A FUEL THAT PRODUCES ELECTRICITY.

The object which M. Brard, of La Rochelle, has in view in his researches is to produce an apparatus capable of transforming heat into electricity without having recourse to the complications presented by dynamo-electric machines which have been hitherto inapplicable for domestic illumination. M. Brard wishes to produce a veritable electro-generative stove, furnishing at the same time heat, light, and electricity. After having demonstrated by his experiment that thermo-electric batteries have on one hand only a feeble production, and on the other hand are soon rendered useless under the action of heat, M. Brard thinks he has found, according to the *Electrical Review*, the solution of the difficulty in a thermo-chemical battery, in which the current is produced by chemical action, the combustion of carbon, under the influence of an elevated temperature produced by a special method, by the oxidizing action of nitrate of potash or soda. It forms thus a veritable thermo-chemical battery, analogous to the ordinary batteries, in which the oxidizing of the carbon takes the place of the oxidizing of the zinc, and the nitrate of potash of the oxidizing body. The carbon is, therefore, the negative pole, and the nitrate the positive pole of the element.

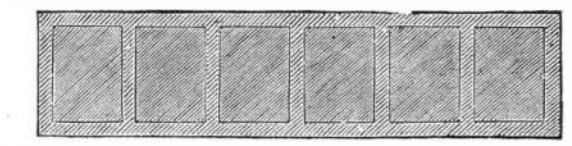
M. Brard alluded, in reference to his labors, to the experiments of Antoine-César Becquerel in 1855, and those more recently made by M Paul Jablochkoff in 1877; he has, however, gone further than his antecedents in this way, for he has presented to the association the principal features of an apparatus actually in construction, and showed some electro-generative slabs which we are about to describe, reserving the description of the complete generator until it has been tried, and until it has undergone certain modifications which the experiments will suggest.

Electro-generative Slab.—The electro-generative slab may be defined as *a piece of prepared carbon, which, when thrown into the fire, produces electricity by its combustion.* The subjoined figures, which represent the exterior view of it, the longitudinal section, and the transverse section, will demonstrate clearly the principle of it.

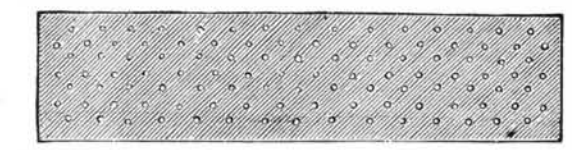
The slab presents the external appearance of a parallelopiped, about 15 centimeters (6 inches) long, 3½ centimeters, (2 1-6 inches) wide, and 25 millimeters (1 inch) thick; the materials which compose it are enveloped in a sheet of asbestos paper, only two thin sheets of brass being exposed to view, which serve as conductors of the current. The interior consists theoretically of a prism of carbon and a prism of nitrate of potash, separated by a plate of asbestos, which plays very nearly the same part as the porous cell in ordinary batteries. In practice the sheet of carbon is formed of about 100 grammes of coal-dust, formed into a paste with molasses or tar. The paste thus obtained is strongly compressed, cold or preferably with heat, in a mould of suitable form, at the bottom of which has been placed previously a sheet of copper, of brass, or any other metal which is a good conductor, cut into several strips, which are found embedded in the agglomeration of the carbon and project from one of its extremities to constitute the negative pole. The mould is disposed in such a manner that the slab is perforated throughout its thickness with numerous holes intended to facilitate combustion and to multiply the points of contact of the carbon with the nitrate, as we shall presently see. It bears besides upon the upper surface rectangular depressions, 15 millimeters deep, divided by transversal partitions more or less numerous, obtained by the moulding. The angles thus formed are intended to prevent the flowing of the melted nitrate into the fire during the working of the apparatus. The whole surface of these compartments is covered by a thin sheet of asbestos paper. The upper part of the brick is formed of a mixture of three parts of ashes and one part of nitrate of soda or potash. The ashes are intended to prevent a too rapid combustion, and to prevent the slab from melting. This mixture is melted and poured upon the brick very hot and in a sirupy state. About 100 grammes per slab are required, equal to about 25 grammes of nitrate and .75 grammes of ashes. A second sheet of copper or brass analogous to the first is embedded in the nitrate before cooling, and forms the second pole of the slab. The whole is enveloped in a sheet of asbestos paper.

It is sufficient to place in a fierce fire the extremity of the slab opposite to the conductors, in order to obtain in a few minutes a continuous current—and a constant one if the slab is homogeneous—during its combustion, lasting an hour and a half to two hours. M. Brard has not yet taken the constants of this new thermo-chemical battery, but in an experiment which we owe to the chemical department of the laboratory of the Lycée of La Rochelle, a single slab was sufficient to actuate an electric bell of the ordinary commercial form. One can, moreover, burn several briquettes at once, and group them in tension or in quantity to increase the effect. Three or four slabs in tension produce the decomposition of water.

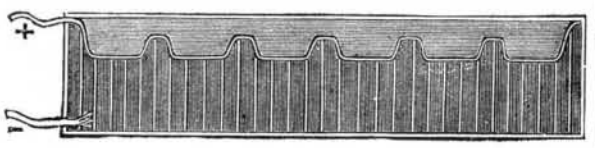
Such are the results at present obtained by M. Brard. Without expressing an opinion as to the future and the results which will be obtained from this apparatus, which is



TOP VIEW.

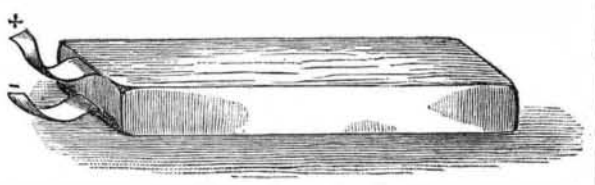


UNDERNEATH VIEW.



LONGITUDINAL SECTION.

TRANSVERSE SECTION.



GENERAL VIEW OF SLAB.

at present confined to the laboratory, we may observe that these researches are very interesting, and that to M. Brard must be ascribed the honor of having been the first to construct a veritable *electro-generative combustible.*

Decline in the Salmon Catch.

The salmon catch this year on the Pacific coast has been the smallest for many years. The canners blame the Chinese, but say nothing of the frightfully wasteful fishing wheels which they themselves have been using of late, destructive devices which unprejudiced observers have predicted would produce the result now complained of by killing all the young fish.

MEETING OF THE FRENCH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE AT LA ROCHELLE.

The eleventh meeting of the French Association for the Advancement of Science recently took place at La Rochelle. As usual on such occasions, many interesting excursions were made to localities where historic curiosities abound. We shall not describe all these excursions, but shall speak only of the more interesting of them, and especially of the visit to Esnandes and its mussel crawls.

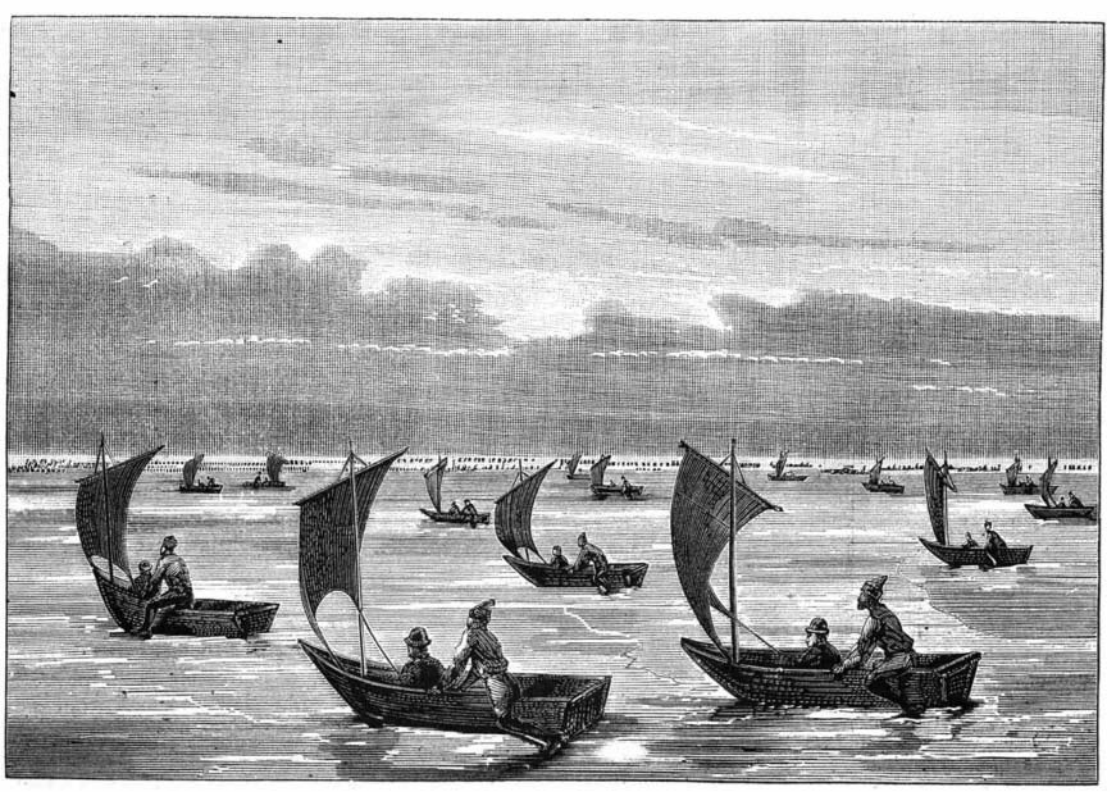
Sunday, August 27, everybody was astir, and omnibuses were filled with excursionists at the Place d'Armes, and set out one after the other for the coast at Esnandes, reaching it two hours afterward, during low tide. Here was seen an immense beach of slimy mud, on which it would have been impossible to venture without sinking in up to the waist. Yet it was necessary to cross this to reach the stakes that are planted at some distance out, and where the culture of mussels is carried on. For navigating this sea of mud the fishermen have devised a very ingenious process; this being the use of small flat-boats, called *accons*, that slide over the mud without sinking into it. In the middle of this boat they place the objects that they have to carry; in going, wooden poles or fagots for constructing the crawls, and in returning, the baskets filled with mussels. To move the accon forward over the mud they place themselves in the stern, with one leg hanging over the boat's side to serve as a propeller. By a series of energetic thrusts of the foot against the mud they cause the boat to glide along with great speed. When a visitor comes they place him in the middle of the accon, where he sits down on a little straw.

The fishermen are young and robust, and have acquired in this peculiar sort of work an uncommon skill. When the wind is favorable a small sail is hoisted in the bow of the accon, and this aids its running considerably. On the day of the visit to Esnandes it was curious to see the ocean of mud plowed by these little boats, each containing one—sometimes two—passengers squatting in the bottom, pushed along by long legs that successively bent and straightened after the manner of angle levers, and which served at once as boat hook and rudder. A few intrepid ladies likewise consented to participate in the excitement of this sort of navigation. It takes about half an hour to effect the crossing of the muddy beach. As soon as the ocean is reached the accon is shoved into the water and becomes a boat, which is maneuvered with either a pole or a wooden scoop serving as an oar. When the wind is favorable a sail is also used. The crawls are immense angles formed of stakes and handles, the base of which points toward the land and the apex seaward. A narrow aperture in the extremity of the angle, to receive nets or other apparatus to stop the fish at ebb tide, completes the crawl, and makes of it at once a mussel pen and a fishing place. It is here that the mussels are raised. It is asserted that this sort of culture extends back to the eleventh century.

"In 1035," says Mr. L. de Richemond, "an Irish bark ran aground at half a lieue from Esnandes. The master, named Walton, was the only one saved. Having settled in the country, he first invented the Allouret nets that serve for capturing the birds that sweep the surface of the water during the evening and night. To stretch these apparatus it was necessary to reach the center of the muddy beach. To effect this object Walton constructed the accon, a sort of boat from 2 to 3 meters in length and 50 centimeters in width, that was maneuvered by resting on one knee and propelling the boat with the other leg, which was incased in a long boot. In visiting his nets he perceived, one day, that the spawn of mussels had attached itself to the stakes, and that the shellfish thus developed in clear water were superior, as regards size and quality, to those that developed in the mud of the coast." It was then that he devised the crawls of which we have just spoken. Walton's invention was received with much favor. Following his example, others constructed crawls, and, without waiting for the mussel spawn to attach itself to the hurdles, it was collected on the coasts and carried to the inclosures prepared for it.

"At the same time," says Mr. De Quatrefages, in his "Souvenirsd'un Naturaliste," "the industry was perfected and systematized, so to speak, and each of its operations received a name, which, borrowed from another class of ideas entirely, might make one believe that two crawl owners when talking about their business were conversing about agriculture."

The small mussels hatched in spring are called "seed." They are scarcely larger than lentils up to near the end of May. Beginning with this epoch they grow rapidly, and, in July, attain the size of a kidney bean. At this time they take the name of "sets,"



MEMBERS OF THE FRENCH ASSOCIATION CARRIED TO THE MUSSEL CRAWLS IN ACCONS.