

**Vibrations of the Plate of a Bell Telephone.**

Experiments have been made by M. Henri Dufour to determine the vibrations of this plate. The first method employed consisted in transmitting the vibrations to a gas flame. For this purpose the wide-mouthed bell of the telephone was replaced by a cylindrical one of small capacity. A cork, pierced with two holes through which passed two kneed tubes of glass, bounded within the cylinder a sort of little chamber comprised between the front face of the vibrating plate and the hind face of the cork. The illuminating gas entered through the first tube, and issued, forming a small flame, at the extremity of the tapering second tube, so that the whole constituted something analogous to the manometric capsules which M. König places upon the pipes. Every vibration of the plate was betrayed by a movement of the flame when the induced currents employed were those produced by a small Dubois-Reymond coil, even when the exterior coil was at two centimeters from the extremity of the inducing coil. The currents produced by the voice in a second telephone caused no variation in the height of the flame. The result was equally negative when a small mirror was borne on a kneed lever with its end resting on the vibrating plate. A ray of light reflected by the mirror did not appear to be displaced under the influence of the vibrations produced by the voice. Finally, M. Dufour tried to produce colored rings between the vibrating plate and a lens placed upon it. For this a very thin piece of glass was placed upon the vibrating plate, in contact with the slightly convex lower face of a lens. The sounds were transmitted by the instrument, although weakened. The colored rings were observed through a telescope furnished with a reticule. The displacement of a bright ring to the following dark one was produced by a difference in the thickness of the stratum of air equal to a quarter of a wave-length; that is to say, a change in the position of a yellow ring will be ascertained for about 0.000143 millim. displacement of the plate. This displacement is manifested by a diminution in the distinctness of the rings, which oscillate about their normal position. The displacements are observed very distinctly by employing the induced currents of a Dubois-Reymond coil, but it has not been possible to verify them for the currents produced by the voice.

Having heard it said that two telephones, the localities of which have very different temperatures, do not work well, the author desired to put the matter to the test by direct experiment. One of the instruments was left during several hours exposed to a temperature of  $-18^{\circ}$ , while the other passed the same time in an inclosure heated to  $40^{\circ}$  C. The two instruments put in communication transmitted speech perfectly. As soon as the telephone was employed on the telegraph lines the action was remarked which is exerted upon the instrument by the currents used to work the Morse apparatus, and passing in wires near that which connects the two telephones. This action is attributable to induction phenomenon. M. Dufour tried to ascertain the distance at which an intermittent current can produce an appreciable current in the telephone. Two copper wires, perfectly insulated, were stretched parallel over a length of 15.2 meters, and at distances varying between 15, 35, and 45 centimeters. One of the wires joined the battery and the manipulator with the receiver of a Morse apparatus; the earth line was formed by the gas pipes. The two extremities of the other wire communicated directly with the telephone. The current employed produced a deflection of  $60^{\circ}$  on a telegraph needle. Under these conditions all the motions of the manipulator were distinctly perceived, and the author is persuaded that a telegraphist would have understood the signs produced by the manipulator, even when the distance between the two wires was 45 centimeters. It may hence be concluded, therefore, that on telegraph lines the noise heard in the telephone when a message traverses a neighboring wire may be attributed, at least in part, to induced currents.

This experiment may have a certain interest in the lecture room, to show at what distance an induced current can be produced. In this respect the telephone is much more sensitive than the galvanometer.—*Electrician.*

**Ground Honey.**

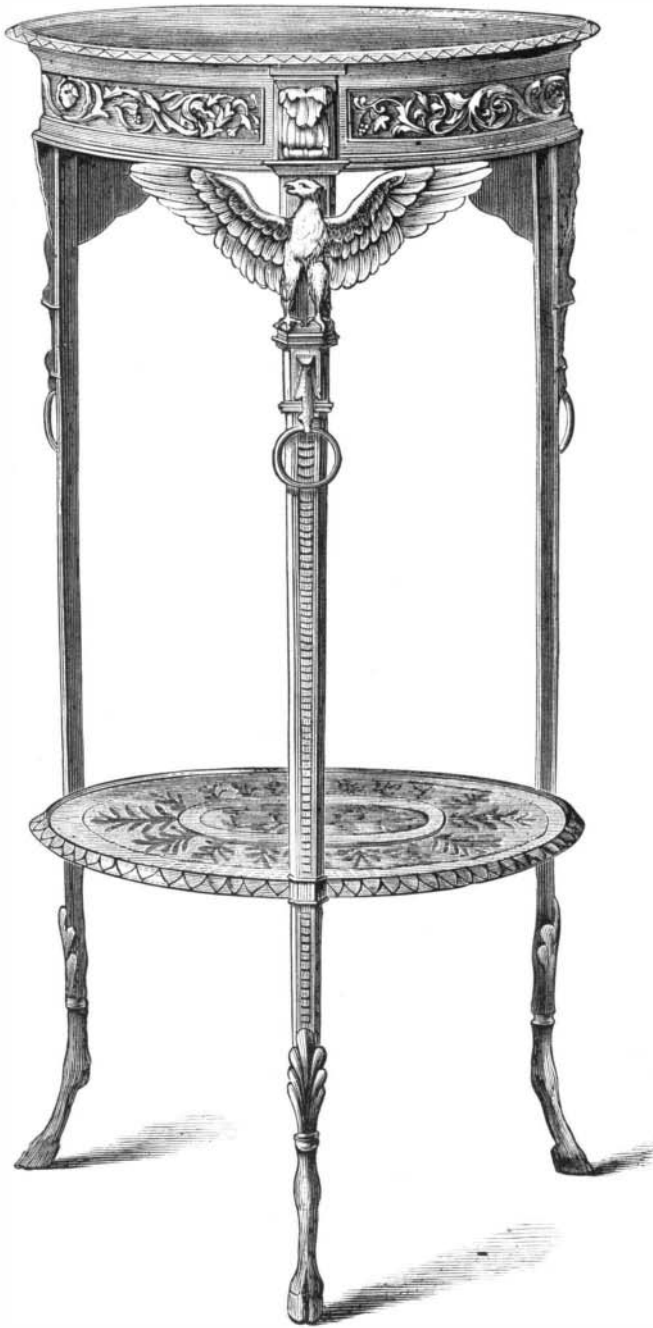
M. Pierre Arnoux, lately traveling in Abyssinia, discovered in small cavities in the soil a species of honey without wax, produced by an insect resembling a large gnat. Examined by M. Vielliers, this ground honey was found to have the following composition: Water, 25.5; fermentable sugar, 32; mannite, 3; dextrine, 27.9; ashes, 2.5; diverse matters, 9.1; total, 100. The undetermined matter contained a small proportion of some acid principle, the nature of which M. Vielliers had not been able to make out. The composition of this honey resembles that of the manna of Sinai and Kurdistan, formerly analyzed by M. Berthelot, that of the sugar found in the leaves of the plane tree by M. Boussingault, as well as that of ordinary honey. It is, however, distinguished from all those substances by the total absence of cane sugar. In Abyssinia this substance is collected by the natives, and used as a remedy for affections of the throat.

**Morning Mirage.**

A characteristic phenomenon in Dakota is the morning mirage, seen on the prairies just before sunrise in clear, cold, still weather. At such times wide reaches of country ordinarily cut off from the view by rising ground or belts of timber will be raised, as it were, above these obstacles. Towns and other prominent objects, 20 miles away, are no longer invisible, but are clearly revealed, with all that lies between them and the spectator. The windows may be counted in houses which at other times can no more be seen than if they were at the antipodes, and near objects, usually just within the range of vision, seem to be brought much closer. As the sun's orb rises above the horizon the vision sinks below it.

**FINE CAST IRON WORK.**

The annexed engraving shows a specimen of iron castings for a table. It has many details of ornament, and exhibits the application of the best style of modern art to such decorative objects.



**ORNAMENTAL CAST IRON TABLE.**

The design is founded upon classical types adapted to Renaissance ornament. This specimen is from a series of designs carried out in metal by the firm of E. G. Zimmermann, of Hanau (Hesse Nassau).

**Preventing Seasickness.**

Of the many annoyances to which the traveling public is subject at this particular season, seasickness is, perhaps, the most distressing. A perfect cure for this malady would rob ocean travel of half its terrors. No drug, however, has been discovered which acts as a specific. The cause of the sickness is largely, if not wholly, due to the involuntary and unexpected motions to which the passenger is subjected on board ship. These cause undue pressure upon the stomach and liver, and derange the action of those organs. To prevent this, attention has recently been called to an old plan, which is said to be very successful. It consists in regulating the act of breathing according to the pitching or rolling of the vessel, drawing in the breath as she rises, and breathing out as she falls into the trough of the waves. After a little experience the practice, it is said, becomes involuntary. When seasickness has fairly set in, the only thing to be done is to get rid of the extra bile thrown into the circulation, and to allay the irritation of the stomach. For the latter, brandy is the popular remedy, but cool, effervescent drinks are preferable. Champagne is recommended as the best medicine to subdue nausea, and give the necessary tone to the system.

**The Argan Tree.**

In his account of his recent travels in North Africa, Sir Joseph Hooker, the eminent English botanist, describes the argan tree as in many respects the most remarkable plant of South Morocco; and it attracts the more attention as it is the only tree that commonly attains a large size, and forms a conspicuous feature of the landscape in the low country near the coast. In structure and properties it is nearly allied to the tropical genus *Sideroxylon* (ironwood); but there is enough of general resemblance, both in its mode of growth and its economic uses, to the familiar olive tree of the Mediterranean region to make it the local representative of that plant. Its home is the sub-littoral zone of Southwestern Morocco, where it is common between the rivers Tensift and Sous. A few scattered trees only are said to be found north of the Tensift; but it seems to be not infrequent in the hilly district between the Sous and the river of Oued Noun, making the total length of its area about 200 miles. Extending from near the coast for a distance of 30 or 40 miles inland, it is absolutely unknown elsewhere in the world. The trunk always divides at a height of 8 or 10 feet from the ground, and sends out numerous spreading, nearly horizontal branches. The growth is apparently very slow, and the trees that attain a girth of 12 to 15 feet are probably of great antiquity. The minor branches and young shoots are beset with stiff thick spines, and the leaves are like those of the olive in shape, but of a fuller green, somewhat paler on the underside. Unlike the olive, the wood is of extreme hardness, and seemingly indestructible by insects. The fruit, much like a large olive in appearance, but varying much in size and shape, is greedily devoured by goats, sheep, camels, and cows, but refused by horses and mules; its hard kernel furnishes the oil which replaces that of the olive in the cookery of South Morocco, and is so unpleasant to the unaccustomed palate of Europeans. The argan averages about 25 feet in height, and covers a space of 60 or 70 feet in diameter. Sometimes goats were seen feeding on the fruit, much to the amusement of Sir Joseph, who had not been accustomed to consider the goat as an arboreal quadruped. Owing to the spreading habit of the branches, which in the older trees approach very near to the ground, no young seedlings are seen where the trees are near together, and but little vegetation, excepting small annuals; but in open places, and on the outer skirts of the forest, there grows in abundance a peculiar species of thyme (*T. Broussonnetii*), with broadly ovate leaves and bracts that are colored red or purple, and the characteristic strong scent of that tribe. It is interesting to the botanist as an endemic species, occupying almost exactly the same geographical area as the argan. It is replaced in the interior of the country by an allied, but quite distinct, species. Its penetrating odor seems to be noxious to moths, as the dried twigs and leaves are much used in Mogador, and found effectual for the preservation of woolen stuffs.

**The First Experiences of the Japanese with Statical Electricity.**

The following is from Mr. E. Clark's "Life and Adventure in Japan." The author lived in Japan from 1871 to 1875, and was in the service of the Japanese Government. He describes the Japanese as being very fond of anything practical, and as being delighted with anything in the shape of experiment, even, apparently, when practiced upon themselves: "I never witnessed a more ludicrous sight than the effects produced upon the Japanese by some of my experiments. The innocent manner in which they stepped up to the various electric machines, and did whatever they were told, was only excelled by the dumb astonishment or the frantic yell with which they received the electric shock. No visible effect, however great, upon the first who wanted to take hold was sufficient to restrain the intense curiosity of those who wished to follow. They wanted to feel for themselves, and their ambition was usually satisfied after one trial. Two of the governors took a 'spark' from one of the machines, but the third was very dignified, and would not deign to come up to the table, as it was contrary to strict etiquette. So I politely offered to bring him some electricity in a bottle. He doubted whether that could be done. In order to dispel his doubts, and also to bring him down to the level of ordinary mortals, I took a large Leyden jar, which I charged full of electricity, and brought it to him with good grace. He looked at the jar, and seeing nothing in it, concluded to touch the brass knob at the top. The effect may be better imagined than described, only he didn't show any more dignity or touch any more jars that day."

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**PROTECTING POLISHED IRON SURFACES.**—A correspondent states that a varnish, consisting of beeswax dissolved in benzine, is an excellent protector for polished iron surfaces. It is also a good varnish for patterns.