from Figs. C and D. In C the corolla has been cut longitudinally so as to leave the stamens intact. In Fig. D, a portion of the stamens is shown separately. The anthers have a long connective astride the filaments. The latter are very short, and are inserted in the sides of the tube of the corolla, *f*, in Fig. C and D. One anther, *a*, is developed regularly; the other, *a'*, is transformed into a flattened appendix, nearly rectangular, slightly curved, and convex outside. These two organs are so placed together as to form a kind of spoon, which very exactly closes the tube of the corolla. They even adhere quite strongly by their anterior points. The connective, which is almost unapparent on the inferior side, is elongated on the upper portion into a delicate arched filament which carries at its extremity the only pollen-enclosing cell of the anther.

If it be attempted to push a needle or bit of stick into the tube of the corolla, the little spoon, *a'*, will just be encountered. By a light effort, the connectives are turned around the filaments, when the fertile anthers, concealed under the superior lip, project themselves forward and deposit their pollen upon the intruding instrument. On withdrawing the latter, the elasticity of the filaments carries the anthers back under the upper lip. Up to the time when the pollen is ripe, the style, which is also concealed at the bottom of the upper lip, does not arrive at complete development and the bi fidal stigma, *s*, hardly extends beyond the corolla, Fig. A. In the advanced flower, deprived of its pollen, the style elongates downwards and carries the stigma at the level of the entrance of the tube (see *s*, Fig. B).

It is now easy to follow the action of the flower, when a bee, for instance, visits it. The insect alights upon the lower lip of the corolla, and, to reach the hidden nectar, tries to penetrate the tube. But this it cannot do without, as already shown, pushing before it the short branches of the two levers formed by the connectives. At the same time the arched upper parts advance and embrace the body of the bee, applying the open anthers to its abdomen so that the insect emerges covered with the fine pollen. As long as it seeks the nectar of flowers of the same age as that just left and of which the styles are still very short, the stigmas can receive but little pollen; but when the bee attempts to enter an older blossom than B, the elongated stigma grazes along its back, rubs off the pollen, and thus becomes fecundated. Since the pollen of the *salvia* is deposited on the back of the insect, it is evident that little can be given to a flower of another species the construction of which requires the placing of the substance upon the head or trunk. While whatever may be the flowers which the bee visits before entering another *salvia*, the pollen with which it is charged is not rubbed off or wasted as it remains intact until a proper blossom is entered.

UP THE AMAZONS.

No. 2.

VOLUME OF THE GREAT RIVER AND ITS TRIBUTARIES.

The Amazons is the most voluminous of rivers. At the narrows of Obydos, six hundred miles from the sea, half a million cubic feet of water pass any given point every second. Born in Lake Lauricocha, among the Andes of Peru, the main trunk runs northerly for five hundred miles in a continuous series of rapids; and then, from the frontier of Ecuador, it flows easterly, twenty-five hundred miles across the great equatorial plain of the continent. The average current of the Great River in its passage through Brazil is three miles an hour. At Tabotinga, two thousand miles from its mouth, the width is a mile and a half, with a depth of eleven fathoms; at the entrance of the Madeira, it is three miles wide, and below Santaren, it is ten. The tributaries are in keeping with this colossal trunk. In fact, the Amazons is a great river system, rather than one river. It has twelve affluents over a thousand miles long, the largest, the Madeira, equaling the Arkansas, entering the Amazons nine hundred miles from its mouth.

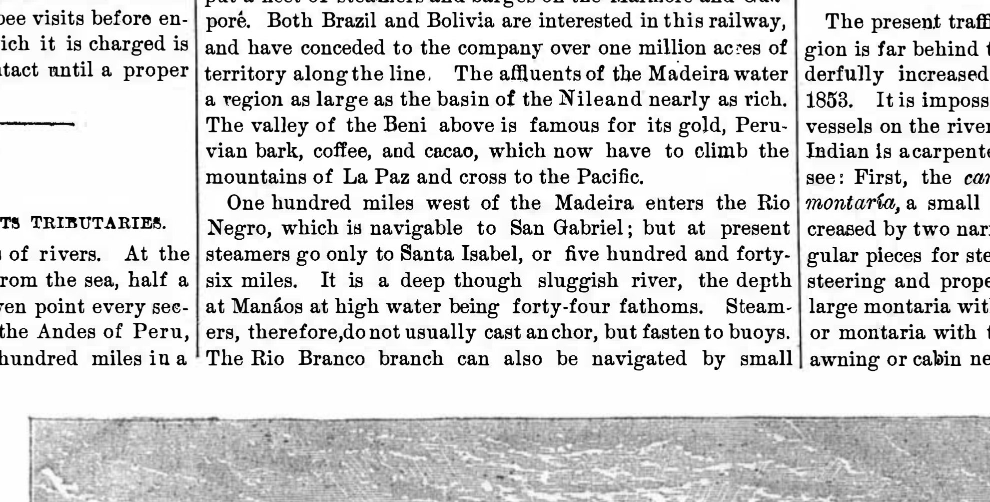
Besides these and a host of minor tributaries, there is a wonderful network of natural canals alongside of the main river and joining the tributaries, called *igarapés*, *paranás*, and *furos*. These bypaths are of immense advantage for intercommunication. They are characteristic of the country, and are so numerous that Amazonia is truly a cluster of islands. Atlogether, this vast inland fresh water sea drains a territory of two million square miles, reaching from the Andes to the Atlantic and throwing out its arms to the Orinoco and Paraguay. On the Lower Amazons, the annual rise reaches its maximum about the middle of Jnne, and its minimum in December, the difference of level being about fifty feet.

EXTENT OF NAVIGATION.

No other river runs in so deep a channel to so great a distance. No other river can furnish over six thousand miles of continuous navigation for large vessels. For two thousand miles from its mouth, the main stream has not less than seven fathoms of water; and not a fall interrupts navigation for twenty-five hundred miles. The Pongo de Manseriche is the western limit to navigation on the Amazons proper. While the current is ever east, there is a constant trade wind westward, so that navigation up or down has always something in its favor. In August and September, a strong breeze sweeps up the lower part of the main trunk, so that schooners often go from Pará to Obydos in ten days, or one third of the ordinary time.

As to the tributaries: the first in order, the Tocantins, could furnish a natural highway to the rich province of Minas Geraes, were it not for rapids one hundred and fifty miles from its mouth. This interruption will some day be circumvented by a railroad. Above the falls, a steamer can go six hundred miles. The Xingú is navigable nearly one hundred miles. From Santarem, steamers ascend the broad Tapajós about sixty leagues, to the rapids of Itaitúba; and passing these, traders go by canal to Diamantino and Cuyabá on the confines of Paraguay. From Itaitúba, there is communication *viâ* Manes with the Madeira. Near Obydos enters the Trombétas, navigable one hundred miles. And just beyond Serpa, the great Madeira pours its flood of waters. This majestic tributary is about two thousand miles long, one branch rising near Lake Titicaca, a second starting within fifteen miles of the source of the Paraguay, and a third washing down the gold and diamonds of the Sierras. It has a three mile current, and at its mouth is two miles wide and sixty-six feet deep. It is navigable to San Antonio, a distance variously estimated from five to seven hundred miles. Here begins a series of rapids, nineteen in number, having a total fall of thirty-eight fathoms; above which a steamer can ascend to Santa Cruz, in the heart of Bolivia. Colonel Church, who sounded the Marmoré for six hundred miles above the rapids in October (the dry season), found nowhere in midchannel less than fifteen feet of water, an average current of two miles an hour, and a width varying from six to twelve hundred feet. A railway around the formidable rapids which separate Bolivia from the Lower Madeira is now in process of construction by the Madeira and Marmoré Railroad Company. The track extends from San Antonio to Guajarámirim, a distance of one hundred and eighty miles, and by the terms of the contract the road is to be finished in April in 1874. This is one of the most important enterprizes on foot; but great difficulties have been encountered, as the scarcity of laborers, the attacks of Indians, and the prevalence of epidemics. The company, however, in spite of all obstacles, declare that this great connecting link must and shall be built. As soon as completed, the National Bolivian Navigation Company will be ready to put a fleet of steamers and barges on the Marmoré and Guaporé. Both Brazil and Bolivia are interested in this railway, and have conceded to the company over one million acres of territory along the line. The affluents of the Madeira water a region as large as the basin of the Nile and nearly as rich. The valley of the Beni above is famous for its gold, Peruvian bark, coffee, and cacao, which now have to climb the mountains of La Paz and cross to the Pacific.

One hundred miles west of the Madeira enters the Rio Negro, which is navigable to San Gabriel; but at present steamers go only to Santa Isabel, or five hundred and forty-six miles. It is a deep though sluggish river, the depth at Manáos at high water being forty-four fathoms. Steamers, therefore, do not usually cast anchor, but fasten to buoys. The Rio Branco branch can also be navigated by small steamers for sixty leagues. Above the rapids of San Gabriel, the Negro is connected by the Cassiquian with the Orinoco; and hence the commerce of this part of the river is naturally in the hands of Venezuelans.



MOUTH OF THE AMAZONS

Next in order is the Purús, one of the most promising tributaries of the Amazons. Recently opened to the world by the daring Chandless, this hitherto mysterious river, possessed by the untameable Chunchos, has suddenly become one of the most attractive and valuable streams in the world. Rising in the richest part of the Andes and entering the Amazons only forty-five leagues above the city of Manáos, it is navigable for steamers, the greater part of the year, for over twelve hundred miles. At the distance of eight hundred miles from its mouth, the depth is never less than twelve feet. It is nearly, if not fully, equal to the Madeira in size, but is exceedingly winding in its course. Parallel to the Purús is the almost equally important Juruá. It is navigable, for steamers drawing three or four feet of water, for fifteen hundred miles. Like the Purús, it is a very crooked river, and has a two and a half mile current. Five hundred miles from its mouth, it has a depth of two fathoms at low water.

The Jutahi and Japurá are first class tributaries; the latter is navigable for ten days by steamer, when falls are reached where there is a lofty table-topped mountain. The Içá has no rapids and is navigable into New Granada. It is a healthy river, and is of considerable commercial value. The Jávari is navigable for an unknown distance, and is called the "Golden Dream of the Peruvians," who think it is the eastern outlet of their country. The Napo could be ascended by a flat bottom steamer five hundred miles; it is the natural highway eastward for Ecuador. The noble Ucayáli has been navigated by a steamer of five hundred tuns for six hundred miles in the dry season; and a small steamer has ascended over seven hundred miles, or within two hundred miles from ancient Cuzco, and three hundred from Lima. There is twenty feet of water at Sarayacu. The Ucayáli will undoubtedly connect Lima with the Amazons. Finally, the Huallága has an average depth of three fathoms for a hundred miles; but canoe navigation begins at Tingo Maria, one hundred and twenty miles from Huánaco. Such are the vast capabilities of this gigantic river, fitly called the Mediterranean of the New World.

THE NATURAL WEALTH

of the country is in proportion. No spot on the globe contains so much vegetable matter as the Valley of the Amazons. Within it we may draw a circle of eleven hundred miles in diameter which shall include an evergreen, unbroken forest of grand and beautiful and valuable trees, in endless variety. In truth, it is this very excessive exuberance which offers the chief obstacle to settlement. We know next to nothing of the interior; but the margins of the main trunk and especially of the tributaries abound with precious woods, drugs, dye stuffs, edible fruits, and other useful products. Among the most important of these for exportation are: Moira, pinima, moira pirânga, moira coatiára, itaúba, palo di sangre, massarandúba, sapucáya, jacaranda, cedar, and cumarú; salsaparilla, vanilla, cupaiba; cinchona and guaraná; cacao, coffee, tonka beans, nuts, farina, tapioca, cotton, rice, tobacco, and sugar; rubber, piassába, pita, and copal, and a host of others unknown to commerce.

SAILING CRAFT AND STEAMERS.

The present traffic in the riches of this inexhaustible region is far behind the world's expectations; but it has wonderfully increased since the introduction of steamers in 1853. It is impossible to ascertain the number of sailing vessels on the river; but the variety is extraordinary, for the Indian is a carpenter and shipwright by intuition. Thus we see: First, the *canœ* proper, or "dug out." Second, the *montaría*, a small boat made of five planks, or a canoe increased by two narrow boards for the sides and small triangular pieces for stem and stern. The paddle serves for both steering and propelling. Third, the *montaria-possante*, a large montaria with oars. Fourth, the *igarité*, a large canoe or montaria with two masts, rudder, keel, and palm leaf awning or cabin near the stern. Fifth, the *galiota*, an igarité with wooden covering. Sixth, the *cobérta*, a large galiota with one or two wooden cabins. Seventh, the *vigilêngas*, a large igarité, short and broad, flat bottom with keel fore and aft, first made at Viges. Eighth, the *batelao*, a barge with square sails but no deck, to carry cattle; sometimes propelled by long oars. Ninth, the *barco*, a batelao with deck. Tenth, The *escuna* or schooner.

Of steamers there are now thirty-five afloat on the Amazons, varying in tunnage from seventeen to eight hundred and sixty-four. The aggregate tunnage is over ten thousand. Twenty of these belong to three companies, which receive a large subsidy from the Government and have a total capital of $3,600,000. The oldest and most powerful line ("*Companhia de Navagaçao a vapor de Amazonas*") is owned in London, but is under the management of the distinguished and energetic Sr. Pimeuta Bueno, of Pará. This company is endeavoring to swallow up the other two, having just purchased the Paraense line and nearly completed negotiations for the Fluvial, and thus monopolize the carrying trade on the river. Officially made free to the world in 1867, the navigation of the Amazons is virtually restricted to the Brazilian flag. Foreign vessels may go up the main river as far as Manaos; up the Tapajos to Santarem; and up the Madeira to Borba. On the Maranon the Peruvian government has two large steamers, doing monthly service, besides several small ones for the tributaries; and an English firm at Iquitos has recently inaugurated a private line between that point and Pará. Goods for Peru pass Pará free of duty. Two regular steamers leave Pará for Manaos and intermediate points, on the 2d and 18th of each month, and a monthly steamer plies between Manaos and Loreto, on the Brazilian frontier, connecting with the Peruvian Morona for Yurimaguas on the Huallága. The other steamers run from Pará and Manaos to numerous villages along the main river and the tributaries. The navigation of these tributaries, but ust commenced, is most important, for they are the real sources of the characteristic products of the country; the region bordering the main trunk yields scarcely anything. On the Tocantins a steamer goes once a month to Cametá; once a month (during high water) to Baiao and to the first falls. Almost the only trade on this river is in Brazil nuts. The Xingu has one occasional steamer going just above Souzil for rubber, of which the annual product is five or six thousand arrobas. The Tapajos has a monthly steamer as far as Itaituba (175 miles) leaving Santarem the 28th, and bringing down rubber, salsaparilla, tobacco, farina, cacao, coffee, copaiba, pepper, nuts, pirarucú, pitch, hides, lumber and limestone. The annual amount of the Topajos cacao is is 100,000 arrobas, rubber the same, pirarucú 50,000 arrobas, salsaparilla 1,000 arrobas, nuts 40,000 bushels, hides 20,000. A steamer leaves Manaos for San Antonio, on the Mádeira, the 27th of each month, and oftener when there is a cargo.

PRESENT AND PROSPECTIVE COMMERCE.

At present the trade on this chief tributary is inconsiderable, its value, in 1872, amounting to only $279,312. The exports consist of rubber (about 25,000 arrobas), hides, tallow, quina, copaiba, cacao, nuts, fish, tobacco (of superior quality for pipes), and salsaparilla. But the moment the railway around the falls is finished, a magnificent country will roll its wealth down the Madeira. Above the falls are the cities of Exaltocion, Trinidad, Santa Cruz, Oruro, Cochabamba and La Paz; there is the Bene valley, famous for its gold, silver, tin, copper, lead and mercury mines; and from the banks of the Marmorá will be exported, as soon as an outlet can be made, cinchona bark, rubber, coffee, cacao, salsaparilla, tobacco, farina, cotton, llama and alpaca wool, cattle and hides. At present, cattle can be bought there at $7 a head; cinchona, $45 a quintal; cacao, $1.50 an arroba; sugar, $1 an arroba.

On the Rio Negro a steamer makes six trips a year as far as Santa Isabel (546 miles) for piassába and salsaparilla. The value of the trade on this tributary, in 1872, was $62,586; it is now on the increase. The rich cacao and coffee, once raised in this region, is no longer cultivated; and no one can be found to cut the celebrated moira pinima—the most beautiful wood in the world. Not a stick can be found for sale in the city of Manaos; while everybody confesses that there is an abundance of it up the Negro, especially on its branch, the Branco, near the boundary line of Guiana. A regular monthly steamer (and often an extra one) goes up the Purús, one thousand miles to Hyutanahau, bringing down rubber, copaiba, salsaparilla, nuts, turtle oil and fish. The commerce on this river is rapidly increasing. Its value in 1872 was $627,602. There are more inhabitants along the banks of the Purús than on any other tributary.* There is a monthly steamer, likewise, on the Juruá, ascending to Marary (five hundred miles), and the trade is similar to that on the Purús. The Peruvian steamers, plying between Lonto and Yurimagnos, takes up dry goods and hardware in exchange for Moyabamba hats and salsaparilla. Her rate down stream is eighteen miles an hour and from ten to twelve up, while the Brazilian steamers descend at the rate of twelve or fifteen miles an hour, but make only eight up stream.

Such is this great fluvial highway, as thus far developed. Unless checked by blind legislation, the commerce of the Amazons, leavened by Anglo-Saxon capital and Anglo-Saxon enterprise, is destined to assume proportions commensurate with the magnitude of the river. JAMES ORTON.

*The latest intelligence contradicts the report of Mr. Piper's massacre, and announces that he has found gold in abundance.

NOTE ON AN ELECTRO-DYNAMIC EXPERIMENT.

BY MM. GASTON PLANTE AND ALF. MAUDET-BREGUET.

In charging a secondary couple of leaden plates with the magneto-electric machine of Gramme, we have observed a phenomenon which affords quite a curious example of the reciprocal transformation of mechanical power into electricity, and of electricity into mechanical power.

The machine of Gramme possessing, as is well known, the remarkable property of furnishing currents influenced in the same direction, the secondary couple is charged by the aid of this machine as if under the influence of a voltaic pile, and enables us to obtain, at the end of a few moments, by a successive chemical action accumulated upon a large surface, temporary effects of an intensity superior to those which the machine produces in a continuous manner. It is easy to verify this, either by the incandescence of a thread of platinum, or by any other physical action. But if, instead of thus discharging the secondary couple, it is left in communication with the machine, and if we cease to make it revolve, if we even stop it entirely, by opposing a sufficient resistance, it will immediately be observed to put itself in motion again under the influence of the secondary couple which it has just charged, not in a contrary direction, but in the same direction as the motion with which it was animated, while charging the secondary couple.

The velocity is less, it is true, than that which is given to it in order to develope electricity, but it is still sufficiently great, and the rotation may be prolonged two or three minutes, that is, during the time employed by the secondary couple to discharge itself. The dynamo-electric machine operates in this case as an electro-magnetic motive power, and the secondary couple gives back to it, under the same form, the power which it has stored up. Electricity serves only, as it were, as the intermediate machinery in this communication and restoration of motion.

If we measure the forces called into play, we can plainly ascertain that this restoration is not complete on account of the loss inevitable in every transformation. But as the measure of the product of the secondary couple, effected by one of us in a previous experiment conducted after another method, has demonstrated that this couple was a good receiver of the electric force, it is probable that one would find here, all the circumstances being the same, only a trifling waste in the transformation.

The direction of the rotatory motion communicated to the machine by the discharge of the secondary couple is, we have said, the same as that in which the machine was turned in charging the couple. Now if the machine in turning in a certain direction has charged this couple, it is difficult to conceive, at first view, that under the influence of the discharge of the couple it turns still in the same direction; for it must then tend to recharge the secondary couple, so that the latter would be discharged and charged at the same time.

Nothing seems more paradoxical. Nevertheless the fact is easily proved, and is very simply explained in the following manner: If we consider in the first place the direction of the current furnished by the machine, that of the current given back by the secondary couple (which is the reverse of the preceding), and if we take into account the actions resulting, we confess that, according to the laws of induction and of electro-dynamics, the rotating ought indeed to act in the direction indicated by experience. If we observe, on the other hand, that the secondary couple, once charged, has a temporary intensity superior to that of the machine, that is, that it can furnish in a given time, by means of the accumulation which takes place, a quantity of electricity superior to that which the machine would produce during the same time, we understand that it could overcome or surmount the feebler intensity which the machine tends to develope by its rotation even under the influence of the discharge of the secondary couple.

The motion then takes place by virtue of a difference of intensity between the current furnished by the secondary couple and that which the machine would tend to develope by the simple fact of its rotation. Thus is explained, according to us, this apparent paradox of electro-dynamics. We will add that the experiment can be easily repeated, with the smallest as with the largest models of Gramme's machine.

On the Manufacture of Ether.

O. Süffenguth states that the best method of making large quantities of ether is by the continuous process. A retort, containing a mixture of nine parts sulphuric acid of 66° B. and five parts 90 per cent alcohol, is heated to 284° Fah. and alcohol allowed to flow in continuously to keep the mixture at a constant level. Heretofore a direct fire has been applied under the copper or iron retort; but owing to the inflammability and volatility of the ether, this is evidently dangerous; and moreover, the direct fire soon destroys the retort, or at least dissolves the leaden lining. This is now entirely avoided by the use of superheated, high pressure steam for heating the retort. Even though this method is rather more expensive, it prevents igniting and exploding the ether vapor, which quite compensates for the cost. Another advantage is the ease with which a constant temperature is maintained by regulating the pressure, so that the operation is no longer dependent upon the care and experience of the workmen.

Various materials have been used for the retort or still; sometimes copper alone, sometimes copper lined with lead, and also iron lined with lead. Experience has proved that the last named is not only the cheapest but will last the longest. If the operation is carefully conducted, 66 per cent of ether of a specific gravity of 0·730 will be obtained. Half a pound of sulphuric acid makes 100 pounds of ether, and the apparatus is so constructed that it can be refilled without interrupting the operation. Great attention to the regulation of the temperature and to the flowing in of the alcohol are the principal conditions for obtaining a large yield.

The crude ether thus obtained is freed from the acid dissolved in it and washed, after which it is rectified in a suitable apparatus. Attempts have been made to rectify it in the process of its manufacture, by conducting the ether vapor into a vessel with double walls, the space between the walls being filled with water at a temperature of 35° C. (95° Fah.) Here the water and alcohol are condensed, while the ether passes up into a second vessel filled with pieces of quick lime of the size of a man's fist, which take up the sulphurous acid. It is now warmed and enters from beneath into a cylinder holding a leaden basket of dried wood charcoal, or alternate layers of charcoal and pieces of coke soaked in a solution of soda and well dried. From here it is conducted through a cooler into the receiver. This continuous rectification is more difficult and requires greater attention on the part of the workmen than where the purification is a separate operation, first on account of the continual regulation of the temperature in the different parts of the apparatus, and secondly because the lime sometimes stops up the tube or is carried off in the vapor. The operation never goes on regularly nor is the product always pure. It seems to be better, in practice, to keep separate the two operations of making and of purifying the ether.

Bees as Architects.

Now we exercise a patient observation on Nature, analyzing, investigating, calculating, and combining our facts, and say coolly with Professor Haughton, "bees construct the largest amount of cell with the smallest amount of material;" or with Quatrefages, "their instinct is certainly the most developed of all living creatures with the exception of ants." "The hexagons and rhomboids of bee architecture show the proper proportions, between the length and breadth of the cell, which will save most wax, as is found by the closest mathematical investigation," says another great authority. Man is obliged to use all sorts of engines for measurement—angles, rules, plumb lines—to produce his buildings, and guide his hand; the bee executes her work immediately from her mind, without instruments or tools of any kind. "She has successfully solved a problem in higher mathematics, which the discovery of the differential calculus, a century and a half ago, alone enables us to solves at all without the greatest difficulty." "The inclination of the planes of the cell is always just, so that, if the surfaces on which she works are unequal, still the axis running through its inequalities is in the true direction, and the junction of the two axes forms the angle 60° as accurately as if there were none." The manner in which she adapts her work to the requirements of the moment and the place is marvelous. A center comb burdened with honey was seen by Huber and others to have broken away from its place, and to be leaning against the next so as to prevent the passage of the bees. As it was October, and the bees could get no fresh material, they immediately gnawed away wax from the older structure, with which they made two horizontal bridges to keep the comb in its place, and then fastened it above and at the sides, with all sorts of irregular pillars, joists, and buttresses; after which they removed so much of the lower cells and honey, which blocked the way, as to leave the necessary thoroughfares to different parts of the hive, showing design, sagacity, and resource. Huber mentions how they will find out a mistake in their work, and remedy it. Certain pieces of wood had been fastened by him inside a glass hive, to receive the foundation of combs. These had been placed too close to allow of the customary passages. The bees at first built on, not perceiving the defect, but soon changed their lines so as to give the proper distance, though they were obliged to curve the combs out of all usual form. Huber then tried the experiment another way. He glazed the floor as well as the roof of the hive. The bees cannot make their work adhere to glass, and they began to built horizontally from side to side; he interposed other plates of glass in different directions, and they curved their combs into the strangest shapes, in order to make them reach the wooden supports. He says that this proceeding denoted more than instinct, as glass was not a substance against which bees could be warned by Nature, and that they changed the direction of the work before reaching the glass, at the distance precisely suitable for making the necessary turns—enlarging the cells on the outer side greatly, and on the inner side diminishing them proportionately. As different insects were working on the different sides, there must have been some means of communicating the proportion to be observed; while the bottom being common to both sets of cells, the difficulty of thus regularly varying their dimensions must have been great indeed. The diameter of the cells also varies according to the grubs to be bred in them. Those for males have the same six sides, with three lozenges at bottom, as those for workers, and the angles are the same; but the diameter of the first is 3½ lines—that for the workers only 2⅖. When changing from one size, to another, they will make several rows of cells intermediate in size, gradually increasing or diminishing, as required. When there is a great abundance of honey, they will increase both the diameter and the depth of their cells, which are found sometimes as much as an inch and a half in depth.—*Good Words.*

Enameled Iron.

M. Peligot has made a report, to the Society for the Encouragement of Industry, on the enameled wrought and cast iron work introduced by M. Paris about twenty-five years ago, and for which the Society have awarded him two medals. According to the report in question, the enamel used is a true transparent glass which allows the color of the iron to show through, very tenacious, having the same power of dilatation as iron, and capable of resisting powerful acids. The ordinary white enameled ware of Paris generally contains lead, and often in large proportions, and is liable to be attacked by even very weak acids. M. Paris' ware has been employed for many purposes: cast iron vases for gardens decorated in imitation of old Rouen ware have been exposed to all weathers without suffering any injury; a chimney in enameled plate iron was set up at the Mazas prison in 1849; the doors of the gold assay furnace in the laboratory of the Paris mint are of the same, and have borne the effect of nitrous vapors since 1850; in 1866 this enameled iron was selected for street names and house number plates, in several districts of Paris, and the report states that, while other manufacturers make enameled ware of the same appearance as that of M. Paris, the latter has shown its superiority in resisting the effects of time.

Specimens of new applications, lately introduced by M. Paris, were presented to the Society, and included chairs, tables, and stools for gardens, enameled on sheet iron and mounted on castings; and stands for dishes, decanters, etc., made in imitation of ancient earthenware, but presenting the superior advantage of bearing heat well.

ACTION OF NITRIC ACID ON CHROMATE OF LEAD.—On treating chromate of lead with about double its weight of nitric acid, a solution of chromic acid is obtained, according to M. E. Duvillier, containing but two per cent of oxide of lead. It is considered that the nitric acid decomposes the chromate of lead into chromic acid and nitrate of lead, which precipitates itself on boiling in presence of the excess of nitric acid employed.