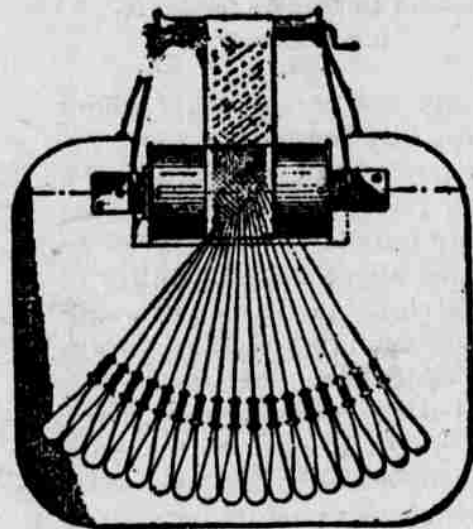


# SCIENCE and INVENTION

## Lacemaking Machine.

It would be a revelation to the shoppers who visit the city stores in search of finery to trim their gowns to know the story of how the lace which they so much prize is made—how whole families and even towns in continental Europe are engaged in this work, especially in the long winter months, when they are shut in by the ice and snow. Some of these tollers have to-day the aid of electricity and fine machinery in their work, but for years and years others have been toiling on old-fashioned hand looms, and even with no loom at all, turning out the dainty fabrics with only their needles.

The great value of this product and the enormous amount of labor spent in its manufacture have led the inventor to study out every possible means of simplifying the manual part of the work. A simple little machine, with the aid of which even the young may be taught to manufacture some neat pattern of lace and on which a skillful woman can soon learn to turn out complicated patterns, is that shown in the illustration. The mode of use is to attach the ends of the threads from all the bobbins to a flat strip of ribbon just beyond the pin-covered roller and then interweave the threads on the bobbin to form the



Simple Mechanism for Home Use.

desired pattern, winding up the finished product on the reel as the work progresses.

Sylvester G. Lewis, of Chicago, Ill., is the designer of this machine.

## Electrical Changes Fixed.

A naval physician, Dr. Jolly, has applied the Schliep rule in Madagascar, and by comparing the instruments he has been able to fix the changes of the electrical condition—changes which vary during the day and night. During the dry season there was an excess of positive electricity, Dr. Jolly observing that both in his own case and that of other subjects the best condition of health corresponded to the positive discharges, while during the periods of negative dominance there was weakness and lassitude. These changes also have their echo in the state of general health, notably in fevers.

## Tells Amount of Precipitation.

A tipping bucket attachment has been added to the rain gauge of the weather bureau on top of the custom-house at St. Louis. It accurately tells of the amount of precipitation. The rain is drained into a double bucket, so poised that it tips on receiving a certain amount of water. Every movement of this kind is registered by an electrical connection.

## As Yet Unknown to Science.

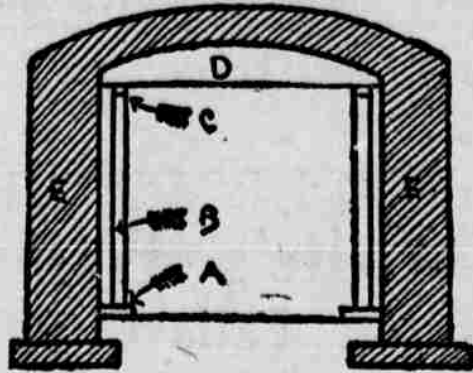
It can be said with reasonable certainty that electricity and magnetism are states of disturbances in the universal ether, although the exact kind of disturbance cannot yet be defined, partly because the mechanism of the ether itself must be sufficiently known in order to differentiate its disturbed conditions from its normal conditions.

## TO BUILD CONCRETE ARCH.

Strong and Lasting Structure Comparatively Inexpensive.

S. S.—Please tell me how to use concrete in building arches over streams and under main roads.

Where the span is not more than ten feet the arch can be moulded all in one. When the diameter is greater the concrete should be molded into blocks and then laid up the same as stone. If the culvert is not more than five feet wide, the arch may be put on flat, but if wider it should have a little crown. The plan shown describes the mode of building an arch. It has a 2 by 12 inch plank on the bed of the stream; on this stand 2 by 4 inch upright, which should not be



Concrete Arch Over Stream.

A, 2 by 12 in. plank; B, 2 by 4 in. uprights; C, 2 by 4 in. scantling on uprights; D, center supporting arch; E, concrete.

more than 2½ feet apart; on top of this a 2 by 4 inch scantling is laid lengthways of arch; then a center cut out of the plank, or inch boards and covered with inch lumber to hold the arch. The earth should be well rammed around the wall when filling in.

## Fitting Rafters on a Barn.

E. N.—I am building a barn 80 by 32 feet, and wish to put on two sets of rafters, to meet at the perline plate. What length should the rafters be and how should they be fastened?

Each set of rafters should be 18 feet long. The lower set should project one foot over the lower plate. These should be sawed so as to sit squarely on the plate, the projecting foot to be two inches deep. The upper end of the rafter rests on the perline plate, and the lower end of the upper rafter lies beside it. The top sides of the two rafters should be flush. The upper rafter fits on the perline plate with a tongue on the lower side to drop down on the inside of the plate to form a brace. The rafters are all spiked to the plates if necessary. The lower rafters should have a 9-foot rise and the upper ones seven.

## Support for a Chimney.

A. E. B.—I wish to build a brick flue 18 feet high, 30 bricks to the foot. I want it to rest on a floor having 4 by 6 inch sills, 12 feet long and 16 inches apart. If the sills rest on the 6 inch sides would they be strong enough to bear the weight?

If the chimney is built at the end of the building so that it rests on end of the joists these will provide sufficient support, but if it is built in the center of the room supports should be provided immediately underneath. If the chimney starts from the ground floor a small abutment can be built under the joints or sills, which will hold the weight.

## Setting a Cottage.

J. H. A.—In building a one-story cottage, 19 by 23 feet, with a veranda in front on level ground, how high should it be set in order to appear well from the road?

A one-story house should be set about two and one-half or three feet above the grade, if the appearance from the road is the only consideration to take into account, and assuming that the lot is level. The depth of the cellar sometimes has to do with the height from the grade. As the general thing houses of this size are set about that high.

## FLOWER IS A MYSTERY.

Remarkable Bulbous Plant That Comes From Central Asia.

Central Asia now puts in a claim for the most remarkable of all the bulbous plants. It bears the imperial title of "Monarch of the East." In color and appearance the bulb resembles a large potato, and its extraordinary



property is that it flowers without the aid of earth, sand, stones, water, or anything else. The discoverer of this phenomenon says: "The flower sheath sometimes reaches a length of nearly two feet, is of a red-brown color, tipped with red and yellow, while the inner parts of the flower are equally brilliant." He also adds that the bulb of this extraordinary plant needs only to be placed in a saucer, without water, in a warm room, when, without showing either leaves or roots, the flower makes its appearance, usually early in the year, thriving entirely upon the nourishment contained within the bulb.

As soon as the flower has faded away, and a growth appears to be coming from the bulb, it should be potted up in good soil and freely watered. Later on an umbrella-shaped leaf is formed on a stout stalk resembling brown granite in color, and sometimes reaching a height of three feet. In autumn this leaf fades, and as soon as it has died off, the bulb is lifted out of the soil, cleaned up, and placed in a dry condition in a warm room, when the previous year's display will be repeated.

## Nerve Cells.



Under the microscope the nerves of the human body look like the tiny roots of onions.

## Ancient Legal Documents.

Two of the oldest legal documents ever presented at the court house at Worcester, Mass., have just been filed at the registry of deeds. One, dated 1786, was a deed of twelve acres of land in Spencer to Nathaniel Bemis of Spencer, yeoman. It was dated Dec. 19, 1786, and the 11th of the independence of the United States. The second document was a deed dated Feb. 1, 1804, and was of three acres of land in Spencer, from Jonas Gullford of Spencer to Nathan Bemis yeoman.

## Lovely Woman.



That one of the fairest out for a stroll should appear thus seems odd until you consider it is a bird's-eye view.

## TOYS OF CHILD MONARCH.

Remarkable Automata Made For the Amusement of Louis XIV.

An extraordinary piece of mechanism was constructed for the amusement of Louis XIV when a child. It consisted of a small coach drawn by two horses, in which was the figure of a lady, with a footman and page behind. According to the account given by M. Camus, the constructor, this coach being placed at the extremity of a table of a determinate size, the coachman smacked his whip, and the horses immediately set out, moving their legs in a natural manner. When the carriage reached the edge of the table it turned on a right angle, and proceeded along that edge till it arrived opposite to the place where the King was seated. It then stopped, and the page, getting down, opened the door, upon which the lady alighted, having in her hand a petition, which she presented with a curtsy. After waiting some time she again curtsied, and re-entered the carriage; the page then resumed his place, the coachman whipped up his horses, which began to move, and the footman, running after the carriage, jumped up behind it. Louis XIV had an automaton opera in five acts, with fresh scenes for each. It measured 16½ inches in breadth, 13 inches 4 lines in height and 1 inch 3 lines in thickness for the working of the machinery.

## Korean Guide Post.

This is the sort of thing the traveler in Korea constantly runs across in his travels on the public highway. In-



cidental only is it a guide post. Its principal use is to frighten away evil spirits with which the country is believed to swarm.

## Cat Adopts a Chicken.

A tabby cat owned by Gibson H. Jones, proprietor of the Wabash House, Toledo, Ohio, is the foster mother of a Plymouth Rock chicken. Ten days ago the fledgling was hatched in advance of the rest of the brood and taken by Mrs. Jones to the house and placed on a rug before the fire. The cat at once manifested an interest in it, and was soon licking it in cat fashion. Since then she has continuously cared for it, and hundreds have gone to see her curled up with the chicken huddled up in her fur. The cat pets and purrs over and coddles the chick, which now follows her about everywhere.

## Life Size Rickshaw.



Among the 450 pieces of Japanese miniature art comprising a memorial gift to Princeton was a carving in ivory this exact size.