Ancient & Medieval Medicine: Crash Course History of Science #9

Crash Course: History of Science
https://youtube.com/watch?v=iGiZXQVGpbY
https://nerdfighteria.info/v/iGiZXQVGpbY

===== (00:00) to (02:00) =====

[INTRO MUSIC]

HANK:

We've seen how from around 400 BCE to CE 1300, ideas in astronomy, math, and engineering were traded all the way from Beijing to Delhi, and from Baghdad to Constantinople. But in the next episodes, we're going to dive into how some specific kinds of knowledge evolved over time. First up: healing.

The history of medicine is about two of our big questions. One - What is life? What makes it so special, so fragile, and so goopy? And two - how do we know what we know? Why should I take my doctor's advice? Why are deep fried Oreos bad for me? It might be tempting to look at medicine as a science that has simply progressed over time. That medicine used to be bad and its history is the story of how it got better. And don't get me wrong, we love modern medicine. You'll have to take my word for it until crash course deep fried everything drops, but the science behind lipid transport is just fascinating.

Focussing on progress though obscures what worked in the past. The ancient and medieval medicine worked for millions of people. They understood their bodies as bounded by rules. And regardless of what worked, early medical systems allowed people to make sense of bodies and health. You may think that medicine is a techne or practically oriented knowledge, but today we're going to focus on systems of medicine as world ordering theories, or episteme.

These theories were built up into a textual tradition in which doctors wrote down what they saw and cited earlier doctors when explaining their treatments. So let's turn to medical education. What textbooks would a would-be doctor read in a given place and time?

[TITLE ANIMATION: ANCIENT AND MEDIEVAL MEDICINE]

Let's say you lived in Song dynasty, China. You would study machine printed textbooks on traditional Chinese medicine or TCM. In this system, humans are small pieces [of one vast organism called the 'entire dang universe'.]

===== (02:00) to (04:00) =====

[In this system, humans] are small pieces of one vast organism called the 'entire dang universe'. All things within this system are composed of 5 elements: fire, earth, metal, water, and wood. In TCM, health means a balance between two forces, yin and yang - representing dark and light, femininity and masculinity, hot and cold, and so on. Disease means imbalance. Thus healthcare means restoring balance. In TCM by manipulating the energy that flows through living bodies - called chi - you, the would-be doc would learn all about how to move chi around using acupuncture and acupressure, herbal therapies, exercise, and prescription diet.

If you lived in Gupta dynasty in India, you would also get down with a 5 element theory of matter. But you would study the science of life - Ayurveda. You'd probably pick up the popular textbook, Charaka Samhita or one of the other Samhitas (or collections) that could help you memorise hundreds of named body parts. In addition to anatomy, the Samhitas would also teach you etiology, or what causes different diseases, and symptomatology or what diseases look like.

When it came to treatment, your Samhita would have information on the 8 specialties: the diseases of children, those of the elderly, mental diseases, diseases of sense organs, surgery, poisons/antidotes, and aphrodisiacs. You would learn the 5 karmas or actions that were used for removal of toxins from body tissues. And to prepare treatments, you'd learn a lot about plants, minerals, and animals but treating patients is only a part of Ayurveda. The science of life concerns healthful living in general, including how to prevent disease and influence hygiene and diet.

What if you lived in, say, 14th-century Bologna, Italy, Home to one of the oldest universities in the world which opened in CE 1088? You would attend lectures and you'd have a hand-copied textbook - not made by a press as in Song, China. The medical theories in your textbook would be founded on Aristotelian biology and physics. Bodies are composed of 4 special bodily humours. Each of these corresponds to one of the four elements of empédocles.

===== (04:00) to (06:00) =====

Blood - made of air, phlegm - made of water, yellow bile - made of fire, and black bile - made of earth. Illness is an imbalance in humours. Too much black bile, for example, causes depression. Treatment means restoring the right humoural balance, like with bloodletting. When too much of one humour built up in the body, one way to restore the balance was to let some of the excess to drain off. But the most common treatment, then as now, was simply offering good dietary advice.

Aristotle linked the four elements with the humours, but he wasn't a doctor. The oldest nuggets of humoural wisdom in western Eurasian medical textbooks were attributed to a physician named Hippocrates of Cos, which means Gregory House in classical Greek. We know something of his life. He died when Aristotle was in his teens, but we don't have many surviving works by him. What we have is a collection of texts of various age and unknown authorship called the Hippocratic Corpus. According to the corpus, Hippocrates was a fan of the Pythagoreans - which you remember as the weird secret math cult. But his skepticism or doubt that certain knowledge is possible to set Hippocratic medicine apart from a lot of greek natural philosophy.

Hippocrates emphasised reason, observation, and medical prediction. He emphasised that diet and environment influenced health, not the direct will of the gods. And his oath "Do No Harm" still underpins medical education. Hippocrates was the Jimi Hendrix of Eurasian and North African medicine, innovating a new style that challenged traditional ideas. But Hippocratic physicians had to compete among many schools of healers.

It was a roman named Galen who became medicine's Michael Jackson - the populariser of the standard humourism that would last until the 1800s. Galen's system absorbed the smaller uneven Hippocratic corpus. Gales was born around CE 130 in Pergamon but he made his career in Rome treating gladiators. This gave him lots of experience peeking into the body while sewing up wounds. Eventually, he got the offer of a lifetime, court physician to Emperor Marcus Aurelius, [who was a battle-hardened general...]

===== (06:00) to (08:00) =====

[... emperor marcus aurelius, who was a] battle hardened general, stoic philosopher, and all around hardcore dude. Galen wrote a huge number of influential texts, supposedly 500, though only 83 survive today. These show that galen built on the systems of hippocrates and aristotle, but also made detailed notes on human anatomy drawn from experience. He accurately observed how the larynx works and demonstrated that the lungs fill up with air. Oh yeah, and he innovated cataract surgery! But galen definitely got

some things wrong.

One reason is that human dissection was illegal in imperial rome and the states that succeeded it. So a lot of anatomy was guesswork based on observations of animals. For example, dissecting sheep heads, galen identified a circulatory organ called a "rete mirabile" or "wonderful net" that is found in animals like sheep and dolphins but doesn't exist in humans. After galen the most notable medical theorists in the greater mediterranean weren't greeks or romans, but arabs or persians, who had access to both greek and Indian sciences.

First among them was the persian polymath Abu Bakr Al-Razi, whose name also means Gregory House. Born in CE 854, Al-Razi was prolific. He wrote dozens of books including detailed accounts of his cases. He's considered by many historians to be one of the founders of several disciplines from psychology to ophthalmology. He was the first to describe smallpox and measles as distinct diseases. Al-Razi also wrote for general audiences educating them about health and disease. Many of his works were encyclopedias based on greek humoural medicine and natural philosophy. His big one "al-hawi al-khabar" or "the virtuous life" was a large influential medical encyclopedia.

Al-razi was a unique dude who did whatever he wanted. Although he was one of the most scientific doctors of his time, he also wrote works of islamic prophetic medicine, "Al-Tibb al-nabawi". This discipline, an alternative to the hippocratic galenic system, advocated traditional medical practices mentioned in the quran. Al-razi also influenced medicine by becoming the first fan of the greco-roman humoural medicine to beef with galen.

===== (08:00) to (10:00) =====

[...greco-roman humoural medicine] to beef with galen. He wrote a book called "Shukuk 'ala alinusor" - "doubts about galen", in which he said that some of his own observations contradicted some of galen's claims. Remember "Nullius in Verba" - "On the word of no one", the motto of the royal society of london founded in 1660? Al-razi advocated this approach to medicine circa the year 900, over 700 years earlier.

But really, if you were a medieval italian medical student the book you'd read probably wouldn't be by hippocrates or galen or al-razi. Instead, you'd read a translated encyclopedia featuring all of them. In doing so, you'd be participating in the scientific wonder called scholasticism-or learning through close readings of approved texts that recorded the observations and theories of earlier thinkers. Take it away thought bubble.

One of the all-time greatest hits of medical education was "al kanoon fi al-tibb", or the "canon of medicine". The canon was written by another persian polymath, Ibn Sina, born in 980. Ibn Sina was widely seen as the best writer to summerise and comment on the greco-roman doctors. His canon became one of the most important medical textbooks and introductions to aristotle's physics for 600 years. Your textbook is really a mash-up of several different books.

Each page is like an onion. At its heart, one punctum, or big idea by aristotle or hippocrates or galen. These are surrounded by layer upon layer of annotatia or notes by famous physicians from distant cities such as baghdad. Your main throughlines are summaries by Ibn Sina, whose name has been latinised as Avicenna. But there are notes by latin translators such as Gerard de Creomona or Constantinus Africanus, plus outer layers of notes by other medical students, maybe you even jot down some of your own. Thus, way before web MD, you are in conversation with doctors from all across space and time.

In universities such as bologna or salerno you might have access to another textbook, this one by - wait for it - a lady.

===== (10:00) to (12:00) =====

Trota of salerno wrote Practical Medicine According to Trota and Treatments of women - One of the books of the trotula ensemble. This group of 3 texts from around 1200 CE traveled widely throughout medieval europe. The trotula became foundational to gynecology and other topics related to women's health. But you might not know that this foundational text on women's health was written by a woman because her identity was systematically written out of history until the late twentieth century because of course, it was.

Thanks thought bubble.

So what was life for many educated people in asia and north africa between roughly 400 BCE to CE 1300? Life was a universal property of which humans were just interesting examples. Life was linked to the movements of special fluids, which were the objects of medical treatments. Life was ultimately built out of a smaller number of elements, and good health meant balancing fluids and elements in the right way.

How did we know what life is? For some physicians in classical greece or imperial rome, careful observation and comparison to animals were crucial methods. Persian doctors influenced by both greek and Indian ideas, synthesized earlier ideas, expanded evidence for them, and challenged and reworked them. Why did you, medieval citizen trust this information? Because books told you to. And with that, dear student, we leave you to deal with the black plague of 1347. Bummer!

Next time, we'll dive deep into the eternal question of what is stuff, with the group of thinkers who tried to science lead into gold, the alchemists.

Crash Course History of Science is filmed in the Dr Cheryl C Kinney studio in Missoula, Montana and it's made with the help of all these nice people and our animation team is Thought Cafe. Crash Course is a Comlexely production. If you want to keep imagining the world complexely with us, you can check out some of our other channels like the SciShowPsych, the Animal Wonder, and the Art Assignment. And if you would like to keep Crash Course free for everybody forever, you can support the series at patreon - a crowdfunding platform that allows you to support the content you love. Thank you so much to all of our patrons for making Crash Course possible with their continued support.

===== (12:00) to (12:06) =====

[end music]