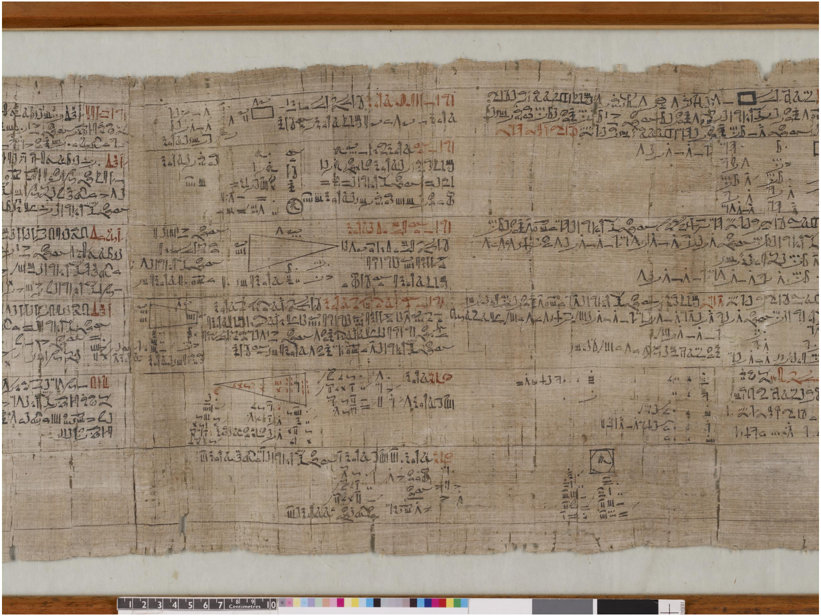
Quelques Ecrivains, parmi leſquels eſt *Hérodote*, fixent la naiſſance de la Géometrie au tems où Seſoſtris (*k*) coupa l'Egypte par des canaux nombreux, & en fit une ſorte de répartition générale entre ſes habitans. M. *Newton* (*l*) en adoptant le ſentiment d'*Hérodote*, dit que ce partage fut fait par le conſeil de *Thot*, le Miniſtre de *Seſoſtris*, qui eſt ſuivant lui *Oſiris*. Cette conjecture ſur l'emploi & la nature de ce perſonnage célébre, n'eſt pas deſtituée d'autorités anciennes, & s'accorde parfaitement avec l'opinion dont on a parlé ailleurs, que *Theut* étoit l'inventeur des nombres, du calcul & de la Géometrie. En effet, on peut dire que le partage projetté par *Seſoſtris* exigeant des connoiſſances Géometriques, ſon Miniſtre en jetta à cette occaſion les fondemens. Ceci s'accorde encore avec le ſentiment qui attribue ces inventions à *Hermes*, autrement le fameux *Mercure Triſmegiſte*; car tous ces hommes ſont probablement les mêmes. Un Ecrivain (*m*) raconte que ce Mercure grava les principes de la Géometrie ſur des colonnes qui furent dépoſées dans de vaſtes ſouterrains, & le fabuleux *Jamblique* (*n*) dit que *Pythagore* profita beaucoup de la vûe de ces monumens. Un Auteur enfin cité par *Diogene Laerce*, (*o*) dit que *Mœris*, apparemment ce Prince qui fit creuſer le fameux lac de ce nom, pour ſervir de décharge au Nil, avoit inventé les principes de la Géometrie. On voit facilement le motif de ſa conjecture.

(*k*) Herod. *l.* II.
(*l*) *Chron. ad ann.* 964.
(*m*) Ammian. Marcell. *rerum geſt. l.* XXII.
(*n*) *In vita Pythagor,* c. 29.
(*o*) *In Pythag.*

Augustus De Morgan (1838)

There is a *stock history* of the rise of geometry ... that the Egyptians, having their landmarks yearly destroyed by the rise of the Nile, were obliged to invent an art of land-surveying in order to preserve the memory of the bounds of property; out of which art geometry arose. ... There is no proof whatever ...

Rhind Mathematical Papyrus



Reconstructing ancient Egyptian mathematics

- Is it valid to use modern mathematical ideas to reconstruct ancient mathematics?
- What do you do if the mathematical and linguistic evidence point in different directions?
- What story were people trying to tell?
- Where does ancient Egyptian mathematics sit within wider stories?

HT reading course: content

Early set theory in the works of Cantor, Dedekind, and others

The reading course will consist of three parts: the detailed reading and analysis of portions of

1. Bolzano's *Paradoxes of the infinite* (1851), as a glimpse of early 19th-century investigations of the infinite and associated embryonic set-theoretic ideas;
2. Dedekind's writings on real numbers, with their implicit use of a set-theoretic language;
3. Cantor's investigations of the infinite, which led to his formalisation of the set concept.

As during the lecture course, the emphasis will be on the use of original sources — not only those mentioned above, but also any other relevant materials that may arise.

HT reading course: arrangements

Seminars: weekly classes of an hour and a half each

(Note that these will timetabled with the lectures as two sessions per week, but you only need to attend one of these — sign up as you would for intercollegiate classes.)

Essays: up to 2,000 words to be submitted in advance for discussion in the seminars in weeks 3, 5 and 7

(Further details will appear online during the vacation.)

Assessment: extended essay (3,000 words), details of which will be announced on Monday of week 7. To be submitted by 12 noon on Monday of week 10.

HT reading course: vacation work

Vacation reading for discussion in first-week seminar is now given on the course webpage.

The British Society for the History of Mathematics:

www.bshm.ac.uk

BSHM undergraduate essay prize

http://www.bshm.ac.uk/undergraduate-essay-prize

See you next term...