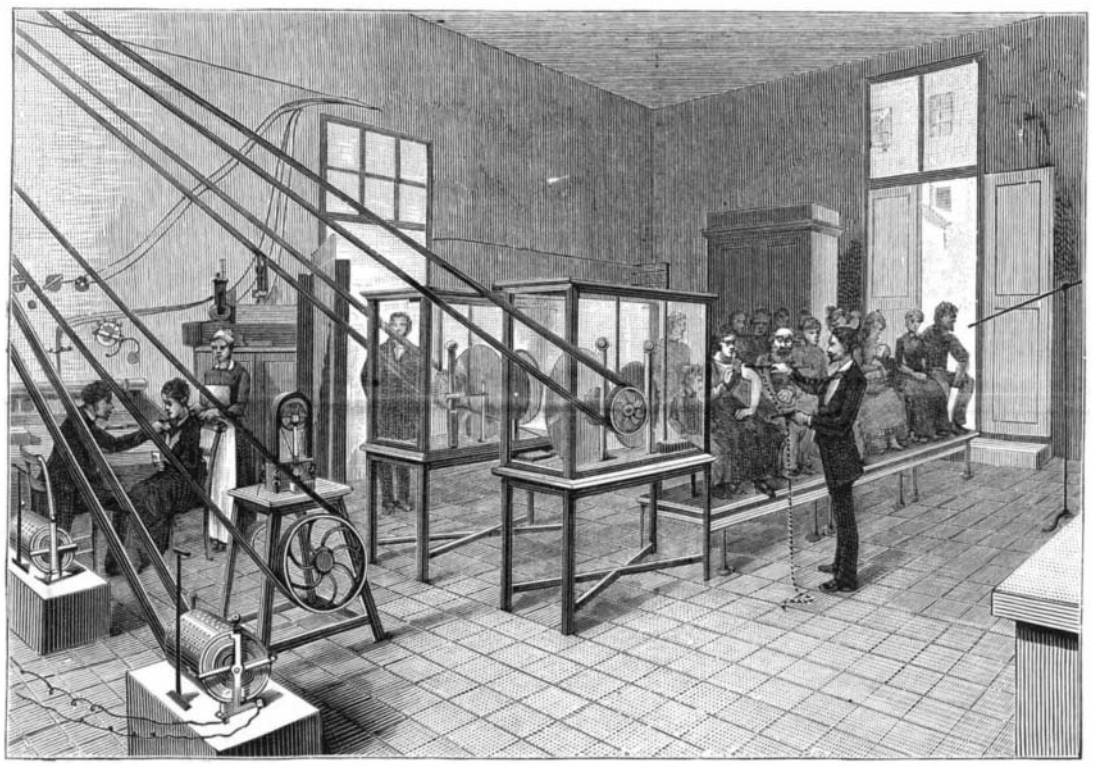
A Ship Canal from the Baltic to the Ocean.

The project of connecting the waters of the Baltic, the Elbe, and the German Ocean has been under the consideration of the Prussian Government since 1865. The scheme of a ship canal was formerly opposed by Count von Moltke, on the ground that it would be better to invest the immense amount of money required by such an enterprise in building up the Imperial Navy. Now that this work has been completed, and a powerful fleet of ironclads stands ready to plow the waters of the new canal as soon as it can be opened, the Field Marshal of the Empire has changed his views, and declared himself in favor of the work. At a recent meeting of the Bundesrath, a bill for its construction was unanimously approved. It is held by the advocates of the canal that the defense of the German coast must always remain a divided task so long as no waterway connects the Baltic with the German Ocean, and German war vessels are forced to pass from one sea to the other by a route which exposes them to the danger of falling into the enemy's hands. The estimated cost of the work is put at 156,000,000 marks, or about $39,000,000. It will be strongly fortified, and besides its military value will be of much importance to commerce.

ELECTRICITY AT THE SALPETRIERE.

At the Salpetriere, electricity constitutes one of the chief elements in the treatment of the sick. In fact, the service of electrotherapy has existed here for a long time. Its creation, in 1877, was due to the initiative of Professor Charcot, and its organization was the work of Dr. R. Vigouroux, who has continued to direct it ever since its foundation. The patients, as their numbers are called, pass from the reception room into the room for treatment shown in the engraving. Most of them take a seat upon two rows of insulating stools, where they receive electricity from the two machines seen in the middle of the room. They are thus in the first place submitted, for a length of time varying with the case, to what is called an "electric bath." Then the operator, provided with special instruments of various forms, called "exciters," makes such an application to each person as the case requires. As soon as a patient has been thus electrified, he gives way to another. In this way the sixteen stools are constantly occupied. The number of persons electrified at each sitting is 180, on an average. Those who are not to sit upon the stools go over to the electro-therapeutic table (shown to the left), where they receive electric applications of a different kind. The total number of persons treated at each sitting may be estimated as 200.



ROOM FOR ELECTRIC TREATMENT AT THE SALPETRIERE.

There are two categories of patients, viz., the inmates of the Salpetriere, and those from the outside, who come solely for electrical treatment. The inmates, of both sexes, belong for the most part to Professor Charcot's wards. As for the outsiders, many of them come from afar by rail, boat, etc. Numbers of these persons have a more well-to-do appearance than the usual patients of hospitals.

The original and important element of this organization consists in the use of electric machines. These latter, which had nearly ceased being used in medicine, have been very successfully applied by Dr. Vigouroux in the simultaneous treatment of a large number of sick persons. Without them, that is to say, with the ordinary processes of electrotherapeutics, the most active physician cannot treat more than twenty patients per sitting—which is an insufficient number. The electric machine solves the problem of the extension of the benefits of electricity to an indefinite number of patients.

Dr. Vigouroux has been kind enough to inform us as to the results of this electric treatment. They are, according to him, of the most satisfactory character. We believe, with most physicians, that nervous affections are nearly the only ones amenable to electricity. This, according to Dr. Vigouroux, is too narrow a view to take of it. At the Salpetriere almost all complaints are represented in the patients who succeed each other on the stools. In Dr. Vigouroux's opinion, electricity, especially static, must be considered as a stimulant and a regulator of the general nutrition. But it is not our object to write a medical criticism; and we shall confine ourselves to the descriptive side of the subject under consideration. Those persons ignorant of medicine who accompanied us were especially struck by the indifferent attitude of the patients sitting upon the insulating stools. One had unfolded a newspaper, another was doing crocheting, a baby was asleep upon its mother's knees, and, in curious contrast, the hair of each member of this quiet party was standing on end through the effect of the electricity. The calmness diminished slightly when the operator drew some sparks with a metallic ball; but, positively, the treatment appeared to us very mild, and was certainly borne very willingly by all these patients. Several, who were very infirm, were seated in large arm chairs or lying upon stretchers placed upon the insulating supports.

The electric machines are, as shown in the figure, inclosed in glass cases that preserve them against dust and dampness. They are of the Carre system, but arranged horizontally. Dr. Vigouroux is now having others constructed on a new plan. The manner in which they are set in motion merits special mention. A Gramme motor located in the room actuates a shaft, on which there are distinct pulleys that receive two belts for the electric machines and one for a laboratory Gramme machine. The current is furnished by a dynamo situated about 600 yards off, alongside of the large steam engine of the laundry. This transmission of power was put in by the house Breguet.

A small laboratory alongside of the room for electric treatment serves for experiments or researches.—*La Nature.*

High Speed on the Ocean.

The speed of ocean steamers has, as we know, increased very much during the last few years. It is not so long ago that nine days was looked upon as a quick passage in a transatlantic liner, and eight days a remarkable trip. Now, anything over seven days is regarded as a slow trip; the record having been brought down to six days ten hours and ten minutes, reckoned from the moment of losing Sandy Hook lightship to the sighting of Fastnet light. Referring to this and other fast trips made by the Oregon, her designer is reported to have prophesied that the trip would eventully be reduced to six days; and this is probably the best that can be expected, even when the present type shall have been developed to its best. Others have sought for more speed by lessening the draught and increasing the beam, but have not yet found it. All seem to think that higher speed is to be found in a change of lines and distribution of weight. The theory of propulsion, however, has remained unchanged, a propeller operating in the same line as the ship's motion.

Now comes a mechanician who contents himself with the present model, but proposes to increase the speed by a radical change in the principles of propulsion. He gives his views so clearly, and brings to their support such cogent reasoning from a mechanical standpoint, that they seem worthy of serious consideration; and though perhaps failing to convince the naval architect, wedded as he is to certain mechanical theories, in which he has been trained, may at least succeed in interesting him as well as the general public, who have of late been attracted by naval designs in marine construction.

In a pamphlet before us, Capt. John Giles essays to show that a much higher rate of speed can be had by changing the position now given to the propeller at the stern of the ship, as well as its inclination or dip. He would put the propeller under the ship, and, as near as we can judge by his diagram, just forward of the mizzen-mast; giving it an inclination of 45° with the plane of the ship's motion. With a propeller thus situated, he believes he can get forty knots an hour where now only twenty are had. The theory is based upon the manner of propulsion of animals, in which, as we know, the efforts of propelling impulse all radiate at an angle from the line of motion.

He says: "The organs of propulsion obtain their impulse from the reactionary force of the water upon which they operate; and as the motion of the fish creates no current in the lines of the propulsive effort, there is no depreciation of the propelling force by the motion of the body, but the mechanical energy derived from fluid reaction is constant at all velocities. In this case the body is totally immersed in water, and the organs of propulsion are duplicated, so that the propelling forces may balance in the line of motion. How completely this principle is carried out may be seen from the flatness of the fish's head, which, if it were not balanced by the opposing mechanical force of the pectoral fins, would destroy the equilibrium of the fish's motion. In the case of birds that swim the surface or that fly in the air, and of animals that live on the land, they are all subject to the force of gravitation operating in their bodies; and though they all exhibit the same mechanical principles in their structure, yet their propelling organs are not duplicated in adverse directions, as in the fish, but the force of gravitation balances the oblique application of the animal's mechanical impulse, the two forces then uniting in the line of motion in the body. The bird which flies does not expend its force in the line of the body's motion, but upward at an angle to it, and against the weight of its body, and at such a varying angle as the exigencies of flight and the forces resisting it require to secure a forward motion. The power of the horse is not expended in the same line as the motion of the body, but in its maximum effort of draught, in a direct line between the resting point of the hind feet and the animal's center of gravity. It is the same throughout the whole animal kingdom. Every one has doubtless experienced the force with which a fresh cherry stone can be projected by nipping it between the thumb and the finger at such an angle as to impart to it a forward impulse. This simple experiment exhibits the whole principle of animal locomotion, which in all cases is the result of coupled forces, operating at an angle to the line of the body's motion, and uniting their impulses in that line upon the center of gravity of the body. Where the body is immersed in a fluid of the same specific gravity as itself, all the propelling forces are mechanical; but where the weight of the body operates, the mechanical force of the animal is expended against its gravity and at an angle to it."

As another instance in support of Mr. Giles' theory, the reader who can swim will remember that he goes fastest in the water when he kicks out at an angle of about 30° from the line of motion of the body, with the feet inclining downward.

But notwithstanding this and the mathematical and mechanical formulæ as to resistance of water and slip of propeller when in the usual position which Mr. Giles brings forward to sustain him, it is difficult to see how the results he confidently expects from his system are to be obtained. Looking at the diagram of the proposed ship, with its elongated overhang, it seems as if the action of the propeller, with its inclination of 45°, would result in lifting the light after-hull of the ship and in a consequent depression of her bows.

On the other hand, it is easily seen that the propeller would have a deeper average immersion, and that there would be a greater resistance of the water to the screw blades, due to the water of reaction being projected downward—an important advantage certainly.

The Fuel Used at the Mint.

Mr. D. M. Fox, Superintendent of the U.S. Mint, Philadelphia, Pa., says the fuel used exclusively in melting gold and silver is "Council Ridge" anthracite coal, carefully hand picked and screened. He adds: "After many years' experience, and many experiments with other grades of coal, we find the 'Council Ridge' anthracite to be the only fuel really suitable for the purpose, and we have discarded all others. We use the 'broken' coal size."