theories, attributing the earthquake to the tension of vapor of water in the subjacent strata. The valley of Zafarraya, indicated above as the probable focus, is a locality where much water gathers and easily penetrates beneath the surface, and to the vapor of high tension produced from the water here collected in deep-lying strata are attributed the forces which gave rise to the present earthquake. It is assumed that in general the lines of seismic propagation, following crevices in the strata beneath the surface, will accord with the direction of the surface water courses. On this idea, the principal radiant lines from Zafarraya were along the rivers Marchau and Genil; a view which is regarded as confirmed by the phenomena in the Sierras Tejeda, Marchamonas, and Eumedio, where large crevasses occurred parallel to the direction here indicated. In the province of Malaga the principal seismic effects were found in the vicinity of Periana, adjoining the district designated as the focus, but on the other side of the sierra, which separates the two provinces, and here the principal radiant line followed the course of the river Velez.

Theoretical considerations suggesting that the area affected should approximate in form to an ellipse, this is found to agree with the observations; but the data at hand do not suffice for any exact determination of the direction and velocity of the movment, nor of the depth of the focus.

In conclusion, then, the report fixes upon Zafarraya as the focus of this earthquake, and suggests a probable cause for it in the subterranean waters gathered there; but more exact results are yet wanting, and may very likely remain so, even when the fuller report is issued. This, however, will be awaited with interest, and will doubtless contain valuable additions to the science of seismology.

The report is signed by Manuel Fernandez de Castro, Juan Pablo Lasala, Daniel de Cortázar, and Joaquin Gonzalo y Tarin.

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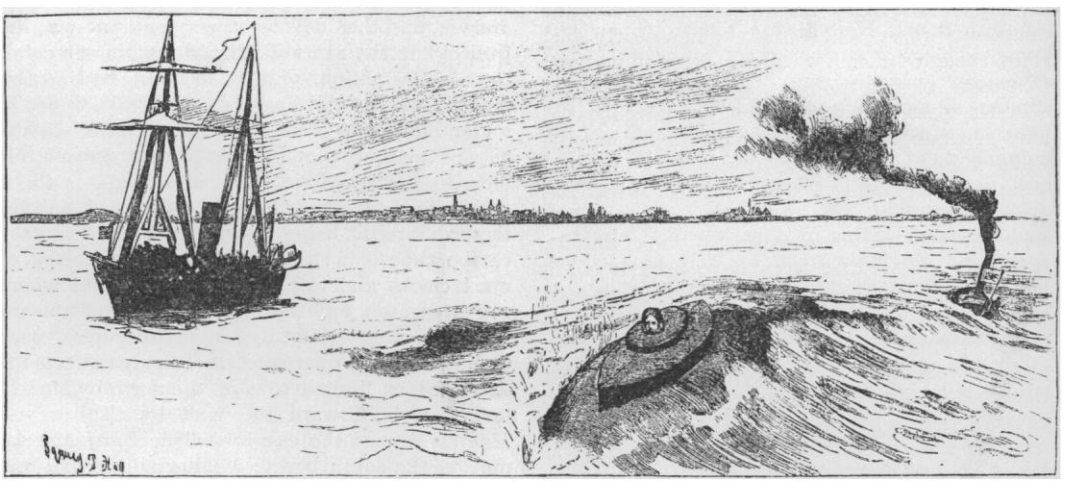
### *THE NORDENFELT SUBMARINE BOAT.*[1]

Just before leaving Denmark for the south, the Prince of Wales, with the King and Queen of Denmark and the Czarina, witnessed off Landskrona, a town on the Swedish coast, an interesting and successful trial of the new submarine boat, which has been built at Stockholm upon the plans of Mr. Nordenfelt, the inventor of the machine gun so extensively used in modern warfare. Ever since the American civil war, naval engineers have been striving to solve the problem of submarine navigation, but until now with very little success. Mr. Nordenfelt's invention, however, appears to fulfill the numerous requirements necessary for overcoming the difficulties and dangers of maintaining, driving and directing a boat beneath the water. The boat is built of steel, and is cigar-shaped, with a glass conning-tower in the centre, from which the commander can keep a look-out. This dome is protected by a strong iron cover. There are three engines, one to work the screw in the stern which propels the vessel, and two to work the propellers on either side, which, when set in motion, compel the boat to sink, and maintain her at a certain depth beneath the surface. When it is wished to sink the boat, enough sea-water is taken in to reduce the buoyancy till the



THE TRIAL OF THE NORDENFELT SUBMARINE BOAT AT LANDSKRONA, SWEDEN.

[1] From the London *Graphic*.

tower is just above the surface. The side propellers being then set in motion, the vessel can be sunk to any required depth, there being an automatic arrangement by which the engines are stopped directly that depth is exceeded. An automatic horizontal steering gear also prevents the boat from going down or up headforemost, an even keel being preserved throughout all the manœuvres. Should a breakdown of the engine occur, the boat from its own buoyancy at once rises to the surface. The motive power is steam, and as long as the vessel is above water the fires can be stoked, the smoke being driven through two channels, which pass partly round the hull and point aft. When, however, the boat sinks, the fires have to be sealed, and reserve steam is used, which is kept at high pressure in two tanks. With this the boat has been driven for five hours at a speed of three miles an hour. Her speed on the surface is eight knots. The crew numbers three, and during their submarine existence, they have to subsist on the amount of air which they take with them in the hull, in which four men have subsisted for six hours without any especial inconvenience. The boat is sixty-four feet long, and the central diameter is nine feet. The enormous utility of such a vessel as this in naval warfare is at once apparent. Moving without the slightest apparent sign of existence, she can launch torpedoes against hostile vessels, enter a harbor unperceived, and render useless the most complicated system of submarine mines. The trial at Landskrona was witnessed by officers representing every European power.

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## *FOURTH CONGRESS OF GERMAN PHYSICIANS*, 1885.

THE fact that some of the most important work in medical science is being done in Germany, and that at the congress, whose proceedings have been recently published,[1] some valuable additions to medical knowledge were made, warrants a notice in the columns of *Science*.

The first subject discussed by the congress was corpulence. Ebstein advanced the opinion that drugs were of little service in reducing the amount of fat, and that an entire change in the regimen—including both change of diet and of the manner of living—was necessary. Any method which reduced the general nutrition, and thus removed fat, was a failure: the fat alone must be removed. The method must not require the individual to give up his business during treatment, else it would not be generally applicable. The method must be capable of being continued indefinitely without producing unpleasant results, for individuals predisposed to corpulence by heredity or constitution must keep up the diet for a long time. One method is to cut off all fatty foods. But as carbohydrates may be changed into fat in the body, this is not reasonable. The object is rather to prevent the formation of fat in the body. To secure this, it is necessary to regulate the proportion of albuminous, starchy, and fatty foods, so that perfect nutrition shall be secured, but no excess of fat produced. The necessary amount of fat for a healthy man is 142 gr. per diem. If this is reduced one-half, a part of the amount necessary for nutrition will be taken from the body to compensate for the reduced allowance in the food, and thus the excess of fat may be removed. Under this system the individual does not suffer the distress which is felt by those who are cut off from all fatty food, and the results are more successful and agreeable than those secured by the Banting system. The amount of carbohydrates is to be reduced so that no surplus above bodily needs shall be taken. In the Banting system the diet is chiefly nitrogenous, which often causes indigestion. Ebstein gives nitrogenous food, with the reduced allowance of starch and fat in sufficient quantity to keep up the general nutrition and working strength, but not in such amounts as to overload and embarrass the organs which digest proteids. The necessity of muscular exercise of sufficient force to produce free perspiration is insisted upon. This system has met with approval in Germany on account of its success.

Henneberg, in discussing the subject, approached it from a different side, and, by a review of the methods adopted in fattening cattle, sought to deduce the rules necessary to be observed in avoiding the accumulation of fat in man. The general discussion elicited varying views upon the physiology of digestion, but all agreed that the use of medicine for reducing corpulence was to be avoided.

The discovery and demonstration by Lustgarten of a bacillus of syphilis has already been alluded to in *Science*.

Measures to be adopted in combating fever formed the topic of one day's discussion of the congress. The well known property of quinine in reducing fever has led to a search for similar properties in organic substances allied to it in chemical constituents. Benzol, carbolic and salicylic acids, salicin, resorcin, hydrochinon, chinolin, kairin, thallin and antipyrin are such substances, and they have all been found of use as antipyretics. Many of them have, however, unpleasant effects; so that, at present, salicin, kairin, and

[1] *Verhandlungen des congresses für innere medicin.* Vierter congress, 1885. Herausgegeben von Drs. E. Leyden und E. Pfeiffer.