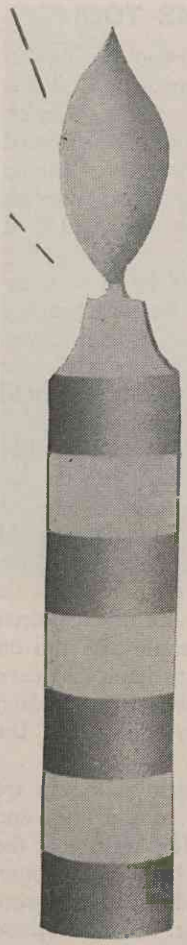

"Burning the candle at both ends" must have been a vivid phrase in 875 A. D. when this Candle Clock was invented by King Alfred the Great of England. It told time by burning through one marked inch on the candle every twenty minutes.

6190 YEARS OF TIME

How long is a minute?

Search your own experiences and you will certainly find examples of "long" and "short" minutes. Did that minute in the dentist's chair go as quickly as the minute at the soda fountain? You wish it did, but it didn't.

This brief test shows a person's own conception of time's passage is not always reliable. If time, as the textbooks say, is measured duration, we are faced with the problem of how to measure it.

No one is quite sure just when man began to mark off Father Time's steps — some say it all started about 6190 years ago back in ancient Egypt—but it is a good guess that our earliest ancestors took advantage of that greatest of all time pieces, the sun, 93,000,000 miles away from them. By the shadows it cast along familiar landmarks, the caveman probably marked the passing of his day. So were formed the crude beginnings of the sundial which, for most of us today, is merely a garden ornament.

In less sunny climates, other methods had to be devised to tell the passage of time. These included candles marked to tell the hour being melted away. Burning candles being too inconvenient to carry in their pockets, our forefathers also developed the portable hour glass in which the sands of time flowed so swiftly.

None of these, obviously, was of a mechanical nature. It is believed that a mechanical time piece with gear wheels was invented by Ctesibus, an Alexandrian, about 140 years before the birth of Christ. This was a development of the Clepsydra—meaning Water Stealer—which started out merely as a vessel from which water dripped slowly through a hole while the gradually lowered level inside the jar measured time against a scale marked off on the vessel's side.

Eventually, with the gear wheels of Ctesibus and a twelve-hour circular face, the Water Stealer came to look very much like a modern clock. The Romans used them both as household and commercial time pieces, and they were official timers in the Roman Senate. One of the tasks of Senate attendants was to keep an eye on those clocks which timed the speakers who held forth before the Senate. Since time allotted each speaker was strictly limited, it was the practice of some of these early politicians to secretly add mud or oil to the clock water to slow its dripping rate, thereby giving them more speaking time. Filibustering, as this shows, is no modern invention.

The next stage in clock development was the substitution of weights for water power to move the pulley and gear attachments of the Water Stealers. The force of weights caused an iron bar to move from side to side, turning the gear wheels and moving the time indicator. The need for accurate time and less cumbersome time pieces led to the development of improved escapements and eventually the mainspring.

The pendulum of Galileo and the dead-beat escapement, developed by the English astronomer George Graham, improved the time pieces of their day. Through the years one improvement led to another, and by 1800 the entire foundation of our modern time piece was laid.

When clocks became smaller, it was the custom of the town watchmen to cry the hours to the good citizens of the town who did not possess time pieces. We have left the town crier behind, but his name has been given to the small clock most of us carry today—the watch.

With the increased use of clocks, necessitated by greater commercial and scientific activities, a vital need developed for establishing a time standard to give a positive measure of time for the clocks throughout the world. The fixed stars have long held top place in providing this positive measure of Mother Earth's rotation. By checking this rotation with one of those distant, great flaming suns which are so deep in the heavens that, to us, they appear as points of light, we are provided with time accurately computed to a hundredth of a second. This checking is done at the U. S. Naval Observatory just outside of Washington, D. C.

All of us are aware that the need for accurate