liable means were at hand, the dinner hour and the time for ceasing labor on the farm were determined by the length of shadows cast by familiar objects. The sun-dial, however, in some shape, has been used for many centuries. We remember when in the school room we watched lines on the window sill, scratched with a pocket knife, to cheer the tedium of the "hope deferred" by anticipating the welcome hour of dismissal, or the time of recess.

An improvement on the sun-dial was the clepsydra, a vessel containing water which found its way, drop by drop, through a minute aperture. These water clocks appear to have been of very early invention. They were used by the Chaldeans, and introduced into Europe by the Romans. The hour-glass was a great improvement, and was used within the memory of persons now living, as measurers of time, especially in the school room, and these cannot forget the couplet in the "New England Primer"—

"As runs the Glass,
Our Life doth pass."

Sand glasses registering three or four minutes are now used as attachments to egg-boilers, and also at sea for some nautical calculations.

We have no certain data for fixing the invention of clocks which were in any degree similar to those now used. Indeed, the only characteristics of these early time-measurers which they have in common with ours, is that they had wheels, one or more pointers, or a bell, and were moved by weights. Such or a similar machine is spoken of as being sent to Frederic II., by the Sultan of Egypt. Calmet in speaking of the customs of the Cistercian monks in 1120, alludes to the striking of the clock to awaken them to attend to their devotions. Dante, who died in 1321, speaks of the striking of a clock. About 1364 Henri de Wyck, a German mechanician, erected a clock in the palace of Charles V., of France. Most of the historical evidence which is reliable seems to point to this period as the first introduction of clocks, and to the fact that the Germans were the most successful clock makers.

The discovery of the isochronism of the pendulum by Galileo and its application to the regulation of clock work by his son, Vincenti, appears to have been the starting point from which the art of horology has reached its present state of perfection. Christian Huygens, however, seems to deserve credit for constructing pendulum clocks, which were really valuable and reliable, although Richard Harris, of London, claims to have antedated the improvements of Huygens by sixteen years, he having used the pendulum successfully in 1641, while Huygens claims are dated 1657.

To come nearer to our own times, who has not seen the Dutch clocks generally brought to to this country by English and German emigrants? They had no cases, only a dial, behind which were the works, the whole being suspended from a nail on the wall near the ceiling. The weights hung by strings, and could descend to the floor, while the clock was wound up by pulling a cord. Still later we have the long-cased clock, so beautifully characterized by Longfellow in his poem, "The Old Clock on the Stairs."

Somewhat back from the village street
Stands the old-fashioned country seat;
Across its antique portico
Tall poplar trees their shadows throw,
While from its station in the hall
The ancient timepiece says to all:
Forever——Never——
Never——Forever.

Halfway up the stairs it stands,
And points and beckons with its hands
From its case of massive oak,
Like a monk, who, under his cloak,
Crosses himself, and sighs, alas!
With sorrowful voice to all who pass,——
Forever——Never——
Never——Forever,

These old clocks had pendulums beating whole seconds and running eight days, both of which were provided for by the length of the case, which extended from the floor to the ceiling, at least in low ceiled houses, being six or seven feet high. The story of the suitor who hid in the clock case from the prying investigation of the irate father is familiar to all. Many of these old-fashioned clocks showed, in a semi-circle above the face, the changes of the moon, and all were ornamented with quaint pictures on glass. To many of our readers this brief reference to the old-fashioned clock will bring a recollection of pleasant seasons and scenes not to be again enjoyed or viewed.

The last phase of clock making is the introduction of the Yankee clocks, convenient, cheap, portable, excellent time-keepers, and models for workmanship without unnecessary finish. We have seen good clocks sold at retail for seventy-five cents, and even now they can be bought for a dollar or two, while the old-fashioned, long clock was considered a splendid article of furniture and a handsome dower for a bride. These cheaply acquired clocks, however, have not the life-long influence of the more costly ones of preceding generations. Then a clock was one of the household Penates, not to be parted with, but as precious as were her household gods to Rachel when she hid them under her camel's saddle. But the Yankee clocks have not only furnished every house in our land, but from their cheapness have found their way into the cottages of English laborers and the dwellings of the original clockmakers, the Germans.

A NEW METHOD OF SAPONIFICATION.

[For the Scientific American.]

Mege Mouries, a distinguished French chemist, has recently found that the neutral fats in the oil seeds during germination, as well as in the animal organism during life, take the state of very movable globules, which offer to the action of reagents a great surface. In this globular state fats show very peculiar properties, from which we will only mention those calculated to interest the readers of this journal.

1. In the ordinary state, fat, as for instance, tallow, soon becomes rancid upon exposure to the air: in the globular state and in a milky form, however; or in the dry state, in the form of a white powder, it will remain for a length of time without alteration. For all practical purposes this is easily obtained by mixing melted tallow of 113° Fah., with water of the same temperature, holding in solution 5 to 10 per cent of soap.

2. In the ordinary state it is difficult to combine tallow as well as other fatty bodies with hot salty caustic lyes, but in the globular state they absorb this lye immediately in a proportion varying with the temperature. Each globule, as it is attacked from all sides by the alkali, gives in such a case its glycerin quickly off and in such a degree that in a very short time each globule is transformed into a globule of perfect soap filled with lye. Two to three hours are sufficient for obtaining such a result.

3. These saponified fat globules have the property, when heated over 140° Fah., of running off the surplus lye with which they are swelled or filled, and of retaining only water for ordinary soap. They thus eventually become transparent (semi-liquid) and by stirring, form a layer of melted soap over the lye, containing the glycerin.

4. The saponification of this mass is so complete, that for the preparation of stearic acid it is only necessary to add a corresponding quantity of diluted sulphuric acid, whereupon sulphate of soda will be formed and the fatty acids separated.

It is then only necessary to melt them by the application of steam for the purpose of separating them from the solution of sulphate of soda, to let them crystallize, and to press them cold. Stearic acid will be obtained, unchanged, inodorous, and with a melting point of 136° to 138° Fah., while the oleic acid, flowing off, will be nearly colorless.

The latter is even of a better quality than fat oils, and more desirable and useful for the manufacture of white soaps of first quality either alone or with other fatty substances. By using oleic acid alone (the glycerin being separated) it is only required to neutralize the same with weak lye: the formation of soap then takes place immediately, which can be melted at once. If, however, the oleic acid be mixed with ordinary fats, the process described under (1) must be followed. Saponification can be effected in 6 hours and in the course of 24 hours a soap can be prepared as neutral and good and of the same detersive qualities as the best old olive-oil soap found in commerce. By this method not only is more time saved but no fat is lost in saponification, whereas in the ordinary process no small quantity of fat is wasted by running in the under lye.

Mege Mouries manufactures at present in his factory near Paris 3,000 pounds of fatty acids daily, separating the whole amount of the stearic acid existing in the fats and using at the same time the oleic acid obtained thereby for the manufacture of soap. A. O.

THE COTTON MANUFACTURE---RING SPINNING AND DRESSING.

The yarn spun upon the mule is usually intended for the "filling" that portion which carries the threads across the width of the cloth, and is generally softer spun than that for the "warp" or length-wise threads. This warp yarn is spun on the throstle or the ring spinner. The throstle is not materially different in its operation from the fly frame which twists the roving although much simpler in its construction. Like the fly frame it spins and winds the yarn upon spools by means of fliers. The ring spinner is a more modern machine, and it winds the yarn upon a cone-shaped bobbin which, when filled, resembles the cop formed by the mule. This yarn is frequently used, as that of the cop, for filling, as the bobbin containing it is adapted for being carried in the shuttle. The ring spinner is a machine of peculiar construction. The spindles carrying the spools are arranged on the sides of the frame vertically and driven at a high speed. They project through openings in a horizontal bar, each aperture considerably larger than the diameter of the full spool. These apertures have a projecting rim standing above the general surface of the bar, which rim is flanged on the upper edge making a projecting lip. A little coil of thin steel made from strips resembling in size the mainspring of a watch, is slipped or sprung over the lip of the ring and slides around its circumference. This coil or loop of steel is called a "traveler." It is simply a ring of thin steel perhaps one-eighth of an inch wide, the diameter of the ring less than one-fourth of an inch. Being of a fine spring temper the two ends of the ring can be spread and sprung over the lip of the ring in the horizontal bar, the elasticity causing the ends to grasp the ring to prevent flying off.

The object of these "travelers" is to guide the thread on to the spool. As the spindles revolve the thread, passing through the "traveler," carries it around with great velocity, and the horizontal bar traversing vertically back and forth, winds the yarn upon the spools in regular concentric layers. In all these spinning machines the roving is led between rollers, the under ones being of fluted steel and the upper of iron covered with smooth leather and weighted.

It remains now to convert this yarn, both warp and filling, into cloth unless the intention is the production of thread. If this is the object, doubling and twisting, starching and glazing and other processes for preparing it for the market, follow the process of spinning; but our object is to follow the yarn through the most important after processes to convert it into cloth. In some establishments the hard twisted yarn or warp is re-wound on larger spools for "warping." This process is simply winding the yarn on a "beam" or immense spool, the length of which corresponds with the width of the cloth to be woven. Huge "creels" or frames hold the bobbins of yarn, and through suitable guides the yarn is wound upon the beams. The beam, being filled, is taken to a machine called a "dresser." A number of beams are placed in suitable bearings at each end of the machine, and the yarn is led toward the center where it is again re-wound upon other beams. But during its passage of twelve or fifteen feet it has undergone quite a change.

All yarn when first spun is "fuzzy" or bearded, full of fibers sticking out from its surface in all directions. These fibers on the warp yarn would considerably interfere with the weaving, and as they cannot be so readily removed and their removal would impair the "body" of the cloth, they are glued down; or, rather, the yarn is sized or starched. This is done on the dresser. The yarn as unwound from the beam passes through a trough of starch, and as it leaves the trough the superincumbent starch is scraped off by the yarn passing through minute perforations in sheets of copper, while immense brushes traverse back and forth on the web cleaning and smoothing the yarn and brushing off the loosely adhering particles of starch. The yarn is thoroughly dried by suitable heaters, the pipes of which pass close to the web, and by blowers keeping up a constant blast of air. Consequently the yarn is dried very rapidly, and when re-wound on the beam is ready to be placed in the loom. The room where this dressing is done is, of course, kept very hot, but we never heard that the occupation is unhealthy.

In the next and final article we will notice the operation of weaving and the subsequent manipulations to prepare the cloth for the market.

TRADE MARKS--- GILLOTT'S 303.

Our reference to the law of trade marks in an article on the general subject last week, received a happy illustration before it was fairly published, in a decision at the General Term of the (New York) Supreme Court, in the case of Joseph Gillott against Richard Easterbrook and others. "Gillott's 303" has been for many years a household word in this country, expressing an exact description and quality of pen, which was bought and sold by name alone, needing no examination, only an assurance of its genuineness. It is clear that the use of this number had become lucrative, and might be made so by any one who should adopt it, and that its value in either case results from the long sustained and high character of Joseph Gillott's manufacture alone. If any result of labor and skill can be property, the reputation and significance which the number "303" as applied to pens had acquired, was the property of Joseph Gillott. The trespasser in the above case was not charged with forging the name of the rival manufacturer, but with appropriating the mark which he had made valuable, and offering to the public another "303", virtually represented as different only in the manufacturer's name, and thus profiting by the public confidence in that brand, which Gillott's manufacture had inspired. In the absence of a patent, the right arises with the inducement to infringe it, from the value acquired by long and meritorious use—not from the mere prior adoption of a number. The case has been vigorously contested by the defendants from court to court with the aid of very eminent counsel, and although the decision above referred to and preceding ones were all against them, they may yet perhaps carry the question still higher until it shall be settled beyond appeal or debate.

A Near View of the Future.—A sleepy traveller dreamed the other day of riding across the continent by rail, and heard among other sounds the voice of the brakeman at intervals sent through the half-opened door in words like these:

"Chicago. Change cars for New Orleans." "Missouri River. Change cars for Saskatchawan, Leavenworth and Galveston." "Rocky mountains. Change cars for Santa Fe, El Paso, Matamoras and the City of Mexico." "Salt Lake—twenty minutes for dinner. Change cars for Fort Benton, British Columbia, Pah Renegat, Panama, Lima and Valparaiso." "Virginia, Nevada. Change cars for Owvee, Columbia River, Puget Sound and Kamschatka." "San Francisco. Passengers for New Zealand, Honolulu, Melbourne, Hong Kong, and all points of Europe, Asia and Africa, will keep their seats till landed on the wharf of the daily line of the Pacific Mail Steamship Company. Baggage checked through to Pekin, Calcutta, Grand Cairo, Constantinople, St. Petersburg, Paris and Liverpool."

Wet Year.—There was more rain in 1866 than in any previous year since 1831, and 12·29 inches more than the average of that period, while the evaporation was 3·77 inches less.

NEW PUBLICATIONS.

Catalogue of Casts of Fossils from the Principal Museums of Europe and America; with short descriptions and illustrations. By Henry A. Ward, A.M., F.G.S., Professor of the Natural Sciences in the University of Rochester. Rochester: Barton & Andrews, 1866. 8vo. pp. 228.

We value highly this addition to our scientific library of reference. The general reader also will find it "stranger than fiction," and, as it is a little book, a cheap and ready means of becoming acquainted with the old fossil world, so far as it is yet known to man. The author has obtained these casts by the slow labor of years, and copies are now offered for sale.

An Elementary Manual of Qualitative Chemical Analysis. By Maurice Perkins, Nott Professor of Analytical Chemistry in Union College. New York: John Wiley and Son, 1867. Small 8vo. pp. 65.

This little manual consists of a selection of three or four of the most characteristic reactions, with a system of analysis for each of the more commonly occurring metals, acids, and radicals on the plan pursued in the laboratory for the instruction of the Engineering Department of Union College.

Gardening for Profit: A Guide to the Successful Cultivation of the Market and Family Garden. By Peter Henderson. New York: Orange Judd & Co. 12mo, pp. 250.

This treatise is by an experienced Market Gardener, and is a practical, business-like manual of advice: just such a talk as we should wish to have before engaging in gardening, from an intelligent man who had followed the business as a business all his life.

American Horticultural Annual, 1867. A Year Book of Horticultural Progress, for the Professional and Amateur Gardener, Fruit Grower, and Florist, New York: Orange Judd & Co., 12mo, pp. 150.

This beautiful Year Book and Almanac will do well to accompany the above noticed volume.

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