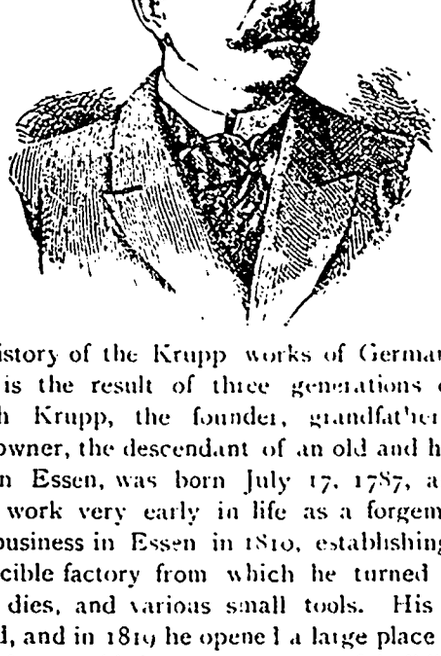
section. By thus showing that there is a demand for the service of power, you may induce capitalists to establish the works.

"I will also suggest that you make inquiries as to the value of the supply canal for commerce. You know that freight can be raised and lowered by power much cheaper than by locks. All things considered, I believe that the subject is sufficiently outlined for the present."

HERR FRIEDRICH ALFRED KRUPP.



A history of the Krupp works of Germany shows that it is the result of three generations of effort. Friedrich Krupp, the founder, grandfather of the present owner, the descendant of an old and honorable family in Essen, was born July 17, 1787, and commenced work very early in life as a forgeman. He started business in Essen in 1810, establishing a small steel crucible factory from which he turned out files, stamps, dies, and various small tools. His business increased, and in 1819 he opened a large place which is still standing amid the present array of buildings. At first successful, a few years later misfortunes came upon him, and when he died in 1826 he left his family in straitened circumstances. His son Alfred, who was born April 26, 1812, was but fourteen years old when his father died, but he had been carefully instructed by him in the trade secrets, and took charge of the business. For a long period the boy acted as smelter, forgeman and clerk. Owing to his diligence, energy and great inventive faculties, he became very successful. The introduction of railroads enlarged his markets, and his invention of a process for hardening steel increased his reputation very materially. His invention for the production of rails without welding pieces together was patented in all parts of the world in 1853. Twelve years later he began to acquire iron and coal mines. His first guns were produced in 1847, but it was twenty years later when the superiority of his steel for fire-arms was recognized. Alfred Krupp died July 14, 1887, and his only son, Herr Friedrich Krupp, who was born in 1854, and whose portrait is here shown, is his successor, and is now sole owner of this extensive establishment, which employs 2,700 persons. Comfortable houses, schools, hospitals and churches have been built by Herr Krupp for his employes. He also maintains several charitable institutions. But though the gun works have made the Krupps famous, they have other establishments, and make steam and gas engines, screws and a variety of machines, which are shipped to all parts of the world. One of the steam hammers used in the gun works has a striking force of 50 tons, and may be made much greater. In their engine works they have 65 engines, 1,150 machine tools, 10 steam hammers, 18 cupolas, and 29 crucible furnaces. The works have taken 113 medals and first prizes at the leading exhibitions of the world.

WIND PRESSURE.

The amount to be allowed for in designing a structure has long been recognized as very disputable, says Prof. W. C. Kernot of the Australasian Association for the Advancement of Science. The pressure is modified enormously by different conditions. In the case of a roof, the vertical wall of the building may, by deflecting the wind current, greatly reduce the wind load, and similarly the leading edge of a plane inclined to the wind experiences a greater pressure than the leeward one. The old formulas connecting wind pressures and velocities are known to be most misleading, and, further, as has been shown by repeated experiments, the maximum mean pressure on a surface of many square feet in area is only about two-thirds the maximum pressure recorded on a single foot of it. The Board of Trade require in bridges an allowance for a pressure of 56 lb. per square foot, though a pressure of about 35 lb. per square foot would overturn nearly every carriage running on our railways. Professor W. C. Kernot's experiments as described in a paper read recently before the Australasian Association for the Advancement of Science, have been directed to two points in particular, viz., the relation between the pressure and velocity, and the determination of the modulus of different forms. The former experiments were not very satisfactory, as the results were somewhat discordant. The modulus of a form may be defined as the ratio between the area of normal cross-section of a solid body, and that of a flat plate which, exposed to the same wind, has the same total pressure on it. The wind was obtained by means of a special form of fan, the arrangements being such that a fairly uniform velocity was obtained at the outlet. The models to be tested were placed in the centre of the blast, and the pressure on them recorded directly by a delicate and a carefully calibrated spring balance. Thus the total pressure on rectangular blocks was practically the same whether they were placed with one face normal to the wind or diagonally. The total pressure was found to be .9 of that on a thin flat plate equal in area to one face in the case of a cube, and from 0.7 to .9 in the case of other rectangulars, the higher figure being obtained for blocks more than three times as high as the width of the base. A rectangular pyramid like a church tower showed a modulus of .8 when placed with one face normal to the wind. When placed diagonally, the pressure was increased 25 per cent. Cylinders gave a modulus of .52, and a cone one of .5. An octagonal prism experienced 10 per cent. greater pressure than its circumscribing cylinder, whilst a sphere had a modulus of 36. Hemispherical cups, such as are used in Robinson's anemometer, had a modulus of .36 when the convexity faced the wind, and one of 1.15 when the concavity did so. With model roofs a number of interesting experiments were made, and the effect of the vertical walls of a building in reducing the pressure was very marked. With a roof of 60 deg. pitch the pressure was reduced 40 per cent., and with one of 45 deg pitch 80 per cent., whilst with one of 30 per cent. there was no observable pressure on the roof. When the wall is extended in the form of a parapet, the sheltering effect was much enhanced, and with a low pitch a negative pressure was then actually observed. The lifting effect was tested by a model house having two ends and one