

## A Floral Time Table.

It is a most interesting fact that certain flowers open and close their blossoms at least once every twenty-four hours, although the cause of this action is as yet but imperfectly known. In some cases it may depend on heat, in others on light being present in sufficient force. The fact has long been known. It was known to Linnaeus, and some of the early gardeners mention floral clocks and dials among the quaint conceits offered to the readers of their books. Here is a list of plants which open at different hours during the day. The first column of figures gives the time of opening in the morning, and the second column shows the time of closing.

|                                                           | H. | M. | H. | M. |
|-----------------------------------------------------------|----|----|----|----|
| Goat's beard— <i>Tragopogon luteum</i> .....              | 3  | 5  | 9  | 10 |
| Late flowering dandelion— <i>Leontodon serotinum</i> .... | 4  | 0  | 12 | 1  |
| Hawkweed— <i>Picris echinoides</i> .....                  | 4  | 5  | 12 | 0  |
| Alpine hawk's beard— <i>Crepis alpina</i> .....           | 4  | 5  | 12 | 0  |
| Wild succory— <i>Cichorium intybus</i> .....              | 4  | 5  | 8  | 9  |
| Naked stalked poppy— <i>Papaver nudicaule</i> .....       | 5  | 0  | 7  | 0  |
| Copper colored day lily— <i>Hemerocallis fulva</i> .....  | 5  | 0  | 7  | 8  |
| Smooth sow thistle— <i>Sonchus oleraceus</i> .....        | 5  | 0  | 11 | 12 |
| Field bind weed— <i>Convolvulus arvensis</i> .....        | 5  | 6  | 4  | 5  |
| Common nipple wort— <i>Lapsana communis</i> .....         | 5  | 6  | 10 | 0  |
| Spotted cat's ear— <i>Hypochaeris maculata</i> .....      | 6  | 7  | 4  | 5  |
| White water lily— <i>Nymphaea alba</i> .....              | 7  | 0  | 5  | 0  |
| Garden lettuce— <i>Lactuca sativa</i> .....               | 7  | 0  | 10 | 0  |
| African marigold— <i>Tagetes erecta</i> .....             | 7  | 0  | 3  | 4  |
| Mouse ear hawkweed— <i>Hieracium pilosella</i> .....      | 8  | 0  | 2  | 0  |
| Proliferous pink— <i>Dianthus prolifera</i> .....         | 8  | 0  | 1  | 0  |
| Field marigold— <i>Calendula arvensis</i> .....           | 9  | 3  | 3  | 0  |
| Purple sandwort— <i>Arenaria purpurea</i> .....           | 9  | 10 | 2  | 3  |
| Creeping mallow— <i>Malva caroliniana</i> .....           | 9  | 10 | 12 | 1  |
| Chickweed— <i>Stellaria media</i> .....                   | 9  | 10 | 9  | 10 |

—The Garden.

## Focusing Screens for the Camera.

Says the *British Journal of Photography*: When glass is coated with a thin solution of starch and allowed to become dry, a focusing surface is secured which possesses certain advantages over all others. It possesses a very fine grain—one which, better than any other, is adapted for arresting the rays from the lens under circumstances conducive to the examination of the image either by a single powerful magnifying glass or by the compound tube. The objection to the employment of a single or simple magnifier, even if it be composed of a doublet or triplet, is this: that when used in conjunction with a plain glass focusing screen there is a certain degree of latitude in the determination of the precise plane upon which the virtual image is projected—a latitude that does not exist when the rays are arrested by any image-receiving surface on the one hand, or, as already explained, by any polished surface on the other, when used in conjunction with a compound magnifier.

An ethereal solution of wax has sometimes been recommended as a coating upon which to receive an image. In such experiments as we have made with this substance the result, although exceedingly pleasing when employed as a backing for a transparency, is not successful when used as a focusing screen. Much better is a film of collodion modified in its physical structure by the admixture with it of an alcoholic solution of lac or the other gum resins which form the solid constituents of a good negative varnish. It is, doubtless, known to many of our readers that if collodion and negative varnish be mixed in certain proportions—the precise nature of which could not be stated unless the exact constituents of each were known—a varnish results which, when applied to a glass plate, dries with an appearance possessing singular beauty. Although both constituents are in themselves transparent, and give transparent films when used separately, yet when mixed the film given by their union is neither opaque nor transparent, but it possesses a remarkably beautiful opalescence.

This, although pleasing and useful as a backing for transparencies, is still of too purely an opalescent character to render it useful for receiving or arresting an image. It gives a surface too nearly conforming to that of opal glass to be of any utility as a focusing screen. This also applies in some measure, although not to such an extent, to the employment of a bromo-iodized, collodionized plate, which, having been immersed in a silver bath, is afterward charged with atoms of reduced silver through the intervention of a developing solution, these silver particles being exceedingly fine. In this category, too, may fittingly be included emulsions composed of such amorphous salts as sulphate of barytes suspended in either collodion or gelatine.

We may here observe that this last named preparation forms an admirable backing for transparencies, especially for those which are intended to be viewed through powerful magnifying glasses. The best way of forming the barium sulphate is by adding a little sulphate of soda to a solution of gelatine, and afterward a solution of chloride of barium. If this be done well, with constant agitation, the resulting sulphate of barytes is very fine and evenly distributed throughout the entire substance of the gelatine.

If, by accident, a focusing screen has been broken when the photographer is at a distance from any point of supply, the best substitute he can adopt is starch, which, happily, is procurable everywhere. To apply this substance to plain glass all that is requisite is to level the plate, and, having previously boiled and strained the starch, to pour it upon the glass, allowing it to remain quite level until by the evaporation of the water the film becomes hard and dry.

There are some photographers who adjust the subject to be photographed by sights placed on the top of the camera. This is an excellent system, especially when photographing at a distance from home. We have no hesitation in saying

that the cameras of every traveler should have such sights affixed to them in case of accident to the ground glass.

Further: to permit of sharp focusing when such accident happens, it would be well to have provided a small but rigid strip of wood capable of being laid across the frame of the focusing screen, and carrying in its center a magnifier adjusted in such a manner as to enable a sharp image to be received in air when there is no ground glass at all to intercept it. This air image must, of course, be made to correspond in position with that which falls upon the surface of the sensitive plate. For such a purpose the magnifier, when once adjusted, must be rigidly fixed so as to be incapable of alteration. This will render the photographer entirely independent of the ground focusing screen should it by accident become destroyed.

## SAFETY CATCH FOR ELEVATORS.

The car is provided with a false bottom, B, below the bottom, C, and on the under side of which two sliding locking bolts, D, are held by clips to slide in opposite directions, the outer ends of the bolts being beveled to fit in the teeth of the racks, F, held on the upright guide posts, G. The inner ends of the bolts are connected by a toggle joint, from the middle hinge of which a weight is suspended that draws the bolts toward each other. On the bottom of each bolt is a check lug, a, to limit the movements of the bolts in either direction by coming in contact with the clips, E. A rope fastened to the middle hinge of the toggle passes over

Fig. 1.

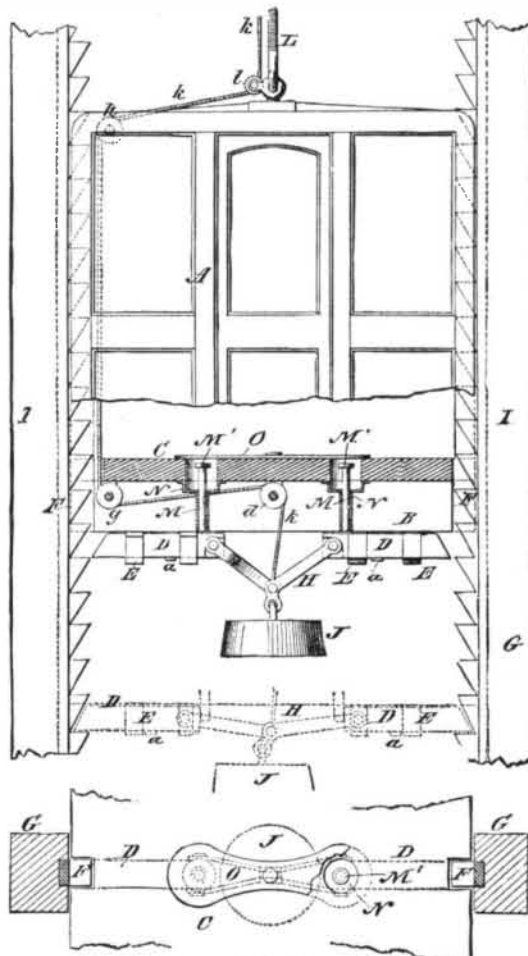


Fig. 2.

## WEEKS' SAFETY CATCH FOR ELEVATORS.

a pulley, d, under the pulley, g, over the pulley, h, and under the pulley, i, on the middle of the top of the car. This rope is wound on the same drum with the hoisting cable, L, or on another drum. Two vertical locking pins, M, held in casings, N, project downward from the bottom, C; they are formed with the heads, M', on the upper ends, and rest on the inner ends of the bolts. The aperture leading to the casing and pins is covered by the plate, O. The weight of the block is greater than that of the bolts and the safety rope, so as to keep the bolts withdrawn.

If the hoisting cable break, all the strain will be on the safety rope, k, which would pull the middle of the toggle upward, thereby forcing the bolts outward and engaging their outer ends with the teeth of the rack, thereby locking the car in place. As the bolts are pushed outward their inner ends pass under the locking pins, M, which drop down behind the inner ends to prevent the weight, J, from drawing them toward each other in case the safety rope should also break. By turning the plate, O, access may be had to the locking pins. Although the device operates automatically, it can also be worked by a person in the car pulling the safety rope. Fig. 2 is a sectional plan view through I I. If desired, the bolts can be arranged on the under side of the top of the car, and a spring can be used in place of the weight for shifting the bolts.

This invention has been patented by Mr. Frank A. Weeks, of Enniskillen, Ontario, Canada.

ORANGE PEEL is now said to be collected, dried in ovens, and sold for kindling fires. It burns readily and with great fierceness, and is safer than kerosene.

## System in Shop Management.

An article under the above heading from the *Iron Trade Review* contains suggestions which it seems to us may be advantageously adopted into many large establishments other than those devoted to manufacturing.

Any changes may be made in the rules to render them better adapted for special localities, or modified to meet the requirements of some peculiar kind of business; but the rules seem reasonable, and the employee does not seem to have any good cause to complain of its requirements. A great many establishments who employ a large number of persons would derive great benefit by the introduction of a system similar to that given below into their works.

It is an encouraging sign of sound business conservatism, says the *Review*, that more attention has been paid of late to the matter of systematizing the work and accounts of our manufacturing establishments than ever before. Within our knowledge several of the largest concerns in the country have recently remodeled their system of accounts to conform more strictly with the economical necessities of the times; and it is no reflection on their business sagacity, but quite the contrary, that the heads of our leading manufactories are each year paying more and more attention to the small economies. We are aware that too much system is often worse than little or no system, but it is undeniable, at the same time, that just in proportion as the various lines of work of a great establishment are drawn to one center, and the record of work done and expenditures made condensed to a few words in few books, just so is that establishment enabled to pay dividends in good times and to weather through hard times when other concerns are floundering about and going under.

For the purpose of illustrating what may be done in this line, we refer briefly to a system adopted recently, after extensive correspondence and investigation, by one of the leading manufacturing establishments of Ohio. Succinctly stated, this system provides for a perfect record of each man's time and work, kept by himself and approved by the foreman of his department. Upon going to work in the morning each man receives a blank something like this:

Report of ..... Department.  
..... 18....

| LOT.<br>Foreman<br>to fill in. | No. Pieces. | Name of<br>Piece. | Class of<br>Work. | Finished. | No. HOURS.  |               | RATE.       |               | Amount. |
|--------------------------------|-------------|-------------------|-------------------|-----------|-------------|---------------|-------------|---------------|---------|
|                                |             |                   |                   |           | Day<br>Work | Piece<br>Work | Day<br>Work | Piece<br>Work |         |

If a man come in late, he is given a similar blank but printed on paper of a distinctive color, with an additional space in which to mark the number of minutes or hours tardy. The effect of this has been to materially lessen the cases of tardiness—the men don't like to get the colored blanks. On the back of these blanks are printed the following rules:

## WORKING HOURS.

These shall be such as may be designated from time to time. No extra time will be credited except by special agreement.

The blowing of the whistle will be the signal for commencing and quitting work.

All employees will be required to be present before, and begin work as soon as signal is given.

Should it be necessary to leave work before quitting time, the case must be laid before the foreman in charge and his consent obtained.

Necessity will alone excuse absence from place during working hours; other absence from post, without special agreement with foreman, will be sufficient cause for discharge.

Piece workmen are required to work the same hours as day workmen, unless especially excused by foreman in charge.

## FOREMEN.

Foremen are required to observe these rules, and secure from the men under their charge proper compliance.

They will in all cases report to the superintendent or assistant any necessary absence.

They should be on hand at least five minutes in advance of signal for commencing work.

## WATCHMEN.

The night watch must report for duty at 5:50 P.M., from May to October; and at 4:50 P.M. from October to May; at 4:50 P.M. Saturdays, Sundays, and holidays throughout the year, and must remain on duty till relieved.

The day watch must relieve the night watch at 6:30 A.M., and must remain on duty until in turn relieved.

## ENGINEER.

The engineer must see that his fires and engine are in proper condition, must start his engine at least two minutes before time for commencing work, and run for two minutes after blowing whistle.

## STRICTLY PROHIBITED.

Conversation among employees and the reading of books and papers during working hours is strictly forbidden.

Smoking or the lighting of cigars or pipes in the shops is strictly forbidden, except that during the noon hour it will be allowed in the foundry, blacksmith shop, and boiler shop, and nowhere else.

## ABSENCE FROM WORK.

Should it become necessary for workmen to absent themselves from the shop for one or more days at a time, proper notice, with reason therefor, should be given to the foreman in charge.

Twenty-four hours' absence, without notice, will be sufficient cause for assigning others to positions thus made vacant.

The advantages of this system of time keeping are manifold. Before, the time was kept by the foreman, and there was no way of checking in case of dispute; now each man keeps his own time, subject to the approval of the foreman. Formerly the office had to keep an open account with each man; now the balances are made up each day. Heretofore there was no satisfactory method of getting at the actual cost of each piece of work; now it can be obtained without trouble. There was some objection by the men to the system at first, but after the adjustment of a few details, such as allowing them to take the company's time for filling out the blanks, all readily acquiesced in the new order of things, and matters are now running smoothly all around.

#### DECISIONS RELATING TO PATENTS.

United States Circuit Court.—Eastern District of Pennsylvania.

SEWING MACHINE COMPANY vs. FRAME.—PATENT CUTTING AND TRIMMING ATTACHMENT FOR SEWING MACHINES.

Butler, J.:

A change made in an old device which, though simple, is effective, and produces a new and useful result, held to involve the exercise of invention.

The correction of a patent by means of a reissue where invalid or inoperative for want of a full and clear description of the invention is proper.

Where there is a doubt as to whether the description in a patent will be misunderstood, the judgment of the Patent Office as to the necessity of a reissue is entitled to great weight.

A structural difference in form and size does not avoid infringement if the same work is done by substantially the same means.

The manner of using it does not characterize a machine. This is effected by its structure and capabilities.

#### Carbonated Beverages.

The Board of Health of Brooklyn, N. Y., having found that water from some of the many badly contaminated wells of that city was being used in the making of carbonated water for the supply of soda fountains, siphons, etc., an inquiry has been set on foot relative to the possible danger to health from this source in New York city. As the firm of John Matthews supplies over three thousand such fountains in New York regularly, they anticipated such inquiry by inviting Dr. Edson, of the New York Health Board, to make a thorough inspection of their large establishment, not only to examine the water used, but also the processes and materials employed in making sirups, and the construction of their fountains and sirup holders, to prove that there was no possibility of metallic poisoning in the use of their apparatus. All the water they use is the city Croton, but this is thoroughly filtered in a large double apparatus by passing it through sand, charcoal, and gravel. The firm expended some \$8,000 in putting down a well some 800 feet, but the water obtained therefrom was so impregnated with iron and sulphur as to be unavailable, and the well was filled up without ever being used. The sirup holders in their soda fountains are of glass, and the fountains themselves are of steel, but have a complete water and gas tight lining of pure block tin, put in by a process originated by the house. The firm use none of the old style copper fountains, which, in connection with the soda water as well as the faucets for the sirups, have undoubtedly caused a great deal of mineral poisoning. They annually receive and cut up many tons of such material for use as old copper, substituting therefor their own improved apparatus. The brass and copper fixtures they are thus receiving daily and consigning to the waste heap almost invariably have large deposits of verdigris, especially about the discharge openings of the multiple cocks for sirup holders. Could some of the old soda water drinkers see the condition of the inside of these fountains and their fixtures, the fine finish and the silver plating on their outsides would not much diminish their alarm. A representative of the SCIENTIFIC AMERICAN, who saw the proof of what is here stated, also drew half a glass of what looked like pure soda water from a copper fountain received only a few hours previous, when the application of a simple reagent for copper instantly turned it to a dark red. The last glass drawn before this had presumably been drunk by some customer. The amount of metallic poisoning it is possible in this way to inflict upon the public is not a pleasant subject to contemplate.

Pure carbonated waters are certainly cheap enough, and there should be no excuse for dealers who neglect to furnish themselves with apparatus by which such beverages can be furnished with a certainty that they will be non-poisonous.

#### Petroleum Springs in India.

The Government of India have received reports of the preliminary examination of the oil bearing strata which exist in the neighborhood of Sibi. The professional reports are of a character so decidedly encouraging that the Government have determined to procure from England the necessary machinery for boring operations. These will begin next winter, and will be conducted on an extensive scale. If the results justify the sanguine hopes entertained, the discovery will be one of no trifling importance.

#### WIREWORMS AND SKIPJACKS.

In turning up the soil round garden plants we sometimes find a stiffish, elongate, shiny, yellowish-brown, worm-like thing, about the thickness of a stout pin, and about three-quarters of an inch in length. Under the impression that any living creature found in garden soil is an intruder that should be summarily disposed of, we may proceed to endeavor to put these ideas into practice, only, however, to find that this is not quite so easy a matter as it seemed; the thing is so stiff and tough, that even a good hard squeeze seems to make but little impression on it. This tough, worm-like thing is a wireworm (Fig. 1), and so dire a foe is



Fig. 1.—WIREWORM, MAGNIFIED.

it to vegetation that we are perfectly justified in making all efforts to dispatch it. On examining it more closely, we find that it is not truly cylindrical, like a piece of wire, but somewhat flattened beneath, and that it is made up of a series of thirteen segments, placed in line, one behind the other. The first of these is the head, and the next three carry six short legs, one on each side of each segment, with which the creature crawls along, trailing the remainder of its body after it. The head is black, and is furnished with a pair of stout, transversely moving jaws, and a pair of short antennæ.

Wireworms are the larvæ of various kinds of beetles, called "skipjacks" or "click-beetles," from a peculiar habit of springing up into the air, and, at the same time, producing a sharp clicking sound. Skipjacks are narrow, elongate insects, with short legs and hard integuments (Fig. 2). The



Fig. 2.—CLICK BEETLE (*Agriotes obscurus*).

head is small and often much sunk into the thorax, and carries a pair of long, distinctly jointed antennæ; the thorax is of large size, and, roughly speaking, more or less quadrangular in outline, and convex above and beneath. The elytra or wing cases cover the body, and conceal a pair of ample membranous wings. Each is somewhat triangular in shape, and they form when closed a strongly arched, shield-shaped surface; they are usually marked longitudinally with parallel grooves or furrows, and covered more or less densely with short hairs. The under surface also is strongly convex, and the legs are short, and capable, like the antennæ, of being folded close up to the body. When thus compactly folded up, the insect may easily be mistaken for a piece of stick or earth. When surprised or alarmed, it will thus feign death, relaxing its hold of what it may have been clinging to, and falling to the ground, as often as not, on its back.

Now usually, when a beetle gets into such a position, it frantically waves its legs about till one of them by chance strikes the ground; then, seizing any irregularities of surface with the sharp claws at the end of its feet, and assisting itself with the end of its shanks it lever itself over sideways. But, owing to the convexity of its back and the shortness of its legs, a skipjack is unable to use this method, unless there happen to be close to it some objects of sufficient height to be reached by its waving legs; failing this, however, it would be, were it not for a remarkable contrivance, as helpless as a turtle in a similar position, and would stand a good chance of being doomed to continue its unavailing struggles, at the mercy of any passing foe, till exhaustion ended its woes by death.

The contrivance is as follows: The binder edge of the thorax is produced in the middle underneath into a long, curved, blunt spine, which is received into a little pit at the base of the body. The thorax is loosely articulated to the abdomen, and can be freely moved up and down, like the lid of a box on its hinge. When on its back, therefore, the skipjack arches its body by bending its thorax backward, and so balances itself on the two extremities of its body; this movement releases from its hollow the spine above referred to. Having stretched itself to the utmost in this attitude, the insect suddenly and forcibly resumes its former supine position—a movement which has the effect of causing it to rebound from the ground and shoot upward into the air to the height of several inches, at the same time bringing the spine back into its sheath with a sharp clicking sound. On returning to the ground, the insect generally manages to land itself right side up; if not successful the first time, however, it renews the attempt, and continues skipping till the desired result is obtained.

About sixty species of skipjacks belong to the British fauna, and three or four of them, brownish insects belonging to the genera *Athous* and *Agriotes*, are exceedingly common; the latter genus furnishes the most destructive wireworms. In their larval existence they are subterranean in habits, living for several years a little below the surface, and spend-

ing their time in devouring the roots and underground stems of plants, and thus, of course, doing much more harm than can be measured by the amount of matter actually devoured. In the winter they retire to a greater depth, descending farther and farther as the frost increases, and pausing in their depredations only in the coldest weather. They devour all kinds of agricultural produce, destroying both root, grain, and fodder crops. Carrying on the ravages as they do in the complete obscurity of subterranean life, they are rarely detected when at work, and the first evidence that the fatal work has been done is seen in the apparently causeless withering of the plants.

It is fortunate that creatures so destructive have natural enemies. Among the most important of these is the mole, which devours the larvæ with avidity. It is aided in its praiseworthy efforts by several kinds of birds, such as rooks and lapwings. A variety of artificial remedies have been proposed for checking the spread of the mischief, such as the application of liquid manure, which has the twofold effect of strengthening the plants that have not been irreparably injured, and driving away or killing the wireworms; paring off a thin coating of the soil, which will contain most of the insects, and then burning it; embedding in the soil at short distances apart slices of carrot and turnip to serve as traps, and then examining them and destroying the wireworms every other day. The latter method has been found serviceable in hop grounds, as many as 150 wireworms having been trapped close to a single hop bill. It should be remembered in this connection that the abundance of many agricultural pests is due in great measure to man himself. We greatly increase the supply of suitable food for these creatures, and in other ways make the surroundings more and more favorable to their existence, and we need not wonder, therefore, that the inevitable result follows, and that the additional task devolves upon us of devising means to counteract the excessive development we have ourselves unintentionally occasioned.—*Knowledge*.

#### Banknote Paper.

The banknote paper on which American legal tender, national banknote currency, and government bonds are printed is made entirely at Dalton, Mass.

If you should happen to stop at the paper mill, with proper introduction and credentials, you may perhaps be allowed to handle a sheet of the crisp paper, where, as the wet, grayish pulp is pressed between heavy iron cylinders, bits of blue and red silk are scattered over its face and silken ribs laid on its surface. You may go beyond into the counting room, where each sheet as it comes from the drying room is carefully examined and counted and then returned to the paper cutter to be divided into smaller sheets. If you trace this paper still further, you will find that from the cutter's hands it passes again into the counting room, and is separated into little packages containing 1,000 sheets each, the amount recorded in a register, and then packed in bundles and stored in fire and burglar proof vaults to await shipment to the United States treasury.

From the pulp room to the vault the precious paper is watched and guarded as carefully as though each sheet was an ounce of gold. Its manufacture is one of the greatest secrets connected with the government's money making. From the vaults of the paper mill at Dalton to the guarded store rooms of the treasury at Washington is a journey of several hundred miles. In the capacious vaults of the treasury building, among gold, silver, copper, and nickel coins, bullion, paper currency, and official records, you will find thousands of packages of the banknote paper made at Dalton. It comes in little iron safes, such as are used by the Adams Express Company, and each package and every sheet is carefully counted before the manufacturer and express company are relieved of further responsibility. The paper that arrives to-day may lie in the treasury store room for years, or it may be sent to the Bureau of Engraving and Printing to-morrow, to return in the course of a month's time a legal tender or bank note.—*Geyer's Stationer*.

#### A Scientist's Cheerful Workshop.

A biography of Louis Pasteur, just completed by his son-in-law, gives the following description of the surroundings of the great French investigator at his daily work: All the animals in the laboratory, from the little white mice hiding under a bundle of cotton wool to the dogs barking furiously from their iron railed kennels, are doomed to death. These inhabitants of the place, which are marched out day after day to be subjected to operations or other experiments, share the space with still more ghastly objects. From all parts of France hampers arrive containing fowls which have died of cholera or some other disease. Here is an enormous basket bound with straw; it contains the body of a pig which has died of fever. A fragment of a lung, forwarded in a tin box, is from a cow which died of pneumonia. Other goods are still more precious. Since Pasteur two years ago went to Pauillac to await the arrival of a boat which brought yellow fever patients, he receives now and then from far-off countries a bottle of black vomit. Tubes of blood are lying about; and plates containing drops of blood may be seen everywhere on the work tables. In special stores bottle-like bladders are ranged. The prick of a pin into one of these bladders would bring death to any man. Inclosed in glass prisons millions and millions of microbes live and multiply.