Curiosity of Plant Life.

It has been long known, and considered very curious, that the two lobes of the leaves of the Dionæa—the Venus flytrap—will close over and capture an insect that alights on the leaf, and more recent study shows that the plant really eats the insect it captures. But little is yet known of the nature of the mechanism by which it is enabled to do such marvelous work. Dr. J. M. Macfarlane has recently discovered that leaf blades

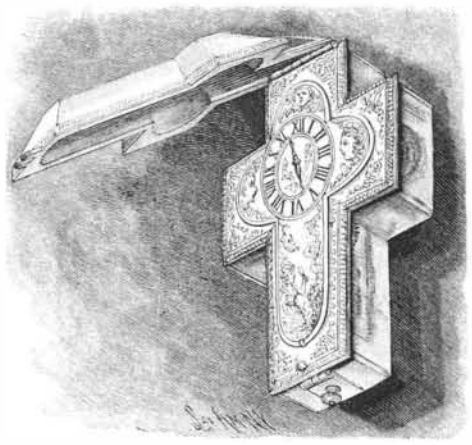

Fig. 3.—CRYSTAL CASE WATCH MADE BY JEAN ROUSSEAU, ABOUT 1675.

will not respond to a single touch. No matter how severe a single stimulus may be, the blades will not close. There must be a second stimulus before an attempt at closing is made. But even here the stimuli must have an interlude. If the two stimuli follow closely, no response follows. Dr. Macfarlane finds that there must be a period of nearly a minute, fifty or sixty seconds, between the two. There is, however, some variation under different temperatures. The effect of the first touch or stimulus will be retained for some

Fig. 6.—NURNBERG EGG, MADE ABOUT 1550.

four minutes. The second excitation, if made after that, stands as an original motion, as a parliamentarian might say. Those who are fond of speculating on the "motives" of plants will see in this a wonderful provision of nature, more wonderful possibly than anything that has yet been brought out in connection with plant life. Knowing now, as we do, that the leaf closes on the insect for the purpose of eating it, there should be some way of discovering whether that which alights on the leaf's surface is eatable or not. It has no eyes to see with, so it cannot tell whether it is a piece of wood, stone, or other inorganic material that is tempting it, as a living creature could. Such material falls, and remains still on the leaf. But an insect struggles, and by this struggle the plant receives intelligence that it is a living thing. Here also may be seen the advantage of a brief interlude between the stimuli; a piece of gravel might rebound—might make two stimuli close after one another. An insect would wait a short time to collect its senses, and formulate some plan of escape. It is very clear that this ability to discern between the animate and inanimate saves the plant from a great amount of useless labor. The discovery of Dr. Macfarlane is probably the most wonderful of all wonderful things that have been discovered in the behavior of plants. Mr. William Canby had already discovered that if a leaf had been "fooled" into closing over a piece or inorganic matter, it soon opened and let it out again. Dr. Macfarlane finds that when it catches an insect, it remains closed over it for twelve or fifteen hours—long enough to consume it. It takes eight or ten hours after an insect is caught before the acid—which in Drosera Mr. Darwin found analogous with pepsin, the leading destructive element in the gastric juice—flowed evenly over the whole surface of the leaf. The leaf surface is subject to stimuli equally with the hair.—*The Independent.*

NOTABLE AND CURIOUS WATCHES.

The display of watches in the Swiss section at the World's Columbian Exposition formed the most conspicuous part of the exhibit of that country, and consisted largely of watches of high grade movements in cases set with precious stones or ornamented with enamel and other high class work. There was also an interesting exhibit showing the progress made in horology. The exhibit of Patek, Philippe & Company, of Geneva, was especially rich in historic watches, of which the following formed part.

Fig. 1 shows the first known watch. The outer case, which contains the movement, is represented as open, so that the dial can be seen. The peculiar key used to wind the watch is shown at the side. This watch was made in 1074 by Hassan Emin. Nothing further is known of the watch, or who Hassan Emin was, or where he lived. That he was a most excellent watch-maker is shown by the remarkable quality of the work in the movement. The case is of bronze, worn and indented by age, and is cracked in places, one crack near the hinge being shown in the illustration.

It is evident the outside of the case was originally ornamented in elaborate Arabic designs, but this ornamentation is nearly all worn off, and the fire gilt which covered the case has disappeared, except in the depressions, where it is still bright. The figures on the dial are also in Arabic. There is one hand, and this is heavy, giving the watch much the appearance of an inexpensive compass. In the back of the case is a hole through which the key is passed to wind the watch, and the key, as seen in the illustration, is of the crank style so extensively used not many years ago in winding the old-fashioned weight clocks. The movement can be taken out of the case, and, when examined under a glass, is found to be in a fine state of preservation. The wheels are engraved in Arabic designs and the whole movement is of brass, protected by a very fine quality of fire gilding. No gold was used in the watch proper, and there is no silver further than the plate on the back of the movement, which is elaborately engraved with Arabic designs. The movement has a fusee and string, without any other timing device than a pin fastened to the bridge, and on which the balance bars beat. The face is elaborately engraved and the movement is complete, so that the watch runs when wound up.

Fig. 2 illustrates one of the first striking watches ever made. This specimen bears the name of Quare, of London. It is a curious and rather rough piece of mechanism, which is now incomplete. There is no date on the watch, but it is supposed to have been made about the year 1600. The outer case is made in open work design, so that the sounds from the striking device may be emitted. The numerals on the dial are like those used at present. The dial is of silver, and, like all watches of early date, there is only one hand. The movement appears to have been practically the same as that used to-day; but the incompleteness of the mechanism makes it impossible to describe it fully.

Coming down to a later period, we have a remarkable specimen of horology in the watch shown in Fig. 3. The case is of quartz crystal, cut in the shape of a cross in a most perfect manner, the corners being beveled with the exactness of machine work. The two sections of the case are held together by a gold clasp, and

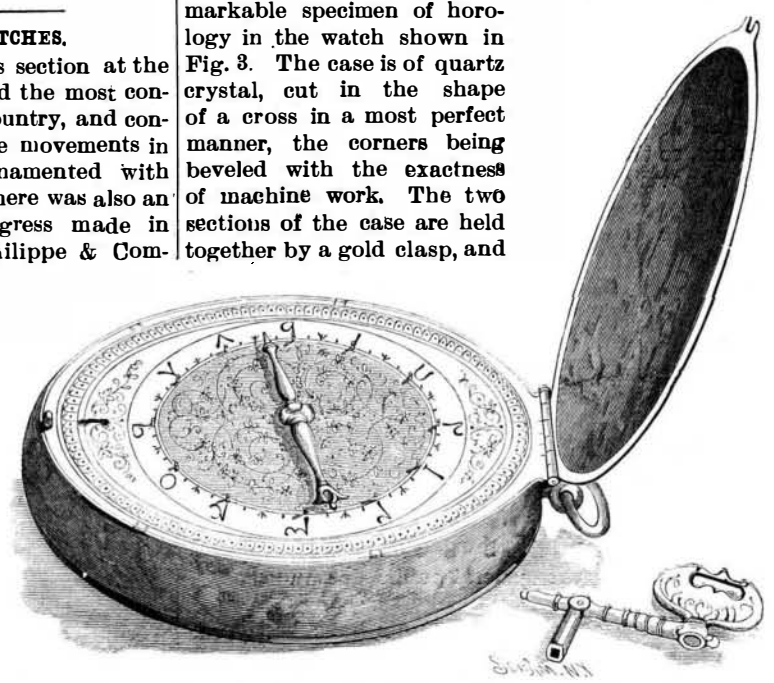

Fig. 1.—WATCH MADE BY HASSAN EMIN, IN 1074.

the inside is hollowed out of the crystal to admit of placing the movement. The case opens and turns on a hinge at the top and the movement is reached by lifting it out of the cavity in which it fits. The movement is made in the irregular shape of a cross and is of the fusee and chain design, without hairspring or other timing device. All the gold work is elaborately engraved. The shape of the watch shows the ecclesiastical tone of the age in which it was made and the motive of the engraving is in keeping with this same spirit. The watch is in excellent running order. It has much historic interest, as it was made by Jean Rousseau, greatgrandfather of the famous philosopher. It was made somewhere about 1675, and is especially mentioned in the inventory of the property of its maker. This watch has been on exhibition in Geneva for a great many years, and the face of the crystal has been somewhat scratched by constant dusting, but the back remains finely polished.

Napoleon's watch, shown in Fig. 4, is scarcely a century old; it is in a fine state of preservation. It was made in Paris, and has the modern bridge verge escapement and is in excellent running order. The engine turning on the back of the case is quite sharp, and is peculiar in that it starts on an eccentric from near the bottom, instead of from the center. The movement is in the shape of a Grecian urn, and the dial is on the face of the urn. The watch is owned in this country. An interesting bit of history attached to this watch is that when Napoleon was campaigning in Holland, and was out driving, the horses became frightened and were about to dash into a river, when a man sprang at their heads and stopped them. Napoleon offered the man money, and, when this was declined, political position. The man also declined this. Taking this watch from his pocket, Napoleon gave it to him, telling him to keep it to remember the circumstance by.

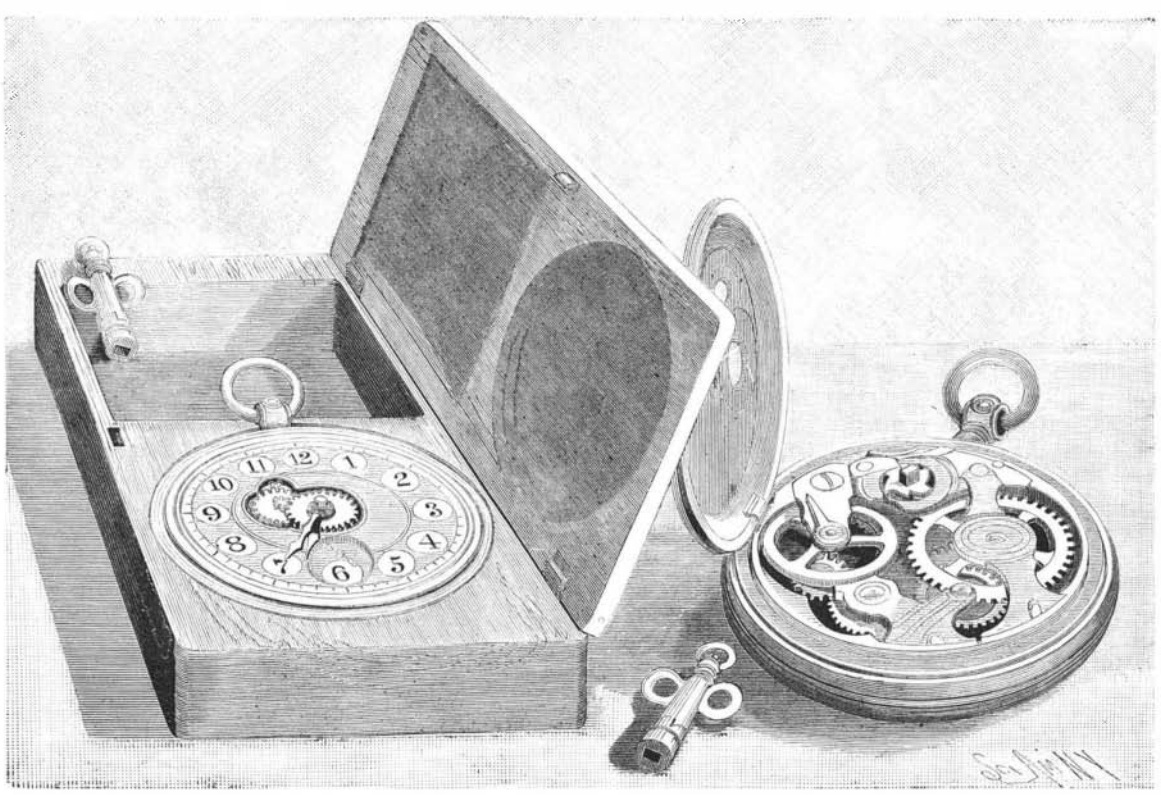

Fig. 5.—WATCH MADE ENTIRELY OF WOOD AND IVORY.

Fig. 5 shows what can be accomplished by a combination of ingenuity, skill, and persistency. It is a watch made almost wholly of wood, by a watchmaker who was convicted of some crime and sent to Siberia by the Russian government. The convict made this watch to while away his time, and was pardoned because of his work. The only tool that he had to work with was a penknife. Irregularity in the work can only be discerned by examining it with a glass. Nevertheless, it is remarkably accurate, and the watch runs and keeps fair time. The wood used was boxwood. The numerals on the face are small pieces of

ivory, inlaid. The dial wheels are of ivory, and are set on the face of the dial. The hour, minute, and second hands are of tortoise shell. The second dial is recessed on the lower part of the main dial. The wheels and plates of the movement are of wood, while the pinions, balance, cylinder and escapement wheel are of ivory. The ratchet spring is of wood. The plates are held together by wooden pins and the balance bridge by ivory screws. The key with which the watch is wound is made of wood with an ivory tip, and is made like a modern ratchet key. The winding "square" is of oblong shape.

This ingenious watchmaker also constructed the box in which the watch is contained. All the joints are perfect, so that the box is practically dust proof. Little is known of this convict further than that his name was Tagansog.

A large watch having a striking mechanism, and known as the Nurnberg Egg, is shown in Fig. 6. It has no hairspring. Pins are provided as a timing device to accelerate or make the balance run slower. There is a fusee with a string. It dates about 1550, but there is no name or inscription giving its date or origin.

The Carbon Telephone Patents.

There have been many inquiries as to the patent situation in the telephone art. There is a general apprehension that the American Bell Telephone Company has the art bottled up in some mysterious way, but why or how the general public does not seem to understand.

The Berliner and Edison patents have been published in full in this journal in the issues for November 28, 1891, and May 14, 1892. As stated in a brief *resumé* of the situation in the *Electrical Review* for March 21, 1894, magneto telephony is open to the public, and, for short line work, this will undoubtedly be found to answer sufficiently well. For local service, as between the several rooms of a building where outside noises do not interfere to any considerable degree, simple magneto instruments connected to a wire strung through the several rooms, provided with a simple push button and bell, will be found to give good service. As such instruments of the standard Bell make can be bought for a low figure, those who would be satisfied with this style of service can easily install their own equipments; but in cases where there are interfering noises magneto instruments of ordinary construction, when acting as transmitters, cannot be expected to yield satisfactory service, and this is where the variable pressure patents of Edison and Berlinger cut an important figure. For the benefit of such of our readers as may not know the scope of the claims in these patents we will refer to them briefly.

Patent No. 474,231, granted to Thomas A. Edison, May 3, 1892, contains the following claim:

"In a telegraphic apparatus operated by sound, the combination with the diaphragm of one or more contact points of plumbago or similar inferior conductor in the electric circuit, whereby the rise and fall of electric tension is proportionate to the pressure exerted upon the said point or points by the diaphragm, substantially as set forth."

The invention contained in this patent was patented in a number of foreign countries—England, Canada, France, Belgium, Austria-Hungary, Italy, Germany, Spain, and Russia. Under Revised Statute 4887, "every patent granted for an invention which has been previously patented in a foreign country is limited to expire at the same time with the foreign patent, or if there be more than one at the same time, with the one having the shorter term."

The term of the British patent is 14 years. The British patent, therefore, expired July 30, 1891. It will be maintained, however, in the interest of the Edison patent and of the Berliner patent, hereinafter more fully noted, that the ordinary construction of the above quoted statute is not a proper construction, and that the words "previously patented" in the statute mean not previously to the date of the United States patent, but previously to the date of the United States application, and the application was filed in the United States Patent Office July 20, 1877. This matter as to the meaning is pending in the Supreme Court of the United States, and is expected to be heard in the fall. It has been said that the American Bell Telephone Company and the General Electric Company, both of which have great interests at stake in the decision, are, in reality, defending the case. What the decision will be cannot, of course, be prophesied. The almost universal construction heretofore put upon the language of the statute is that the term "previously patented" means that the date of the foreign patent is prior to the date of the United States patent. Under this construction the Edison patents would be void, having in reality expired before they were granted. Those who are contemplating using carbon telephones, however, should bear in mind that the question is not definitely settled, and will not be until the Supreme Court renders its decision. It will be noted, however, in looking at the Edison claim, that it covers only two electrodes which contain one or more contacts of inferior conducting material, upon which the pressure is varied by the motion of a diaphragm. Now there is a clean cut class of carbon transmitters that would not seem to fall within the scope of this language, namely, a modification of Hunning's, wherein carbon granules may be placed loosely in a receptacle which is vibrated by the action of the diaphragm, and the resistance of which varies during the motion of the diaphragm merely by the shaking up of the particles. A transmitter of this type has been recently patented by an enterprising inventor outside of the Bell fold.

The Berliner patent contains the following claims:

Fig. 4.—NAPOLEON'S WATCH.

"1. The method of producing in a circuit electrical undulations similar in form to sound waves, by causing the sound waves to vary the pressure between electrodes in constant contact, so as to strengthen and weaken the contact and thereby increase and diminish the resistance of the circuit, substantially as described.

"2. An electric speaking telephone transmitter operated by sound waves and consisting of a plate sensitive to said sound waves, electrodes in constant contact with each other and forming part of a circuit which includes a battery or other source of electric energy and adapted to increase and decrease the resistance of the electric circuit by the variation in pressure between them, caused by the vibrational movement of said sensitive plate.

"3. The combination with the diaphragm and vibratory electrode of a rigidly held opposing electrode in constant contact with the vibratory electrode, substantially as described.

"4. In a telephonic transmitter, a vibrational plate made concave for condensing the sound, substantially as set forth.

"5. In a telephonic transmitter, a vibrational plate provided with one or more apertures, as and for the purposes set forth.

"6. A speaking telephone transmitter, comprising a diaphragm or disk sensitive to sound waves, combined with a rigidly held but adjustable electrode in contact with the same, whereby the electric current is transformed into a series of undulations corresponding with the vibrations of said diaphragm."

The apparatus described in this patent does not contain carbon or any form of carbon; it is simply a metallic contact between a diaphragm and a metal button, and its action as a transmitter is precisely what happened in the transmitter of Philip Reis when the adjusting screw of his notable instrument was in contact with the diaphragm. Those who are familiar with Reis' efforts remember that he was long anterior to Alexander Graham Bell in point of time, but that his efforts were held to be no bar against Bell's patent, for the reason that he only got occasional words transmitted when his apparatus happened to be in the proper condition of adjustment, and as he did not understand how to make the adjustment so that it could be of use for speech transmission, his apparatus was of no value as an anticipation. Berliner's patent was filed in the United States Patent Office June 4, 1877, and, so far as its functions are concerned, may be regarded as Reis' transmitter with the button screwed to the proper point of adjustment. This explanation gives point to the terms in Berliner's claims, "electrodes in constant contact." It will be noted that Berliner's method claim is limited to a variation of pressure between electrodes in constant contact. It is, therefore, an interesting query whether this alleged dragnet claim would cover a type of the Hunning's instrument, above referred to. But a very interesting question arises in the Berliner patent by reason of a decision of the Supreme Court of the United States in Miller *et al. vs.* Eagle Manufacturing Company, decided January 8 of this year, and which was referred to in the recent article in the *Electrical Review* above noted, which contains the following syllabus:

"The result of the authorities on this point of law is that no later patent can be issued for an invention actually covered by an earlier patent, especially to the same patentee, although the terms of the claims in the two patents may differ and the later patent may contain the broader claims, unless it distinctly appears that the invention covered by the later patent was a separate invention, distinctly different and independent from that covered by the first patent. It must contain something more than a mere distinction of the breadth or scope of the claims."

Now, inasmuch as Berliner patented a telephone November 2, 1880, No. 233,969, showing and describing exactly the same apparatus as is shown and described in the above quoted patent, but in which a claim both for the apparatus as a receiver and for the system of transmission were claimed, it would seem that the later patent would be void.

There is another interesting patent which those entering this field should consider, and that is a patent of Berliner bearing upon the use of an induction coil for raising the tension of line current. The original patent is dated January 15, 1888, No. 199,141, and contains five claims limiting the invention to a receiver located in a circuit containing a galvanic battery which is acted upon inductively by the line. This patent was reissued December 14, 1880, and the following broad claim was introduced:

"A telephone transmitter which operates to vary the resistance of the circuit in which it is placed without interrupting it, in combination with a local battery, a short primary circuit of an inductorium which includes both, and a secondary circuit of said inductorium proceeding toward the distant station."

Inasmuch as this patent will not expire until next January, it stands glowering upon the unhappy infringer. Whether, in view of the fact that the reissue was not filed until almost two years had expired, during which the telephone art had made great progress, this reissue claim would be sustained is open to question. The law in regard to reissues has grown very strict in late years, and where they have been taken for the purpose of expanding the claims after the progress of the art had pointed out the value of the expanded claims, they have been held void.

It will thus be seen that, so far as the use of the transmitter is concerned, the chances are strongly with the public and with the infringer, though he may be put to the very serious inconvenience of a protracted legal controversy with the American Bell Telephone Company.

Those who contemplate the use of a number of lines radiating to a central point, where operators can be employed to shift the connections so as to connect together different subscribers, will have another serious problem to confront. There are a great number of switchboard patents covering the various details of a central station which must of necessity be carefully avoided. These inventions are exceedingly complicated, by reason of the number of connections to be made, and cannot be considered here. One who expects to accomplish what is now done in the telephone central station without colliding with some of these patents will assume a burdensome task. There are some things, however, that may be taken for granted, and that is there were switchboards for connecting any of the various lines entering a common office in use long before the days of telephony. The types of switchboards used in telegraphic service could probably be improved so as to yield fairly good results, which would perhaps enable a small central station to be conducted; but in this respect we can only caution the inventor to bear in mind that he will have a large number of patents to consider before he can feel at all satisfied that he is not treading upon the toes of some one who was earlier in the field.—*Electrical Review.*

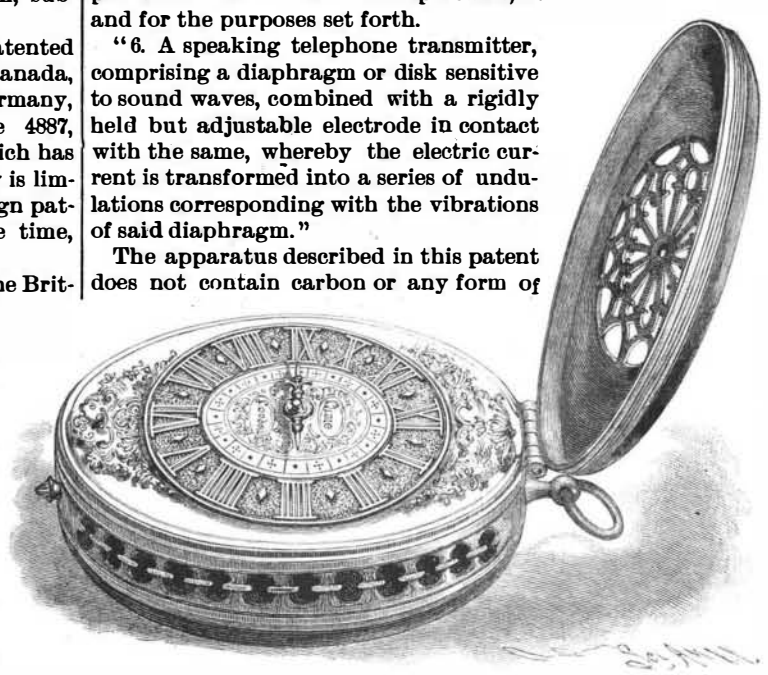

Fig. 2.—OPEN WORK STRIKING WATCH, MADE ABOUT 1600 BY QUARE.

SCIENTISTS are of the opinion that some icebergs last for two hundred years.

Remarkable Applications of Electricity.

Although modern scientific investigators have devoted much attention to electricity, we are probably as far as ever from knowing what this mysterious power really is. All that has been obtained is a fairly complete knowledge of its ways of working, and with this knowledge has come a rapid extension of its industrial applications, since it has been found to be a natural force which is pre-eminently adaptable and easily controlled. Great improvements may confidently be looked for in the near future, especially in the cheapness of its production, and there is the possibility of discoveries which may appear to us as wonderful as the telegraph and telephone when these were first introduced. Even now, when electrical engineering may be said to be but in its infancy, electricity is being used in a great variety of minor ways, besides its more prominent uses in telegraphy, telephony, and public and private lighting. As a motor power it is rapidly taking the place of steam for putting in motion machinery of all kinds, though as yet steam power has to be used, in the first instance, for its production.

It would be impossible, within moderate bounds, to enumerate all the different purposes for which electricity is actually being used, or for which it has experimentally been found suitable, though not yet put into actual use, and only some of its more interesting applications are here referred to.

The use of electricity for household purposes has hardly got beyond the experimental stage, save in the department of lighting; but enough has been done to show what a transformation may be worked by its aid when it will be possible to have houses heated by it. Then the mere turning of a switch will suffice; and the current, passing through a suitable heater, which may be as ornamental as means and taste permit, or, if desired, entirely concealed, will do the rest, superseding fires, with all their attendant trouble, smoke, and dust. With regard to cooking, there are numerous appliances already devised, and only waiting for the cheapening of the current to be widely taken advantage of. Each cooking utensil, being constructed with the heating coil as part of it, is its own stove; and the whole array of pots and pans need only to have the connection made, and the cooking can go on under the most perfect control. Some of the possible arrangements even appear to put a premium on laziness, for, with the food put in the cooking utensils at night, and the necessary connections made, the turning of a switch in the morning in the bedroom starts the cooking of the breakfast.

A New York lady is said to have so contrived matters that she can, before getting out of bed, start a fire in the kitchen by turning on the current; and when she comes downstairs finds the kettle boiling and the place comfortably warmed.

The heating powers of the electric current are also turned to account for raising to the desired temperature hand stamps, curling irons, branding irons, and the like; while in large laundries electrically heated irons have been found very economical, as they maintain for hours at a time the exact amount of heat suitable for the work, thus saving the ironers much time and trouble.

The electric light lends itself admirably to household decoration. Among other curious displays is a table decoration in which jelly is illuminated by a light, shining through the mass from the center; and when the dish, at first hidden by a silver cover and a mass of flowers, is suddenly uncovered, the effect is very striking. Edison is said on one occasion to have had on the table an aquarium in which were gold fish, each of which had in some way been made to swallow a tiny electric lamp connected with a dynamo by a hair-like wire passing out of its mouth. When the current was turned on, the fish presented a strange appearance, their delicate bodies showing all the minute details of their anatomy. The use of very small secondary batteries provides means for startling effects in personal decoration, by lighting up jewels and flowers, as has been largely done on the stage; and even walking-sticks have been furnished with small incandescent lamps.

Medical science has called electricity to its assistance in many ways. Various surgical instruments are heated by it; and the use of very small incandescent lamps, which give out practically no heat, permits more extended examination of internal parts than is possible in any other way. The use of the microphone has revealed sounds in the heart, lungs, and other organs which have hitherto escaped the most sensitive ear using the ordinary instruments. In Russia a lady was saved from premature burial by means of a microphone placed over her heart, which enabled a medical man to detect a faint beat, which had escaped the ordinary tests.

Though recent experiments have demonstrated the absurdity of much that passes for medical use of magnetism, electricity has been employed as a curative agent in various ways. One of the most curious is the electric light bath. The virtues of sunlight are well known, and there is supposed to be sufficient similarity between the light of the sun and the electric light to make the electric light bath serve as a readily available substitute for the sun bath. A closet of sufficient size to accommodate a person, constructed of polished nickel to give a good reflecting surface, is fitted up with a number of sixteen candle incandescent lamps, so arranged as to take up the least possible room and afford the largest possible radiating surface, while the temperature can be regulated by passing the current through a resistance coil. As the temperature in the inclosure can be raised in ten minutes to a hundred and fifty degrees Fahrenheit, the result is equivalent to a combined light and vapor bath. The skin is browned as if by sunburning, and the effect is claimed to be most salutary.

Another recent development is the use of electricity as a local anæsthetic. Painless operations have been conducted under its influence, and similar applications with suitable apparatus have induced cessation of pain in acute tic douloureux. Remarkable cures have also been obtained in such painful maladies as lumbago and rheumatism by simply pressing a small, specially shaped incandescent lamp on the skin over the seat of the pain.

It has been found that sufferers from "shaking paralysis" are much better after a rough railway journey; and the late Dr. Charcot, of the Salpetriere, Paris, the famous specialist in nervous diseases, applied this principle in the construction of a bed to which a rapid vibratory movement is given by means of electricity; and this shaking, which to a person in good health would be intolerable, proves quite enjoyable to the paralytic subject, who appears to be refreshed by it. Another French physician has devised a vibrating helmet for the cure of nervous headache. It is constructed of strips of steel, put in vibration by a small electromotor, which makes six hundred turns a minute. The sensation, which is not unpleasant, produces drowsiness; the patient falls asleep under its influence, and awakes free from pain. An American inventor has brought out a rocking chair actuated by electricity, and the sitter can at the same time receive gentle currents by grasping metal handles or by resting the bare feet on metal pedals.

Remarkable results have been obtained from experiments regarding the influence of electricity on the growth of plants. Professor Spechneff, at Kiev, by an arrangement of poles connected by wires, condensed atmospheric electricity over the inclosed area; and the ordinary grain crops grown within the inclosure showed an increase of from twenty-eight to fifty-six per cent in the weight of the yield of grain, and from sixteen to sixty per cent in the weight of the straw. Potatoes showed an increase of only eleven per cent, but they were from a parasite which devoured the unelectrified crop. By exposing plants at night to the electric light, thus supplementing sunlight, assimilation and growth became continuous, with consequent great increase in the produce; but it has to be noted that, as in plants under normal conditions, assimilation and growth alternate at different periods of the day, the great development of tissues under the double influence cannot be entirely beneficial. Professor Spechneff also tried the effect of electrifying seeds before planting, and found that when they were subjected to the current for only two minutes the rapidity of their growth was nearly doubled. Electrifying the earth in which vegetables were grown had also a prodigious effect, the harvest of roots being four times superior to the ordinary, and that of the leaves, etc., two or three times.

In France the De Meritens system of treating wines by passing currents of electricity through them has been officially tested and reported on favorably. This treatment is found to mellow and preserve healthy wines, and to arrest deterioration in those beginning to give way. Alcohol has also been experimented with, showing a considerable hastening of the maturing processes, the objectionable fusel oils, which render new spirits almost undrinkable, being rapidly converted into complete alcohols. Another industrial purpose to which electricity has been applied of late is tanning, in which it much shortens the time required in the ordinary way. Some measure of success has also attended experiments in purifying sewage by its use.

The well known attraction which light has for fish has induced ingenious fishermen to utilize the electric light as a bait, and it is said that this never fails to bring together large shoals of fish, which swim round the illuminated globe, and are easily caught.

The ingenious Yankee is never behindhand in odd adaptations, and a patent has been taken out in the States for a mechanical pickpocket and coat thief detector—an electrical apparatus which automatically rings an alarm bell when the bearer's personal property is tampered with. Another inventive genius so combined electricity and photography as to secure a flash-light photograph of thieves at work in his office. When they opened a glass case they completed an electric circuit which exposed the camera, and simultaneously kindled the flash-light, to the great alarm of the depredators.

There was recently exhibited to the Royal Society an automatic harbor watchman, named the "hydrophore," which is so constructed that when a torpedo boat approaches within half a mile, or a man-of-war within a mile, the vibrations of the screw propeller are detected and transmitted to the signaling station.

Electricity has further been used in the industrial processes of engraving, bleaching, dyeing, the reduction of ores, and the purification of metals. Mainly by its aid, aluminum can now be produced at a price which is no longer prohibitive. Prior to 1855 it sold at three hundred and sixty shillings per pound; by 1862, it had fallen to twenty shillings per pound, while now it costs only a shilling or two. The cheapest chemical methods of producing it cannot compare with the electrical. By the use of electricity for welding what is in effect a new power has been put into the hands of mechanicians and constructors. It was formerly considered that only iron, steel, and platinum could be firmly welded, while now nearly every known metal and alloy has been successfully welded by the help of electricity.

An electric ventilator has been devised for supplying buildings with fresh air, cold or warm, as may be desired. An electric motor sets the ventilator revolving, and the revolution sucks cool air in. When warm air is desired, a current of electricity is sent into a network of fine wire, through which the air must pass, heating the wires, and these impart their heat to the air.

For the detection of underground ores an "electrical finder" has been devised. The mechanism of this instrument includes a telephone, which is silent in the absence of metal or magnetic ore; but if such be present, induced currents arise, which produce sounds in the telephone which are recognizable by experts.

What should prove a most useful industrial development is the application of electricity to the cleansing and preservation of boilers. The method employed is the sending of currents periodically through the shell of the boiler. By this means the scale formed on the shell and tubes is disintegrated and easily removed.—*Chambers's Journal.*

Coloring Gelatino-bromide Prints.

The *Archiv* gives the following plan for getting different colors on bromide prints. The prints are feebly developed with eikonogen, fixed, washed, and then immersed in a solution of:

Nitrate of lead	4 parts.
Red prussiate	6 "
Water	100 "

This bleaches the image, which may then be colored thus:

Brown.

Schlippe's salt	10 parts.
Ammonia	5 "
Water	150 "

Yellow.

Neutral chromate of potash	4 parts.
Water	100 "

Green.

Immerse the yellow prints in:

Iron perchloride	1 part.
Water	10 parts.

Red.

Immerse the yellow prints in:

Chloride of copper	1 part.
Water	10 parts.

Nickel Green.

Chloride of nickel	1 part.
Water	10 parts.

Orange.

Mercury bichloride	3 parts.
Potassiumiodide	4·5 "
Water	100 "

Aluminum Boats and Sleds.

Mr. Wellman's American polar expedition, which is now about to leave Norway for the Arctic seas, makes, according to *Industries*, a new departure in Arctic voyages. Both the boats and sleighs with which the party is equipped are constructed of aluminum, and thereby considerably reduces the weight which the exploring parties will have to carry. The boats are three in number, and are built on the lines of the surf-boats of the United States Life Saving Service. They are of about the same capacity as those used by Sir E. Parry in the 1827 expedition, but, instead of weighing 1,700 pounds, only weigh some 350 to 400 pounds apiece. The aluminum used has a tensile strength of 54,000 pounds per square inch, and the sides of the boats are so hard that it is impossible to puncture them with repeated blows of the hammer. The sleighs are also made of aluminum, and consist of sheets of well-tempered metal, weighing about 26 pounds each, with a carrying capacity of 1,000 pounds. Each sleigh, in addition, is fitted with a watertight case of the same metal, weighing an additional 40 pounds, which has a sufficient displacement to carry the sleigh and its entire load, so that they can run through slush, or be used as boats in open water without damage to the stores.

Another novelty is the use of saccharine in the place of sugar as a sweetening substance. Although a few ounces of saccharine may be the equivalent of two and a half barrels of sugar, so far as sweetening power is concerned, it is certainly not its equivalent as a food stuff.