



Dear Colleagues

Final exams are behind now us and the faculty and 3Ls are preparing for graduation next Sunday. Academic years have their own rhythms; they create their own sense of time. Our year begins in the Fall not in January, and it ends in May, under a bright sun and long days rather than in December with cold short days and a sun dipping earlier into the horizon.

Graduation is a major milestone in the lives of our law students – after three seemingly long years. For many of you, it will mark the last time you will engage in a formal degree program. It is a special time for you and your families but also a time of celebration for those of us who remain. We wish you well as you enter a new era of your lives. For you, the past is the past and the future is limitless. If you have enjoyed receiving CONSTRUCTION NOTES, send me your new email address and I will add you to my distribution list. Or, you can follow along at <https://medium.com/construction-notes>. For those of you returning in the Fall, I hope you all did well and that you are now looking forward to at least a little relaxation from the rigors of law school. And always remember, as I have said before, you are more than the grades you received in your classes. Come back rejuvenated and write your future.

Fortunately for all of us, the BBC work schedule minimized any disturbances while you wrote those final exams. Nonetheless, there has been much progress at the Capitol Crossing site since last I wrote. Excavation continues for the garage and the foundations for the second building, 250 Massachusetts Avenue, N.W. Demolition of the old highway entrance continues as the new highway entrance creates confusion for those who still expect to turn onto 3rd Street to



Lagging for the Foundation Walls



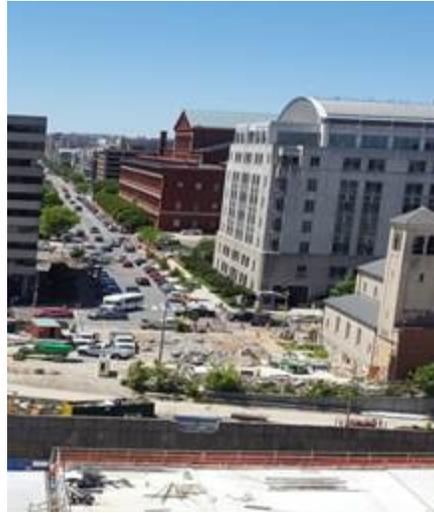
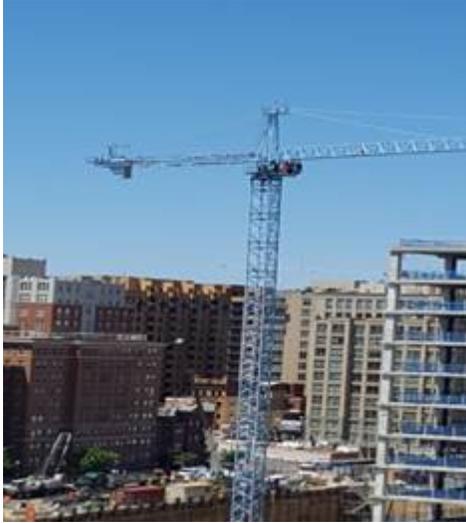
Old Highway Entrance

gain access to the highway going south. Nonetheless, the new entrance is fully functional as is the 2nd Street exit.



New Highway Entrance
the Day Before It Opened

The most visible change on the site is the new Tower Crane. Like its predecessor at 200 Massachusetts Avenue, this crane will be the workhorse for the construction of 250 Massachusetts Avenue. The Holy Rosary Rectory, once a prominent structure on 3rd Street is now little more than a pile of rubble. The East Concourse roof is almost completely framed.



Reinforcing steel, the ubiquitous rebar, covers most of the center-block sections of the East Concourse, awaiting the concrete that will be added later this week. The penthouse on the roof of 200 Massachusetts Avenue is framed out, ready to be closed



in. Anchors for the windowed curtainwall have been installed on the slab edges; when you return in the Fall, you will see the building substantially enclosed.

Dramatic changes are taking place inside 200 Massachusetts Avenue every day. Copper and cast iron water lines establish runs for cooling systems, waste disposal, safety sprinklers, and fresh water. Switchgear, transformers, and cables course through the building waiting to send power to all of the tenants. Air handlers, heating and cooling units, and the



variable air volume (VAV) boxes that control the flow of air for heating and ventilating are being connected by ductwork that lines the ceilings on each floor. And in the construction trailers, the architects, engineers, construction managers, and subcontractors continue to review drawings, make field adjustments, rethink design to meet constructability contingencies, and coordinate the various internal and external systems so that the building comes together as originally conceived.

But most of these activities are invisible to the casual observer since they are occurring inside the topped-off building. It is at this point that people begin to ask: “When will it be finished?” “How much longer will it take?” “It has taken so much time and it’s still not done.” All great projects, be they art, music, literature, or architecture, take time; and their eager owners always want to know when they will be finished. In Irving Stone’s masterful novel, *THE AGONY AND THE ECSTASY*, based on Michelangelo’s personal letters, the author has Pope Julius, the patron of the Sistine Chapel ceiling, repeatedly asking Michelangelo “When will it be finished?” The artist always replies, “When it is done.”

We are an impatient species who seek to measure our lives in “Time.” Time always intrigues. To Byron’s Don Juan, “Time is, time was, time’s past.” Augustine differentiated among three times: time past, time present, and time future. For them, time was constant; it could be reckoned with some certainty. To Einstein and to all of us in the modern world, time is no longer absolute. Unlike the ancients whose measure of time always seemed the same, scientists have revealed what poets always knew – that time flows are variable and elusive, dependent upon where one stands in the vast universe and on the speed, no matter how imperceptible, that one is traveling.

Humankind’s preoccupation with time began over 20,000 years ago. Archaeologists have found sticks and bones with scratched lines or carefully gouged holes that seem to be ancient calendars used to mark days between phases of the moon. Five thousand years ago, Sumerians living in the Tigris-Euphrates valley developed a system that divided the year into thirty-day months and a twelve “hour” day. Babylonians and Celts measured time 4,000 years ago with lunar cycles and star movements. The Babylonian cycle was 364 days. The Egyptians, using Sirius or the Dog Star in the constellation of Canis Major, first measured the 365-day cycle in

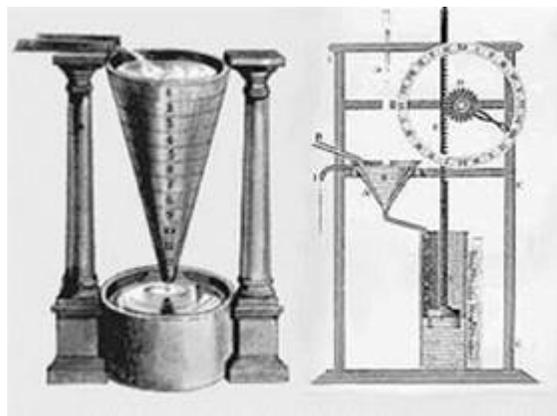
4236 B.C.E. Julius Caesar brought the 365-1/4-day calendar to Rome from Egypt. The Julian calendar, however, proved slightly incorrect, and so it was modified by Pope Gregory XIII in 1582. This is the calendar we use today – the way we measure our days and years – our time.

All ancient civilizations of which we know sought to measure time to mark plantings and harvests, signal the commencement of war, and to honor their gods with celebration. The need to measure time, so elusive in the mind of a poet, remains a constant in the evolution of science, commerce, and philosophy. Measuring months and years did not suffice as human knowledge increased. Understanding ever smaller units of time preoccupied at least Western thought since the Middle Ages and continues to do so today.

True clock making began to appear in the Middle East and North Africa between 5,000 and 6,000 years ago. Around 3500 B.C.E., Egyptians began to use obelisks to cast shadows that marked portions of the day. As early as 1500 B.C.E., they used sundials to measure the passage of time. These horological instruments were not precise because of seasonal changes, but they served their agrarian populations and warring kings well enough. Merkhets measured “hours” at night by marking the movements of stars crossing a median. Charts used to measure such movements are pictured in the tombs of Ramses VI and Ramses IX at Luxor, dating them to 1150 and 1120 B.C.E. Amenhotep III owned water clocks, sometimes called clepsydrae



An Egyptian Merkhet



Amenhotep's water clock

or “water thieves” in 1400 B.C.E., although the tomb of the craftsman Amenemhet suggests that he created water clocks with floating statues to mark the Egyptian hours as early as 1550 B.C.E. Clepsydrae arrived in Greece by the fourth century B.C.E. The great astronomical water clock of Su Sung stood in a thirty-seven-foot tower in the Chinese Emperor's court in 1088 A.D. In 1126, it was carried away and destroyed by Chin invaders who could not make it work. Despite the Chinese preoccupation with calendars and astronomy, the clock then disappeared from China until the Jesuit, Matteo Ricci, reintroduced it to the Chinese court in 1605.

The Egyptians' notion of a 24-variable-hour day and the sundial that measured it passed to Greece during the time of Alexander the Great and then to Rome about 293 B.C.E. By 30 B.C.E., sundials were used throughout the “civilized” world. They remained in use almost to the end of the Middle Ages. Minutes, however, had no meaning to the ancients. Short intervals were often referred to with simile and metaphor such as “in the blink of the eye.” Arabic astronomers

may have been the first to use minutes, but they did not arrive in Europe until the end of the Middle Ages. The true source remains unknown.

Early notions of time were far different from those of modern people. To the ancients, the notion of being “late” could only be determined by the rising and setting of the sun, the passage of water from a bowl, or the movement of the stars. Sometime between the thirteenth century and the sixteenth century, the need to understand ever-smaller units of time began to preoccupy Western thought. Time-consciousness also began to change. Although sun dials and water horologias measured time for monks and astronomers, time for common people was usually marked by periods of prayer, for example, matins, terce, and vespers. Indeed, our word noon comes from the None prayer period, which began shortly after the sun reached its peak. Bells usually tolled church time. Legend tells us that church bells may have been invented in the Italian town of Nola in Campania. Sabinianus is said to be the first Pope to order the ringing of church bells to signal the hours of the day. The practice expanded with the proliferation of church architecture during the Middle Ages. By the thirteenth century, church bells signaled the hour throughout all Christendom.

During the course of the Middle Ages, the notions of Church time and secular time began to diverge as peasants moved to the cities and industry moved out of the monasteries. By the thirteenth century, clocks were in daily use. Like bells and relics, they were part of the church’s and the monastery’s ornamentation. Indeed, churches and monasteries competed with each other based on the grandeur of their clocks. Writers and artists were very conscious of time. Petrarch wrote about the “incalculable value of time.” Dante refers to clocks in the *Divine Comedy*. Fourteenth-century art portrays various subjects in the presence of a sand hourglass, which replaced the small water clock during the late medieval period.

No one knows who invented the mechanical or wheeled clock, and historians can date it no better than the late thirteenth or early fourteenth century. Nor do we know whether the Europeans invented it or merely adopted it from China or the Arab world. One school of thought holds that the mechanical clock was merely a stepchild of other commonly used astronomical instruments. Galileo’s need to measure velocity and acceleration led to an understanding of the uniformity of nature and of mechanical laws that made the prediction of astronomical events fairly accurate. His proofs, however, depended on the accurate measurement of time. The invention of the mechanical clock made Galileo’s theories verifiable; but it did more than that. As described by Robert Andrew Millikan in 1932, these new scientific notions “transformed this world from one that is at bottom capricious and animistic, as was in fact both the ancient world and the medieval one, to a world that is dependable and in part, at least, knowable and controllable by man...”

Horological innovation continued throughout the Middle Ages, and water clocks completely disappeared from Europe by the end of the fourteenth century. The minute hand was invented by Jost Bürgi in 1577. Measuring time became even more accurate when the pendulum, a timekeeping concept first noted by Galileo, was developed for a clock by astronomer Christiaan Huygens in 1657. This mechanical innovation affected all manner of thought. Newton’s postulates required accurate time measurements for their proofs. Descartes, Hobbes,

and Kant all relied on time and on clock analogies as they expounded their philosophies. In time, even God was compared to a clockmaker.

The need for a greater understanding of time pervaded the Middle Ages and the Renaissance. The relationship between bells, clocks, and towers spread during the late thirteenth century and thereafter and it carried a powerful spiritual message to a largely illiterate population. St. Paul's in London and the clock tower in Genoa were built in the mid-fourteenth century. Rouen had one in 1385. The oldest preserved clock tower, built in 1386, is at the Cathedral of Salisbury in England.



Salisbury Cathedral Clock Tower

Artists depicted playable carillons in the early 1300s. Controlled by weights and pulleys and connected to the clock's escapement, these striking clocks were far more complicated than the clock itself. They became the pride of the emerging cities of Europe. Mechanical figures soon joined the bells atop the towers. Often accompanied by melodic chimes, these figures moved in and out of the tower as the clock struck the hour. Moscow's first striking clock appeared in 1404, Dubrovnik's in 1389. The clock at the Cathedral at Norwich (1325) had a procession of monks. The three Magi walked around the tower of St. Jacques Hospital (1326) in Paris. An angel "flew" around St. Paul's. These astonishing inventions were intended to be more than mere entertainment. As Gerhard Dohrn-van Rossum reminds us, the cathedral protocol from 1407 in Chartres states that the "purpose of these contraptions was, right up to the nineteenth century ... to lure people into church, to astound them, and to strengthen the authority of the Church." Temporal concerns, however, were even greater as cities and city states grew. In Milan (1322), Orvieto (1307), and Westminster (1369), clock towers were used to strengthen the political control of their patrons and to regulate the ever-increasing mercantilism of the era. By the fifteenth century, life in cities centered on its clock towers. Dohrn-van Rossum wrote that "the striking clock was born in fact from the needs of urban life."

Marking time, and time itself, had taken on a new meaning for Europeans, one that was far different from the world view of pre-mechanical man. Social complexity had arrived, and it was time-driven. In the words of Ben Franklin, "time was money" and so it is today. Once "time" was reinvented, the need for greater accuracy produced better and better clocks and watches. In 1721, George Graham improved the pendulum clock's accuracy to an error margin of one second per day. Today, simple quartz clocks with neither gears nor escapements provide

anyone with amazingly accurate time measurement at little cost. Modern atomic clocks are now accurate to within one-millionth of a second per year. Scientists at the National Institute of Standards and Technology in Boulder, Colorado, have built a clock designed to only slip by a second once every 30 billion years. This clock “records time by counting the rapid-fire oscillations in a laser. The oscillations, in turn, are kept in pace by a single mercury atom that vibrates at a constant cadence. The result is a clock that counts time by the femtosecond — a millionth-billionth of a second.”

Despite the centuries-old evolution of our understanding of time, from its spiritual underpinnings to its mercantile demands, time remains unknowable. Its meaning eludes us even as it drives our lives. Those of you who are graduating have spent three long years with us; yet it is only a brief moment in what I hope will be a long, prosperous, and fulfilling life for each of you. I have been associated with Georgetown for fifty years but it somehow seems fleeting – “a blink of an eye.” Events that occurred twenty-five years ago often seem like yesterday. But we each measure our time against our own understanding of “Time is, time was, time’s past.”

Those of you who are graduating have watched Capitol Crossing from the start, with the noise, the water shut offs, and lights shining through the windows of Gewirz at all hours of the night. Those days and hours must have seemed interminable. It could not have been easy for you. Yet you accepted my exhortations that the disruption and annoyance would last for only a short time. Short for us perhaps, but not always for you. In any case, I and the development and construction teams are grateful for your patience. And yet, as you leave, Capitol Crossing is still not finished. But it will be completed -- in its own time.

The clock on the Tower Green signals the time to our community and to our neighborhood. But it also marks the time of the poets and scientists, and the time of the ancients who strove to understand their place in a vast universe where time has both relative meaning and no meaning at all. We at Georgetown have shared a time of learning and intellectual growth together. A piece of our shared existence will continue and endure into time yet unknown.

Happy graduation. Go fulfill the dreams you had when you entered Georgetown.

Wally Mlyniec

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