Ancient Mathematics

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The History of Mathematics

Mathematics, also known as the Queen of Sciences, permeates every area of our lives. Whether you are filling in your accounts, building a cabinet, or watching the stars, you are using mathematical principles laid down through the ages, and it is a discipline that underpins life as we know it.

Alongside the development of language, mathematics has shaped human civilization and has given us the mental tools to expand our knowledge in other areas.

The History of Mathematics - Applied and Pure Mathematics

In today's world, mathematics has two broad divisions:

Applied mathematics, which gives us the tools we need to shape the world around us. From the simple arithmetic of counting your change at the store, to the complex functions and equations used to design jet turbines, this field is the practical, hands on side of math.

Pure math is the esoteric part of the discipline, where mathematicians seek proofs and

develop theorems. I studied pure mathematics (not very successfully) at school and it is almost like a different language; professional mathematicians seem to see the world in a different way, their elegant theorems and mathematical functions giving them a different insight onto the world.

The Development of Mathematics - The Egyptians and the Babylonians

Of course, this division into two broad fields is a little crude and arbitrary, with statistics and probability, topography, geometry, and calculus all standalone subjects in their own right. They use their own language and methods, as different from each other as biology is from physics, or psychology from engineering. However, this division into two disciplines hails back to the formation of the subject thousands of years ago.

Applied math developed because of necessity, as a tool to watch the stars and develop calendars, or build architectural marvels. The Egyptians devised a mathematical system designed to meet their needs, based around the need for accurate surveying. Their methods were functional and approximate, using brute force and trial and error to find solutions. As their great monuments attest, this worked for them and, for example, they did not need to know the value of Pi down to 40 decimal places, only an approximation that did the job.

By contrast, the Babylonians, with their skill in astronomy and the need to devise ever more accurate calendars, began to look at the theoretical side of mathematics, studying (Public Domain) relationships between numbers and patterns. Like the Egyptians, they passed much of their knowledge on to the Greeks, with great mathematicians such as Thales and Pythagoras learning from these great cultures.

The Greeks and the Romans - From Applied to Pure and Back Again

Babylon Clay Tablets (Creative Commons [1])

The Greeks were the first mathematicians to concentrate upon pure mathematics, believing that all mathematical knowledge could be derived from deduction [2] and reasoning [3]. They used geometry to lay down certain axioms and built theories upon those, refining the idea of seeking proof through deduction alone, without empirical measurements [4].

Of course, the idea that the Greek mathematicians focused upon pure, theoretical mathematics does not mean that they did not contribute to applied math. Greek mathematicians and inventors created many instruments for watching the stars or surveying the land, all built upon mathematical principles. However, their insistence upon a deductive method is what defined their work, and the Greek mathematicians laid down elaborate rules that their modern counterparts still use.

By contrast, the Romans once again took math into the realm of the tangible, trying to seek a practical use for the discipline. The were amongst the greatest engineers that the world has ever seen and their use of techniques based upon applied math for surveying, building bridges, tunnels and temples.
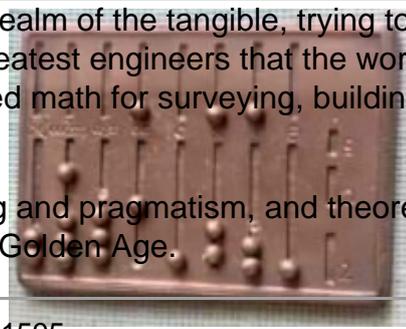
With them, the pendulum sung back towards engineering and pragmatism, and theoretical math became less important until the time of the Islamic Golden Age.

Roman Abacus (Creative Commons)

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[1] http://commons.wikimedia.org/wiki/User:Mr._Kate
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