pany from the street can be immediately switched in without interrupting in the least the supply of electricity. The current from the dynamos operates several combined motors and dynamos arranged in multiple series or in pairs as desired, for supplying the telegraph wires at an average pressure of fifty volts. Switching devices are arranged in connection with them for shifting the current from one to another without affecting it up stairs.

In one corner of the basement is the electric elevator driving mechanism, designed by Pratt & Sprague. It works very effectively and positively. There is a horizontal screw 25 feet long by eight inches in diameter, which has a motor attached at one end. On the screw works a huge nut attached to which on one shaft are half a dozen loose pulleys, over which the elevator propelling rope passes. By means of a special small pilot motor the main switch is operated, which turns on the current to the propelling motor in amount to correspond with the load to be carried, which is regulated by the man in the elevator. When the elevator motor revolves the screw rapidly, the nut holding the pulleys is carried forward and the elevator rises in a steady, smooth motion. To descend the current is reversed, and the screw revolving in the opposite direction draws the nut supporting the wheels back to the other end. In each case the motion is perfectly steady and positive. The elevators have been tested up to carrying two tons weight and worked perfectly.

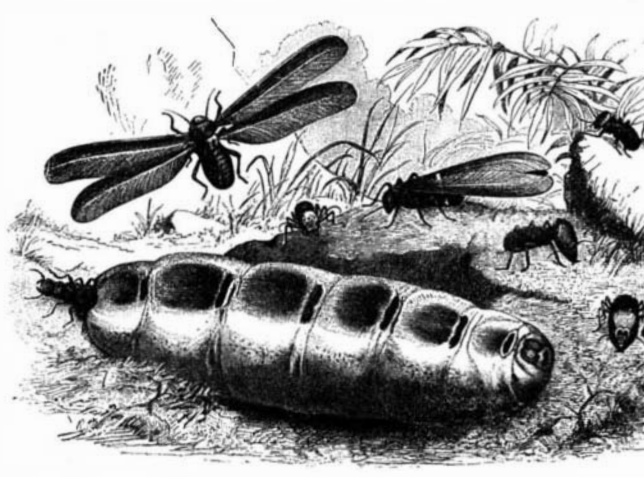
Mr. Francis W. Jones, the electrician, is credited with having arranged the electrical devices and the distribution of the electrical power in this building. His aim has been to have all of it fixed in as positive and simple a manner as possible and to provide for all kinds of contingencies. To electricians and others interested in electricity a visit to the building will be instructive.

A Few Kinks in Brazing.

Brazing is getting to be quite an art now that bicycle mending is coming in from all directions, and the way some of these thin steel tubes for the framework are handled down by the furnace-room door of an establishment is enough to make one think that soft coal and water gas must be selling cheap. A pound of spelter is first sent for, or something that will melt a trifle below the fusing point of common brass, and, if it is not already granulated, must be worked into fine powder with a file. A supply of borax is the next thing to look out for. Then if there is a gas jet handy an artificial blast can be sent through a burner of the Bunsen type and quite a heat directed on a bed of charcoal, where the delicate work is supposed to be buried waiting for the brazing. The joint to be brazed is intended to be made as firm as possible by having a close fit well pressed together, so much so that it will stand the sharpest raps of the poker, for when the brazing materials first melt and are well absorbed in the joint, it is a relief to realize what a rap will do toward working the solder through the joint and knocking off the waste material. The borax is first spread over the joint as the work is approaching a low red heat, and it soon swells up and turns into a snow-like froth, on account of the water of crystallization boiling out of it, settles down and flows over the joint like glass, ready to clean off the surface and prepare the way for the soft brass that is about ready to melt under this temperature. Then comes the green blaze that is always a sure index that the work of sweating the joint with brass is being performed. The zinc, from which is due the green blaze when the brass flashes, is employed in the brazing material to reduce the melting point of brass, and, when it volatilizes and gives off the fumes that produce the colored blazes, leaves the brass behind in a less fusible state. It stands the brazer in hand, then, to prepare the work with the brass all in position and heated so carefully that none of it will melt till the joint is well heated all alike and every portion settles down at the same moment. Borax is a substance that is supposed to dissolve all the rust and every kind of earthy substances and make a clean surface no matter how the work is brought together, but the surfaces that are found on both the outside and inside of steel pipes, as well as drop forgings, will need to be cleaned off by some other treatment in which a file or scraper will be found useful. With sheet iron a joint can be brazed by using filings from soft cast iron in the same way as if it was brass, and a joint produced that will pass off for welding. In all kinds of brazing the substance used for this purpose is inclined to etch the edges of the work and mar the surfaces wherever they have been exposed to the fused material, with the exception of silver. When used for a solder this substance has such a liking for iron and steel that it will take hold without any of that biting action whatever, and when we come to see how economically it can be used for these purposes, it would seem to be the cheaper material in the end.—*Boston Journal of Commerce.*

Action of the Liver After Death.

When a person dies, the tissues of which he is composed do not die immediately and simultaneously; so the chemical functions of the tissues continue for some time after death. The most celebrated example of the persistence of the life of the organs has been given by Claude Bernard, who has shown that the liver con-

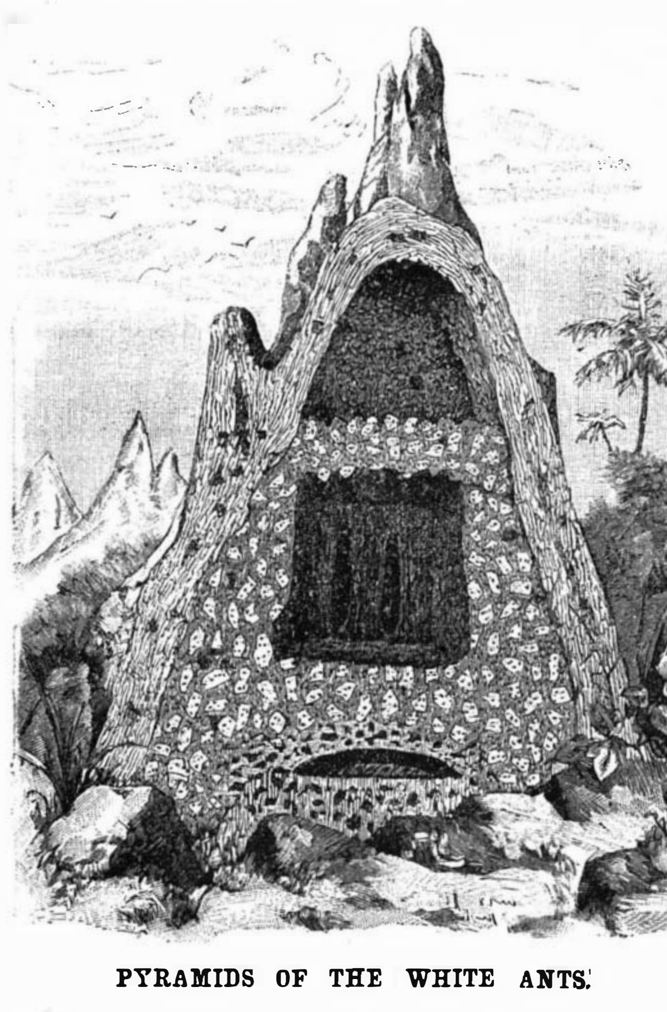


THE QUEEN ANT, SOLDIERS, AND WORKERS.

tinues to form sugar after it has been removed from the body. Mr. Charles Richet has just proved that one of the most important functions of the liver, that of the formation of urea, continues to act the same way in the liver removed from the body and washed.

If, in fact, the quantity of urea that the liver contains be ascertained through analysis, it will be found to be nearly 0·25 per kilogramme of liver; but, if such liver extracted from the body be put into a stove at 40°, we shall find at the end of a few hours that the proportion of urea has greatly increased, and that there is then 0·9 of it. Consequently, the essential chemical phenomena continues to take place in this organ, and the glycopoictic, like the ureopoictic function, is still exerted in the liver separated from the circulation and hæmatosis.

The parallelism between these two great functions



PYRAMIDS OF THE WHITE ANTS.

is complete. The sugar is formed through a phenomenon of diastasis, and the urea also is formed by an analogous chemical action. The demonstration of this is now made, for Mr. Richet has been able to filter the liquid expressed from the brayed liver and to establish the fact (in taking precautions, of course, against any microbian infection) that urea is produced in such liquid.

We have here the first example of a ureopoictic diastasis, and this remarkable phenomenon throws a light upon one of the functions that, up to the present, has been the obscurest of the hepatic gland.—*Le Genie Civil.*

THE TERMITES OR WHITE ANTS OF AFRICA.

The scientific traveler, Max Buchner, tells us how we may picture to ourselves the savannas of Central Africa: "First sprinkle a few million brick-red, irregular pyramids of the termite or white ant over a brick-red surface, in the proportion of, at least, five to the hectare. Next, take about four times this number of trees, and distribute them so that there shall be twenty, more or less, to the hectare. Then distribute, in like proportion, an equal number of Bushmen. Finally, fill up the intervening spaces with clumps of high grass, just far enough apart to render visible the red earth between. Do this, and you will have a faithful representation of the open African forest, but little influenced by the destructive hand of man."

The presence of these white ant pyramids is the characteristic feature of the African landscape. The builders of these structures are not ants; but belong to the much smaller family of termites. There is scarcely an insect so thoroughly hated by man as the termite, and the hatred is fully justified. "There are regions in Africa," writes a traveler, "of which it is safe to say that if a man with a wooden leg were to lie down to sleep at night, nothing of the leg would be visible in the morning save a little sawdust." The termites gnaw away everything; the balconies and posts of the houses, tables, chairs, wardrobes, books, leather, cloth—in fact, little comes amiss to them except iron—though, strange to say, on the authority of Franz Leuschner, they will not touch the European pine and fir timber brought to Africa for building purposes. The evidences of the destructive labors of the termites are to be seen on every side; but the creatures themselves are rarely seen. They steal sneakingly to their labors. They are all blind, with the exception of the king and queen, and all defenseless except the soldier caste, which constitutes about one or two per cent of the population. To escape starvation they must leave their subterranean homes or pyramids in search of dead wood, and, because of their blindness, they render themselves invisible as the best mode of defense.

If one has an opportunity to observe the insect in his work of destruction, the sight is really a most remarkable one. Here is an opening in the earth. A little head appears in it, with a pellet of clay in the jaws; the pellet is laid down, and soon another head appears with another pellet covered with a viscid salivary secretion, by means of which the pellets are fastened together. In this manner, by incessant toil, a small clay tube is constructed, and prolonged until it strikes against a piece of dead timber, the soldier termites guarding the opening from hostile insects the while. The termites then gnaw their way into the timber, eating or removing the whole inner contents, leaving only a thin outer shell. These tubular passages, made by the termites, are even more wonderful than their pyramids. They are about the diameter of a small gas pipe, and are frequently carried in a zigzag course by the termites up the trunk of a tree in their search for a dry branch. One may travel for hours and not find a single tree without one of these passages.

In spite of their destructive proclivities, the termites perform much useful work. There is a certain neatness in the open park-like scenery of Central Africa which strikes one immediately. It gives one the impression that it is scrupulously swept and cared for, and one asks himself, involuntarily, what good fairy maintains such perfect neatness and order in the wilds? There are, indeed, forest keepers of various species, who are continually occupied in the removal of all dead animal matter, from the fallen elephant to the dead fly, and who bury in the purifying earth what they cannot consume. What these do for animal remains, the termite does for the vegetable kingdom. Every trunk, branch, twig, or old bark layer the moment it is smitten with death, is attacked by the white ants who subsist on it, and whose numbers are limited only by their means of subsistence. The balance between them and the vegetable kingdom is thus maintained by natural law. If we examine their pyramids, we find that the interior, as shown in the illustration, contains innumerable chambers connected by passages. There are store rooms, breeding rooms, and nurseries. The chamber of the queen is near the ground, and frequently below the surface. Each of these settlements may be taken as representing a kingdom whose people are divided into distinctive castes, with division of labor. First, there are those engaged in the perpetuation of the species. There is only one queen in each settlement, and she, when fertilized, is enlarged to a cylindrical shaped figure, several centimeters long, with nothing in her appearance, except her head, to suggest what she is. She is carefully watched and tended and fed by her subjects, and lays eggs upon eggs, many thousands a day, and that for months continuously. The other castes, shown in the illustration, are the soldiers, recognizable by their massive heads, and the workers, with the little round heads. The later provide the food and nurse the young, and know how to feed the nymphs, so that they can develop a worker into a queen if there is occasion for one, that is, if the reigning queen should die.

The great work of the white ants, analogous to the labor of worms in temperate climates, is to bring up the subsoil clay to the surface, where it sooner or later mingles with the surface soil, and perhaps gets washed away to form new valleys. One must study the works of these little creatures carefully to form an idea of their extent and importance.—*Die Gartenlaube, Leipzig, No. 9; Translated and condensed for the Literary Digest by C. Falkenhorst.*

Electric Notes.

The growth of the electrical engineering profession in this country is marked by the fact that the American Institute of Electrical Engineers has just celebrated the completion of its first decade. The society is one of the youngest of the engineering bodies, but is characterized by great activity and steady growth. It has begun the present year more than 800 strong, and has attained an annual increase in membership of about 150. One of the most interesting features of its recent work has been the attempt to deal with a question that has had very serious consideration from engineering and other societies in America, namely, how to give all the members as far as possible an equal share in the benefits of frequent meetings. In some of the professions, that which should be a vigorous national organization is represented by local or sectional societies, and much of the good that would come from the action of one representative body, on important matters, is lost. The electrical engineers have tried the plan of having simultaneous monthly meetings in more than one city or center, at which exactly the same paper is presented for discussion. New York and Chicago have adopted this method, and so far it has worked with such success that other cities are falling into line. By this plan all general important questions are left for settlement at the general meeting attended by all members in common.

Prof. W. A. Anthony, formerly of Cornell University, has been making forcible objection to some of the methods in vogue for the subdivision and distribu- He is decidedly in favor of the small unit or incandescent lamp, as compared with the large unit or arc, whether we consider the illumination of a large space or ordinary street linear lighting. Remembering that nine 16-candle power incandescent lamps can be run with the power required for one 405 watt arc lamp, the arcs must be nine times as far apart as the incandescent consuming the same power, and to give the same illumination must be eighty-one times as intense, or about 1,300 candle power. But in no arc lamp as used for street lighting do the rays proceeding toward the more distant points to be illuminated reach more than a quarter of such intensity. Prof. Anthony expresses his opinion that the location of the arc lamps at intervals of 1,000 to 1,600 feet, as they are often seen in pretentious villages or suburban towns, is an entire waste of money. Incandescent lamps at intervals of 100 to 200 feet, run by the same power, would give a far better illumination. It is curious to note that frequent attempts have been made at street lighting by incandescents, but uniformly without great success; and that meanwhile it is a rapidly spreading practice to use the Edison mains, ordinarily employed for interior lighting, for the further service of arc lights on the streets. New York, Brooklyn, Boston, and other cities have to-day thousands of arc lights burning in this way at low and perfectly safe potentials.

Of the five or six hundred electric roads in this country a large proportion reach natural or artificial waters, such as lakes or rivers, and in all parts of the country a large amount of work is now being done in the utilization of the current from the trolley wires for charging storage battery boats to ply on these waters. The success of the World's Fair electric fleet, which carried without an accident 1,000,000 passengers on the lagoons and canals in Jackson Park, directed attention to the subject, and now the fleet is being dispersed to all points of the compass for kindred employment. Milwaukee, Boston, Rochester and other cities are to have large fleets, and in many places the work has actually begun, with remarkable results. It is pointed out that a street railway which will carry a passenger for an hour for five cents can easily earn from him five times as much for half an hour's trip on the water, with less expense. At Altoona, where an artificial lake of thirteen acres has been made, ten cents is paid by hundreds of delighted passengers for a trip around lasting only seven minutes. Electrical boats are also being built now for regular ferriage, and a line is projected to ply between the smaller ports on the Gulf of Mexico. Some of the newer boats are of ample proportions, Mr. John Jacob Astor being the owner of one forty-six feet long.

The vast engineering enterprise now being carried out for the utilization of a part of the energy of Niagara has stimulated attention to the subject of water powers all over the country. Many of them are being quietly bought up, and others are very freely discussed, while on a third class heavy expenditures are already being made. One of the most ambitious of these projects is that for which a big dam has been thrown across the Colorado River, near Austin, Texas, by municipal funds, and which only depends for its completion on the raising of the full $1,500,000 voted by the citizens. This dam is of solid granite and limestone masonry, 1,150 feet long, 66 feet wide at the base, 18 feet wide at the top, and 6 feet high above low water. By its means the river at this point has been turned into a lake 30 miles long, in places 2 miles wide. It is estimated that 100,000 horse power can be furnished when the plant is ready, and one mildly wonders what Austin, a city of but 25,000 people, is going to do with so much, unless it should attract manufacturing industries from all over the South by its cheap power.

The lapse of the Edison incandescent lamp patents in Europe has had the effect of bringing so many new, cheap, and bad lamps on the market that all the manufacturers there are agitated. These patents and those on the telephone have been the only electrical ones that have been sustained by the courts, and now that they have run out, the temptation to enter the field appears to have overcome common prudence. Hence incandescent lamps have sold in London at 14 cents apiece. The lowest price in New York is at least twice as much, and is admitted by experts to be fair. A union is now being formed at Berlin to which all the leading lamp manufacturers of Europe have given their adhesion, which will probably prevent further cutting. The price is likely to be about that which now prevails in America. The complaint is made that fixing the price is a small matter compared with fixing the voltage. Instead of a few standard voltages being in existence, there are literally scores, all of which complicate matters, it is said, and add greatly to the cost of production. The point is made that in Europe, or at least in England, the unit of illumination for a lamp is 10 candle power, whereas in America the unit is 16 candle power, another instance, it is alleged, of American extravagance and absence of economy.—*The Evening Post, N. Y.*

How to Can and Preserve Fruit.

Before preparing fruit for canning, the glass jars, new and old, should be thoroughly washed and partly filled with warm water, sealed, and turned upside down on the table, to determine that they do not leak. Fruit often spoils because care is not taken in selecting perfect jars and rubbers. To prevent cracking, the jars should be thoroughly heated before pouring in the boiling fruit; this can be accomplished by having all the jars to be filled standing in a pan of hot water, and just before using each jar, filling it with very hot water for a few seconds. Pour out the water and stand the jar on a plate to fill. The fruit should always be boiling hot when canned ; if it should cool before poured in the cans, it must be placed on the stove and reheated before proceeding. In canning all kinds of fruit, overflow the jars before sealing.

Strawberries Canned.—Hull, weigh, and wash. Allow half a pound of granulated sugar to one pound of strawberries. Use no water ; enough adheres to the berries to keep the sugar from burning. Put the sugar and strawberries into the kettle in alternate layers, and gradually heat through on back part of stove. Bring forward and boil five minutes. Have the jars thoroughly heated, fill to overflowing, and seal as quickly as possible.

Preserved.—Allow one pound of granulated sugar to one pound of strawberries. Place together in a kettle on back part of stove until the sugar is dissolved into sirup ; then bring forward and boil slowly until sirup thickens when cooled ; test it, after cooking about forty or fifty minutes, by cooling a little in a cup. Put into heated jars, but do not seal until the preserve is cold.

Pineapples Canned.—Slice, peel, and cut into small pieces. Allow three-quarters of a pound of granulated sugar and one pint of water to two pounds of pineapple. Boil together about ten minutes, put into heated jars, fill to overflowing, and seal as quickly as possible. Pineapples weighing about four pounds make about two pounds of fruit when peeled.

Cherries Canned.—Allow three-quarters of a pound of granulated sugar and a half pint of water to two pounds of cherries. Gradually heat together, and boil slowly for ten minutes. Have the jars thoroughly heated, fill to overflowing, and seal as quickly as possible.

Preserved.—Allow one pound of granulated sugar to one pound of cherries. Place together in a kettle on back part of stove, until the sugar is dissolved into sirup ; then bring forward and boil slowly until sirup thickens when cooled. Test it, after cooking about forty or fifty minutes, by cooling a little in a cup. Put into heated jars, but do not seal until the preserve is cold. For preserving use tart cherries, pitted. —*The Outlook.*

Legal Decisions.*

IMPLIED POWERS OF CORPORATIONS.

The doctrine that a corporation has, by implication of law, and without any express grant of power in its charter or governing statute, the power to do whatever is reasonably necessary to effectuate the powers expressly granted it, and that a large discretion will be allowed to it in the choice of means, has received an apt illustration in a recent decision of the Supreme Court of the United States (Fort Worth City Co. *vs.* Smith Bridge Co., 151 U. S., 294), where it was held that a corporation created for the purpose of dealing in lands and expressly empowered to erect bridges, subdivide and sell the same, and to make any contract essential to the transaction of its business, has the implied power to make a contract for the construction of a bridge to render its lands accessible, and that it may agree to pay therefor in its bonds, and in the bonds of another corporation controlled by the same party.

PAYMENT.

The Court of Appeals of the State of New York in Goshen Nat. Bank *vs.* The State (36 N. E. Rep., 316) recently passed upon a case in which the cashier of a national bank was also a tax collector, and in his character of tax collector was indebted to the State. To pay this debt he drew a draft on the bank of which he was cashier, without funds there, and the draft was paid. The bank brought an action against the State to compel the refunding of the money. It was held that the action would not lie, if the officers of the State receiving the money had no knowledge of the fraudulent character of the draft.

HOMICIDE BY ESCAPING FELON.

In Tolbert *vs.* the State (14 South Rep., 462), the Supreme Court of Mississippi holds that where a penitentiary convict escapes and is pursued and turns and kills one of his pursuers, this is murder, although the convict did not fire the first shot. The court said that an escaped convict arrays himself against organized society. It may be added that his purpose in arming himself with a loaded weapon is obviously to kill any one lawfully attempting his rearrest, in case it may be necessary for the escaping man to do so in order to secure his liberty. The malice prepense is all there. The occasion for firing the fatal shot is created by the unlawful act of the felon, and not by the lawful act of the pursuer. In such a case the pursuer is entitled to use his weapon upon slight indication of an attempt on the part of the felon to use his.

HEAPING INSULT UPON INJURY.

At the last term of the Wake County (N. C.) Superior Court, at Raleigh, the following facts appeared : A little half-grown bull was on the railway track. He answered the whistle of an approaching train with a bellow of defiance and a toss of gravel over his shoulder. A tramp who happened to be close behind him stepped off the track and waited to see the fun. The engine struck the little bull fair, doubled him up like a ball, and sent him twenty-five feet as if shot from a catapult. The bull-ball made a line shot and knocked the tramp into a little pond near the road. When the engineer backed the train to take stock of the damage done, the tramp was crawling up on a log out of his involuntary bath. Under advice of counsel learned in the law, action was brought against the railway corporation for the personal injuries and indignity inflicted. On the trial, to the surprise and intense disgust of the plaintiff, the verdict went against him. To a sympathizing bystander he placidly remarked that he had been "bowled over into a goose pond by a little doity piney-woods bull, and that a dozen jackasses had kicked him out of the court house."

THE MICHIGAN "JAG-CURE ACT."

The legislature of Michigan recently enacted a curious statute known as the "Jag-Cure Act." It allows a justice, upon the conviction of a disorderly person, instead of requiring a recognizance for good behavior, to accept a recognizance conditioned that the defendant will take the cure for the liquor habit in conformity with the rules and regulations of some corporation administering the cure. The Supreme Court of Michigan has held the act unconstitutional, on the ground that it remits the nature and extent of the punishment to the determination of the fluctuating rules of a private corporation, and transfers, in a measure, the pardoning power of the governor to such body.

HUSBAND AND WIFE.

Deed from wife to husband, delivered after the passage of the act permitting such conveyance, is valid, though the contract therefor was made, and the deed was otherwise executed, prior to the act. Reynolds *vs.* City National Bank, 24 N. Y. Supp., 1,134.

* From the *Literary Digest*, a weekly compendium of the topics of the day, published by the Funk & Wagnalls Company, New York.

Some Foreign Guns Described.

According to the *Army and Navy Journal*, the Albini rifle has a caliber of 11 millimeters, and its projectile weighs 25 grammes, and has an initial velocity of 417 meters. The improved Mauser has a caliber of 7·65 millimeters, the weight of the bullet is 14 grammes, its length 30 millimeters, and the outer covering is of maillechort metal; its initial velocity is to be determined with the adoption of another kind of powder. The Chassepot and the Gras have each a caliber of 11 millimeters, and are charged with smokeless powder; the Lebel (these three are of French invention) has a caliber of 8 millimeters, a bullet weighing 15 grammes, and 28 millimeters in length; it is incased in maillechort metal (an alloy of copper, nickel, and zinc), and its initial velocity is of 570 meters. This latter gun was improved in 1891 by the Berthier rifle, whose caliber is 0·301 inch, the bullet weighs 205 grains, and is projected by 33 grains of smokeless powder, instead of 46 grains in the Lebel. The magazine contains four charged cartridges, and the Lebel eight; the gun itself also is lighter, 8 pounds 5 ounces. The Martini-Henry rifle bullet is made of 1 part of tin and 12 parts lead; it is cylindro-conoidal, solid, compressed, length 1·27 inch, and has a slight cavity at the base, which is 0·450 inch in diameter; its present weight is 410 grains (formerly 480), and its charge of powder 80 grains. There is a paper cap over the bullet, lightly smeared with beeswax. Its rapidity of fire without aim is 25 shots in a minute.

The Schmidt rifle, model 1889, is the one adopted in the army of Switzerland, and resembles the Wetterli, until very recently used by the Italian troops. Its caliber is 0·295 inch, it weighs 10 pounds 4 ounces, the magazine contains twelve cartridges, the bullet has an outer covering of steel, its muzzle velocity is 1,920 feet in a second, its range 2,100 yards, and the weight of 150 charged cartridges 8 pounds 4 ounces. The Russian army is provided with the Mouzin and the Berdan rifles, both of the same caliber, 0·300 inch, weight 9 pounds 5 ounces, with five charged cartridges in the magazine. Its steel-covered bullet has an initial velocity of 2,000 feet, sighted to 2,100 yards, and the weight of 150 charged cartridges is 7 pounds 7 ounces. These two guns have lately been improved upon by Dandeteau, by reducing the caliber to 6·5 millimeters. The cartridge is charged with 2 grammes of smokeless powder, the bullet having an envelope of maillechort metal. The whole, ready to fire, weighs 21 grammes. At a distance of 25 meters from the mouth of this new weapon the velocity of the projectile is 715 meters per second. The present rifle of the Italian soldier is the Carcano, 1892, which has a caliber of 0·256 inch (the smallest), and weighs 8 pounds 5 ounces. It is a steel-covered bullet, weight 170 grains, projected by 34 grains of powder, having an initial velocity of 2,320 feet per second (the greatest) and a range of 2,100 yards. The magazine contains five cartridges, and the weight of 150 of them, ready for use, is 7 pounds 1 ounce (the lightest).

The Spanish army is now being provided with a modified Mauser rifle, whose caliber is 0·295 inch, cut-off type, central magazine, having five ready cartridges in it. Portugal adopted the Kropatschek rifle, which has a tubular magazine, caliber of 0·315 inch. The gun weighs 10 pounds 2 ounces. The bullet weighs 245 grains, and is projected by 70 grains of black powder. It has an initial velocity of 1,760 feet per second, and the magazine carries eight ready cartridges.

The Lee-Metford rifle has superseded the Martini-Henry as the fighting gun of the British troops. Its caliber is 0·303 inch; it weighs 9 pounds 4 ounces, the bullet has a cupro-nickel envelope, weighs 214 grains, and is discharged by 66 grains of black powder, has a muzzle velocity of 1,830 feet per second, its range 2,100 yards. The magazine contains ten ready cartridges (the largest number but one of all the modern small caliber rifles), and the weight of 150 charged cartridges is exactly equal to the weight of the gun itself.

THE tax of 10 francs a year on cycles, which was imposed in France last April, yielded in the first half year, it is said, over 780,000 franc

THE IRRIGATION OF LAWNS.

Among the surroundings of a country dwelling, perhaps nothing adds so much to its rural charms as a green and flourishing lawn. The eye ever rests upon it with delight; and if there are extended prospects, the lawn lends beauty to the scene.

In order to preserve a lawn in freshness during the parching days of summer the grass must be repeatedly watered; and if the lawn is of much extent, this work of irrigation is no easy job. A common method is to have a hollow standard provided at its top with a rotary perforated head. This, when connected with the supply hose, throws a gentle rain over a considerable space; after which the standard is moved into a new position and another part of the lawn is watered, and so on. The time and attention of one or more men, according to the size of the lawn, is required for this duty.

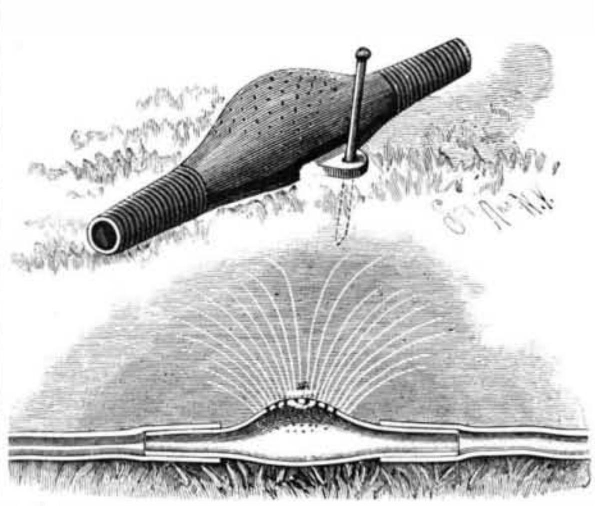


Fig. 2.—FOUNTAIN PIPE SECTION.

The object of the present invention is to effect the instantaneous irrigation of every part of the lawn, at any time desired, without the interposition of a special attendant, such irrigation being effected by simply turning the water faucet, which any member of a household may do.

For this purpose the usual lawn hose is employed, which is divided into various sections, the ends of which are connected to a series of short fountain pipes, as shown in our engraving, Fig. 1. In Fig. 2 is seen an enlarged view of one of these fountain pipes. They may be made of copper for durability, but a cheaper material is tin, and it answers very well. One side of the pipe is provided with an ear, through which passes a long pin, by which the fountain pipe is fastened to the ground. The central part of the fountain pipe is enlarged, as shown, and is perforated with fine holes, so that the escaping water from the several fountain pipes will issue in the form of fine showers, as shown in Fig. 1.

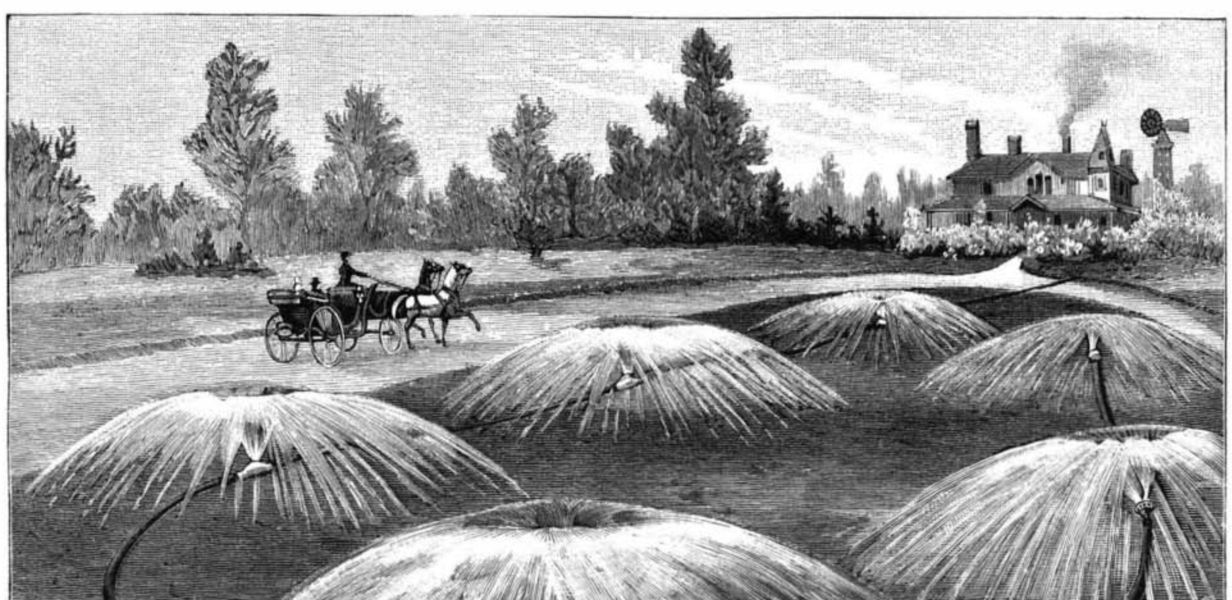


Fig. 1.—FOUNTAIN PIPES FOR LAWN IRRIGATION.

In practical use the hose, furnished with the fountain pipes, is laid throughout the lawn, and the pipe pins are driven down to hold the fountain pipes in proper position. The water valve is then opened, when the entire lawn will be thoroughly and quickly showered. The hose and fountain pipes may be left in position upon the lawn throughout the season, and the lawn may be irrigated whenever desired simply by turning the supply faucet.

Planet Notes for July and August.

H. C. WILSON.

Mercury, having been visible in the evening during the last days in June, will in July pass between us and the sun, being hidden by the rays of the latter during the greater part of the month. He will be at inferior conjunction July 20 at 4 h. 28 m. P. M. central time.

Venus is slowly receding from us and moving around behind the sun. Her disk will be 0·76 illuminated July 1 and 0·92 August 30. Venus will pass by Jupiter on the morning of July 20, the nearest approach of the two planets to each other occurring at about 2 h. 30 m. A. M. On the morning of July 28 at 6 h. 13 m. Venus will pass very close to the third magnitude star μ Geminorum, the difference of declination of the two bodies at the time of conjunction being only 3′. August 8 at 7 h. 45 m. A. M. Venus will pass 9′ to the south of another third magnitude star, δ Geminorum. Venus will be in conjunction with the moon July 30 at 1 h. 34 m. A. M. and August 28 at 7 h. 23 m. P. M.

Mars will come into good position for observations after midnight by the 1st of August, and it is to be hoped that observers will begin early to study the markings on the surface of the planet. It is not necessary to have a great telescope in order to see them to good advantage. In fact, there are some good observers who believe that planetary details can be seen better with small than with large telescopes. We do not subscribe to this belief, but do say that the difference in favor of the large telescope is not so great as to entirely discourage the possessor of a good small one from attempting to add to our knowledge of the planetary markings.

Jupiter and *Neptune* are coming round as morning planets, but will not be in good position for observation during the summer. As already noted, Jupiter will be in conjunction with Venus, 51′ north of the latter, on the morning of July 20. Neptune will be still closer to Venus, only 9′ north, July 11, 11 h. 54 m. P. M.

Saturn will be visible in the early evening, but will be pretty low in the west by the time twilight is over. Saturn and the moon will be in conjunction July 9 at 9 h. 11 m. P. M. and August 6, 7 h. 30 m. A. M.

Uranus is making the turn of the loop in his apparent course among the stars and will be almost stationary during July. In August he will move eastward toward the star α Libræ. Uranus will be in conjunction with the moon July 11 and August 7.—*Astronomy and Astro-Physics.*

Another Inventor of the Telephone.

Those of our readers who have all along believed that Prof. Bell was the original inventor of the speaking telephone, or, perhaps, Dr. Gray, and that Blake or Berliner or Reis were the pioneers in the microphone field, will be somewhat surprised, says the *Electrical Engineer*, to learn that the honor of having made the first microphone is now claimed by Dr. R. D'Unger, of the D'Unger Long Distance Telephone Company, at Chicago.

The doctor states that as early as January 29, 1869, he filed a caveat for his "Electro-Medical Music Box," and that in 1879 a pair of small musical boxes were insulated according to the claims in the caveat and perfect speech was had from them.

The gist of the doctor's invention consists, as he explains, in the fact that by taking two ordinary Swiss musical boxes and insulating the harp plate and frame from the cylinder carrying the note pins and connecting the two instruments by means of a wire carrying an electric current, not only the musical impulses of one of the boxes will be transmitted to the other, but that articulate speech can also be sent over the wire.

Although the doctor makes the above claims and insists that he had a talking machine several years before Prof. Bell and also before Elisha Gray's harmonic telegraphs were known, he makes no claim that he is the discoverer of the art of telephony, but accords that honor to Charles Bourseul, of Paris, France, who in 1854 told in plain words how a telephone could be made and what it could and would do.