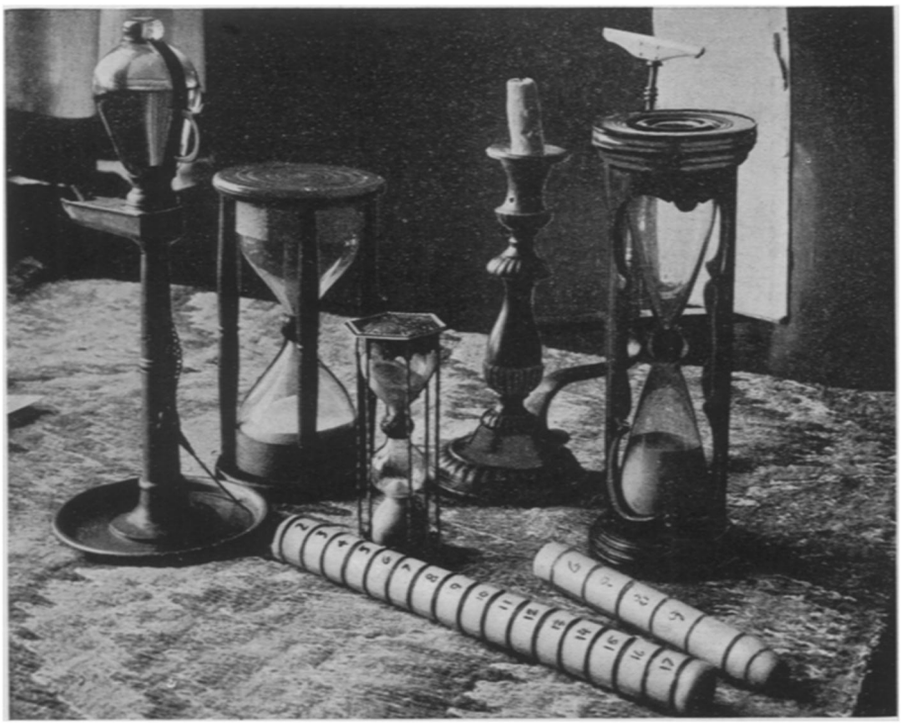

HOW TIME WAS TOLD

A few samples of replicas of ancient timepieces in the L. C. Eichner collection. At left is a clock lamp in which the falling level of the oil marks the hours. Next is a copy of an old hour glass; then an ingenious three-bulb sand glass marking hours and half hours. Behind, at the right, is a candle clock. The shadow of the bone piece is cast on a graduated hour screen. In front of the screen is an ornate, tall sand glass of old design while in the foreground are two clock candles with graduated stripings. The latter follow the time-measuring method originally attributed to King Alfred.

HOROLOGY

Modern Arts Reproduce the Timepieces of Olden Days

Sand Glasses, Water Clocks, Graduated Candles, Clock Lamps and Fountains in New Collection

MASTER craftsmanship combined with thorough engineering training is keeping alive in this bustling streamlined civilization today the art of making modern copies of the myriad devices man has used during his history for keeping time.

A collection of replicas of timepieces ranging from the water clocks of ancient Egypt to the famous pendulum clock Galileo designed but never built, assembled for the meeting of the Horological Institute of America, the watchmakers' professional society, reveals the history of time-keeping and of the perpetuation of ancient crafts.

Built by L. C. Eichner of Bloomfield, N. J., devices such as clock candles, multiple bulb sand glasses telling quarter hours, elaborate sundials, water clocks, lamp clocks, and all other devices which man through past time has used to record time's passing, are included.

Pride of the collection, perhaps, is a primitive looking pendulum clock mechanism faithfully made from original drawings left by Galileo. Clocks made from Galileo's famous clock drawings have been produced before to show that they actually would work, but machine-tooled gears and other parts were employed. The Eichner clock of Galileo is fashioned by hand after methods used in Galileo's day by locksmiths, the craftsman family from which watchmakers have descended.

Another favorite of the horologists is the great "two-hour" glass which duplicates the famous pulpit sand glass now in the Salem, Mass., museum. The forebearers of America's first families had to sit through sermons watching the sands of this glass trickle all-too-slowly to the bottom. And then perhaps the preacher would turn the glass over and start again!

Wind-Blown Sand

But these modern sand glasses contain no ordinary sand. It must be wind blown, and rounded, so that it does not clog in going through the tiny orifice between the bulbs.

The sand particles must neither be too fine nor too large. Stock rule of old sand glass makers was to screen the sand 20 times, but modern improvements in screens have led to satisfactory results with fewer operations.

The glass of the Eichner sand glasses, too, gives the appearance of antiquity for it contains strains of tiny bubbles which characterize the work of older glass blowers. Actually the glass maker fabricating these authentic reproductions uses the poorer glass that comes to the top of the pot in the melt.

King Alfred is credited with the invention of the candle clock and Mr. Eichner has several in his collection. These candles, by their burning, gradually melt away the wax which is marked at equal intervals to record the passage of equal intervals of time. In this invention King Alfred was merely using an old trick of the ancient Chinese of twisting grass into a rope and placing equally-spaced knots in the rope. Sleepers who placed such grass rope between their toes were awakened by the heat; the first alarm clock!

Sundials were the standard time keepers of the daylight hours of past generations but after dark the hour lamps came into use. These lamps marked time's passage by the lowering level of oil in their glass reservoir. Time graduations on these lamps start at 4 p. m.

Mr. Eichner has constructed several varieties of water clocks for his collection. Originally water clocks came from Egypt and the Greeks called them clepsydras. The simplest kind was merely a vessel with a tiny hole punched in the bottom which was floated on water and gradually filled until it sank.

A variation of this principle is employed by engineer Eichner in his "hour fountain" in which water runs from a top reservoir, down hollow legs supporting the reservoir, into the bottom where it bubbles up into a tiny fountain. When the fountain stops an hour has passed and the device is inverted to repeat its operation.

Such devices are time measurers, keeping track of time in units such as hours. Time keepers like clocks and watches give a continuous record of the passing of time. Such a variation of the clepsydra is also in the Eichner collection.

Mounted between two tall pedestals is a hollow drum into which is sealed water and a series of baffles with tiny openings between them. Cords wind around the axis of the drum. The drum is set at the top of its track and the water, passing from one section to the next, through the baffle system, gradually makes the drum rotate. This rotation unwinds the cord and gradually lowers the whole drum. The position of the axis of the drum, at any time, marks the hour and the motion is also transmitted to an orthodox set of hands on a clock face.

Electric clocks, keeping their marvellously accurate time, are appreciated by Mr. Eichner but he has little sympathy with modernistic, streamlined cases. Such clocks do not fit in dignified, period-type living rooms, he believes. Therefore he specializes in the fabrication of period-type electric clocks which look hundreds of years old but keep time in modern, electrical fashion. Prize of these old-new electric clocks is in the Architects' Club in New York City.

Science News Letter, July 16, 1938

CHEMISTRY

Nation's Soybean Lab Develops 36 Varnishes

IT IS just a bit more than a year now since active work on most of the projects at the government's Soybean Laboratory at the University of Illinois got under way. And in that year America has been diligently trying to learn about soybeans.

Thirty-six different varnishes containing 100 per cent. soybean for their oil content have been developed and are now undergoing exposure tests to determine their aging properties, according to Dr. Henry G. Knight of the U. S. Bureau of Chemistry and Soils reporting in *Industrial and Engineering Chemistry.*

The acid, alkali and water resistance of many of these oils is excellent, adds Dr. Knight, who urges that some of them appear to justify their immediate use for certain purposes. All that needs to be realized by the user in applying the new soybean varnishes is that their drying time is not as rapid as the super-quick lacquers which are so popular.

The work of the soybean laboratory is, in many ways, a race with increased production of soybeans by the American farmers. In 1926 only 2,646,000 pounds of soybean oil were crushed. In 1937 the crush will be near 200,000,000 pounds when final figures are compiled.

Soybean oil, oilmeal, soybean flour and other food stuffs are some of the products of the soybean tree. Among its industrial and food uses are: paints, enamels, varnishes, printing ink, linoleum, plastics, shortenings, margarine, foundry cores, livestock foods, flour, soy sauce (chop suey, remember), dietic foods, infant foods and beverages. From the protein content of soybeans a leading automobile manufacturer is now making a synthetic fiber quite comparable with the Italian trick of using the protein in milk casein for the same purpose.

Science News Letter, July 16, 1938

CHEMISTRY

Risk From Poison Gas Less Than That From Automobiles

Masks Are Safe, and Chief Peril Is From Panic, Chemist at University of Edinburgh Declares

CIVILIANS in future wars in England and the United States will run less risk from death by poison gases than they do today from death by motor car accidents.

This is the dash of "cold water" of scientific analysis which is poured on speculative imagining of death from the air by Prof. James Kendall, professor of chemistry at the University of Edinburgh, in his new book, "Breathe Freely! The Truth About Poison Gas," (Appleton-Century).

Without condoning air bombing by gas and high explosives, Prof. Kendall, who formerly was professor of chemistry and dean of the graduate faculty at New York University, seeks to show that the risks from poison gas are much less than the alarmists would have an almost hysterical England believe.

All stories that some new super gas will pass through modern gas masks are nearly 100 per cent. wrong, says Prof. Kendall.

"There is no such animal now, and there never will be," he states, explaining that the activated charcoal in the masks absorbs all molecules of any heavy vapor immediately and it will work for lighter vapors—like chlorine and phosgene—for appreciable periods of time. The filter materials of modern masks will stop all particles of smoke, even those microscopic in size. The only substances which will pass through masks are already known, but all of them are useless in chemical warfare.

The biggest point about gas attacks is that they tend to produce fear, says Prof. Kendall. The danger of fear is that it may lead to panic and it is panic which is really the major thing man has to fear from gas attacks.

Records of the World War show that the casualties from gas were much less than from high explosives and the chance of escape of civilians from high explosives in war-time is "about as good as that of losing the Irish Sweep if you are misguided enough to take a ticket therein," adds Prof. Kendall.

Civilian populations can live with gas attacks in war-times just as they live today with the motor car menace. He quotes General Ashmore, who said, "If you dash down into the Tubes at the mere threat of an air-raid, then, to be logical, you should climb a tree every time you see a motor bus."

The difference, as Prof. Kendall explains it, is that man understands a motor car and it has little mystery about it even though it deals large quantities of death each year. But mystery surrounding poison gases is something else. It is this mystery which Prof. Kendall attempts to dispel.

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