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Mechanical Clocks

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Mechanical Clocks

Hemmungen sind nicht immer etwas Negatives. Zumindest mechanische. Denn erst mit der Erfindung der Hemmung im 13. Jahrhundert begann der Siegeszug der mechanischen Uhren.

Mechanical clocks replaced the old water clocks, which, by the 13th century, had been around for millennia. Water flowed steadily into a vertical tank and the rising water level *indicated* the time of day. That's simple enough, but, like mechanical clocks, water clocks had become *ornate* structures with *gears* and *dials*. Like mechanical clocks, they *told* the hours and displayed the planets.

What makes a mechanical clock is a mechanism called an *escapement* – the balance wheel on a watch or the pendulum on a grandfather's clock. An escapement ticks in a steady rhythm and lets the gears move forward in a series of little equal jumps.

The first escapement was the *verge* and *foliot* mechanism. The foliot is a horizontal *bar* with weights on either end. It sits on a vertical *rod*, called a verge. The verge has *pallets* to *engage* and release the main gear which is turned by a heavy stone on the end of a cable.

The verge *nudges* the foliot back and forth in an *inertial* rhythm, and that determines the *pace* of the gear train. It was complex and very creative, but when did it come about? We don't really know because its importance wasn't *apparent* at first. People who wrote about early clocks couldn't see that the escapement was not just an *incremental improvement* on the water clock. Rather, it was a whole new technology and a whole new metaphor.

French architect Villard de Honnecourt described the first escapement we know about in AD 1250; but he didn't yet use it to control a clock. Instead, he built a kind of almost-clock – a *gadget* that steadily pointed at the sun as it moved across the sky.

After that, *monastery* records mention the bells, *gearing*, and towers that went with either kind of clock, while they ignore the heartbeat of the clock. The first clear drawing of an escapement was given by Jacopo di Dondi and his son in 1364. They'd probably been building clocks for twenty years by then. So we can only guess that the first mechanical clocks were made in the late 1200s.

It's strange that so great a change can be that invisible. The best water-clock *accuracy*

caught

showed

clear

elaborate ... *see list

*see list ... stroke

*see list

*see list ... *see list

beam

stick

*see list ... catch

pushes

slow

speed

clear

gradual upgrade

apparatus

*see list

*see list

precision

was about fifteen minutes a day, and that's about as well as the first mechanical clocks did. But now, engineers began to cut that error in half every thirty years, right up into the 20th century. It wasn't long before mechanical clocks *swept* the imagination of the Western world and created new standards of precision in instruments and ultimately in thought itself.

The defining technology of an age might not be the most *obvious* one. Great changes often come in on little cat feet. That's what the mechanical clock did in the thirteenth century. And we might well wonder what technology is doing just that, today. ■

Prof. Dr. John Lienhard, University of Houston

<i>accuracy</i>	Genauigkeit
<i>apparent</i>	offensichtlich, ersichtlich
<i>bar</i>	Balken
<i>dial</i>	Ziffernblatt
<i>engage, to</i>	eingreifen, einrasten
<i>escapement</i>	Hemmung
<i>foliot</i>	Schwingbalken
<i>gadget</i>	Vorrichtung, Apparat
<i>gear</i>	Zahnrad
<i>gearing</i>	Getriebe, Verzahnung
<i>improvement</i>	Verbesserung
<i>incremental</i>	schrittweise
<i>indicate, to</i>	anzeigen, erkennen lassen
<i>inertial</i>	träge
<i>monastery</i>	Kloster
<i>nudge, to</i>	anstoßen, schubsen
<i>obvious</i>	offensichtlich
<i>ornate</i>	kunstvoll, verziert
<i>pace</i>	Tempo, Geschwindigkeit
<i>pallet</i>	hier: Hemmungslappen
<i>rod</i>	Stange, Stab
<i>sweep, to (swept, swept)</i>	(weg-) fegen, mitreißen
<i>toll, to</i>	läuten
<i>verge</i>	hier: Spindel

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