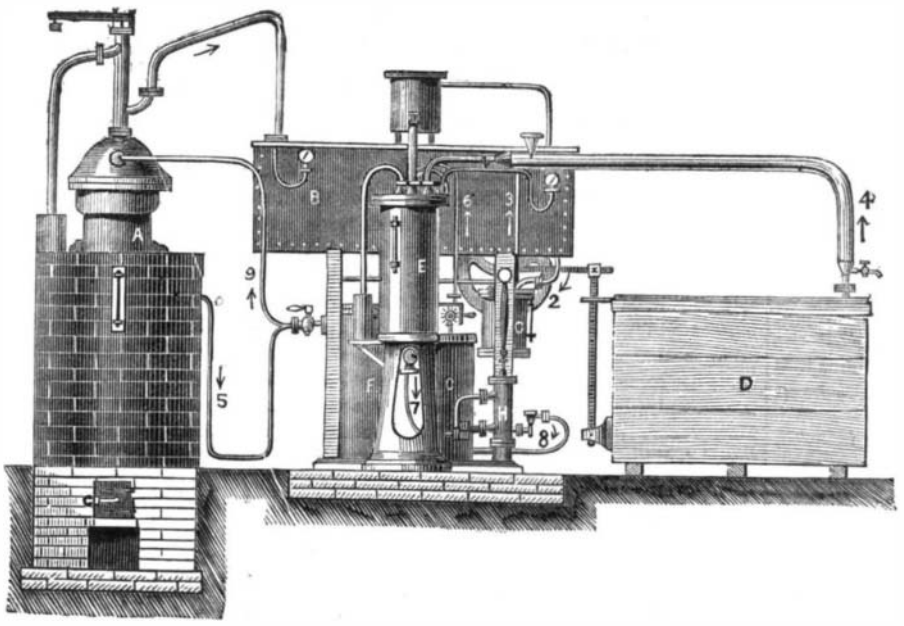
THE AMMONIA ICE-MAKING PROCESS.

We present herewith an engraving of an apparatus for making ice and producing cold, exhibited by Messrs. Vaas and Littmann at the Vienna Exposition, in which, as in the well known system of Carré, the vapor of ammonia is the congealing agent. The normal volatility of ammonia, in both machines, is increased by removing the vapor as quickly as it forms. The apparatus consists of the boiler, *a*, condenser, *b*, gasholder, *c*, ice box, *d*, the absorption cylinder, *e*, the temperature exchanger, *f*, the cooler, *g*, and the pump, *h*. The boiler, *a*, is first half filled with solution of ammonia, which is caused to evaporate by the application of heat, and the gas thus formed is forced through the pipe, *i*, into the worm pipe of the condenser, *b*, and from there through the pipe, 2, into the gasholder, *c*. From the gasholder the gas is conducted by the pipe, 3, to the valve on the top of the ice box, *d*, which is in connection with the worm pipe inside the ice box.

At the commencement of the operation this valve is kept shut; but as soon as the gas has attained a pressure of eight to ten atmospheres, it is slightly opened. The gas, on its passage through the worm pipes of the condenser (which are always surrounded by cold water), is condensed, and the liquid passes through the valve to the worm pipes in the ice box, where it again commences to evaporate, taking up at the same time heat from the solution of chloride of calcium, in which the worm pipes in the ice box are submerged. This absorption of heat so lowers the temperature of the solution of chloride of calcium as to render it capable of turning the fresh water contained in the ice cases to ice.

The ammonia, which has been volatilized again in the pipes of the ice box, passes through the pipes, 4, to the absorption cylinder, E, and, at the same time, the weak solution of ammonia, which has lost the gas by heat, passes out of the boiler by the pipe, 5, into the exchanger, *f*, through the cooler, *g*, into the absorption cylinder, *e*, where it absorbs the gas which comes from the ice box, and from these it is pumped back by the pump, 7, into the boiler to be again heated. When the machine is working the valve on the ice box must be opened just sufficiently far to allow the gas to escape, but not to allow the pressure to fall, and the valve between the cooler and the absorption cylinder must be so regulated as to admit the proper quantity of the weak solution from the boiler as will absorb the gas from the ice box. A machine for making 200 lbs. of ice per hour requires a two horse engine to drive it.—*Iron.*



IMPROVED AMMONIA ICE-MAKING MACHINE.

IMPROVED STEAM PUMP.

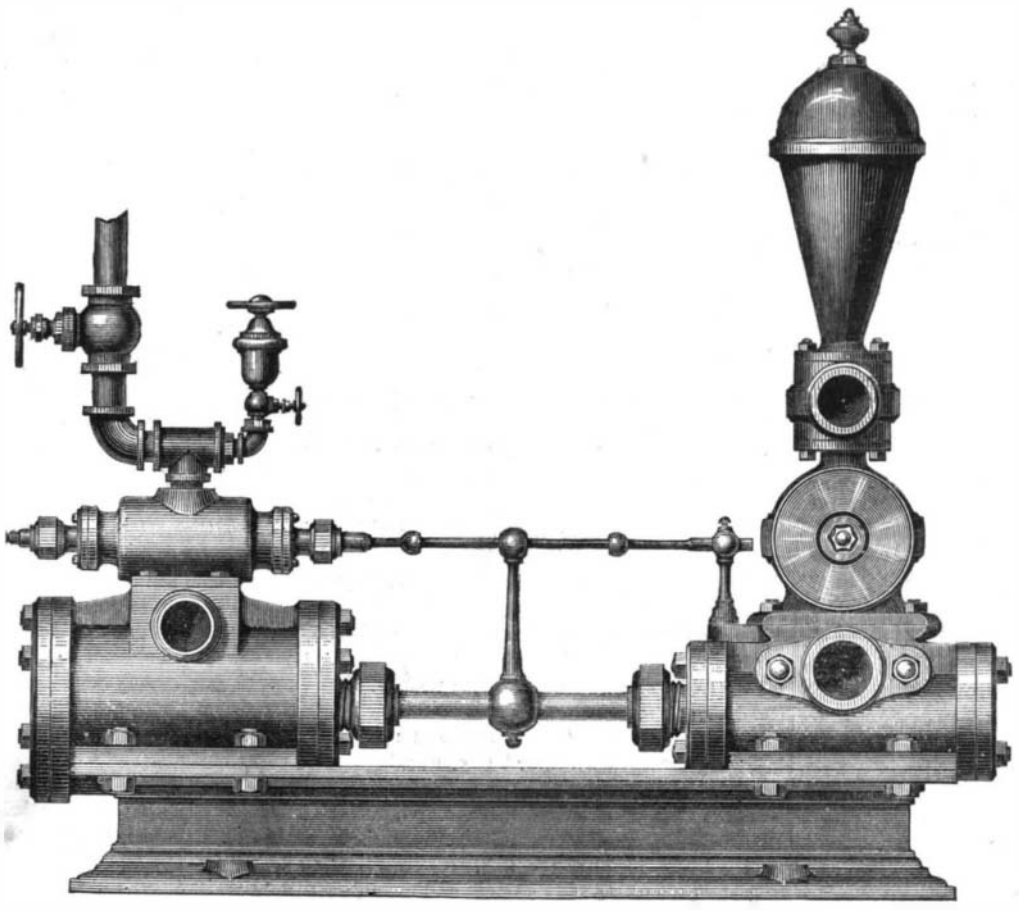
The many and diversified uses of the Niagara pump are so well known that is hardly necessary to allude to them in any detail. Briefly, the machine will pump water—hot, cold, fresh, salt, clean, or muddy—sirups, beer, acids, molasses, or other heavy fluid. It is especially adapted to the feeding of steam boilers and supplying of tanks, and is useful in sugar refineries, tanneries, oil works, and manufactories generally. Finally, it is well suited for the drainage of mines, quarries, low lands, and for wrecking purposes.

The main feature of the improved form of the machine, as represented in our engraving, is the simple steam valve. This appliance, as formerly used in the pump, consisted of an auxiliary slide valve and steam cylinder, and a slide valve operated by the latter. At present this has been simplified so that only one circular balanced valve is employed, working on centers packed with rings, and operated directly from a tappet on the main piston rod. The apparatus can be run so slow that the motion of the piston rod will be hardly perceptible, and then again as swift as desired, without fear of having the piston strike the heads of the cylinder.

By a simple device, the steam operates the valve when running slow; and when working fast, the momentum of the piston opens and closes the valve; so that at any speed there will be invariably a full port of steam for the return stroke before the piston arrives at the end of its course, the connection between piston and valve being direct.

The parts are cast separate to provide for the replacing of breakages, which may occur by accident or frost, at small expense, and the makers add that the fewness of the various portions enables them to furnish a machine of excellent material and the best possible workmanship at a low figure.

For further particulars address Messrs. Hubbard & Aller, 93 to 97 Pearl street, Brooklyn, N. Y.



THE JOHN HARDICK NIAGARA STEAM PUMP.

DR. BROWN SEQUARD ON NERVE FORCE.

Dr. Brown Séquard has recently concluded the admirable series of lectures which he has been delivering in Boston. Some weeks since we gave a *resume* of the initiatory discourses, on the subject of nerve force; and we continue our abstracts, with reference to the very curious and instructive topic of

NERVE DERANGEMENTS.

A great many disorders in our system, says Dr. Séquard, may result from the stoppage or arrest of the activity of certain cells of gray matter. Tetanus or lock jaw is a convulsive affection which can be checked immediately by certain influences coming from certain parts of the system. When produced by strychnin, insufflating air into the lungs stops the convulsions; a similar result is caused by carbonic acid or a current of galvanism. In brief the mechanism of the arrest of convulsions in tetanus is just the same as the mechanism of the arrest of the heart in the case of galvanization of the *par vagum* of the neck. Similarly an irritation of almost any part of the skin may prevent epilepsy. In the case of anaura starting from a limb, a ligature around the latter (by irritating the nerves of the skin and sending a current toward the brain, changing the state of the cells there) serves to prevent an attack. There are many cases of epilepsy that have been cured by accidental injury.

Another kind of stoppage or arrest of the activity of cells consists in the arrest of the morbid activity of the brain. In cases of insanity, a large number of patients have been cured suddenly by means of irritation of the skin, that was either accidental or employed by a physician. A patient in a lunatic asylum met another one who struck his head and broke the cranium on the right side. The brain oozed out; a good deal of it was lost, and the patient was cured of his insanity and epilepsy. Other affections of the brain, such as amaurosis or paralysis, may be cured suddenly, sometimes without any cause that we can find, but with good ground certainly to believe that an irritation has acted which has produced a change in the cells of the brain and dismissed their morbid activity. For there are clear cases in which those affections have been cured by such irritation. Those alterations of cells that were producing an arrest of the power of sight or paralysis have been submitted to an irritation of parts of the skin or of some viscus, and the irritation, going to the morbid part and producing a change in the activity of those cells, has cured the disease.

Referring to paralysis, the lecturer said that the malady is considered to result from a cessation of activity of a part of the brain from disease, destroying some particular portion. According to this view the destruction of the part of the *crura cerebri* or *pons varolii* necessarily should produce a paralysis in some muscles of one half of the body: but such is not the case, for the paralysis may exist in the same side of the body where the disease is or on the opposite side, or the *pons varolii* may be destroyed without any paralysis at all supervening. Paralysis really appears only from an irritation which starts from a place where the disease is and acts upon parts at a distance so as to modify them.

THE DOUBLE BRAIN.

One half of the brain is sufficient for all the functions of the two halves of the organ. There is no question that it is our habit of making use of only one side of the body that consigns to one half of the brain—the right side—the faculty of expressing ideas by speech. If we develope both sides of our body equally, not only would there be the benefit that we could write or work with the left hand as well as with the right, but we should have two brains instead of one, and would not be deprived of the power of speech through disease of one side of the brain.

The nervous system is not essential to the existence of muscular contraction or irritability. Professor Bernard, of Paris, has found that woorari poison affects the motor nerves in muscles so that the conductors which unite the brain with the muscles become paralyzed while the muscles remain active. Dr. Séquard, however, doubts that the woorari acts upon the parts within the sheath of the muscular fibers, and hence nerve power may possibly remain therein.

SEPARATION OF A NERVE.

It is well known that, if a nerve has been divided, after four days it loses its power. The muscles, however, remain perfectly active, and we can produce contraction in them. Unfortunately, here, also, there is an element of nerve tissue which is inside of the nerve sheath, and it is not known whether it has lost its power or not. In the case of two decapitated men, the lecturer said that he had made an experiment of cutting off the arms. He found, after thirteen and a half hours in one case and fourteen hours in the other case, that all signs of life in the limbs had disappeared. Up to that time, either galvanism or a shock produced by a blow with his arm or a paper cutter caused the muscles to respond to the irritation. He then injected the blood of a man into one of those arms, and the blood of a dog into another. In both cases local life was restored in those arms. The muscles became irritable again, and the strength of contraction was extremely powerful. Indeed, in the arm in which the blood of the man had been injected, the power was immense. It was greater certainly than during life. There was therefore a return of muscular irritability after it had disappeared and nervous excitability had not come. The nerves remained quite dead. Therefore it seemed quite clear that the muscular irritability depended upon nutrition by blood and the oxygen in it. The blood injected was richly charged with oxygen and that was the reason why the muscular irritation became so great.

Long ago, said the speaker, I had discovered that light can affect the iris of the eye, even when it has been removed from the body. The eye of an eel had been removed from the body for sixteen days and kept at a temperature of about 36° to 40° Fah. But he found that, although the eye was in almost complete putrefaction, the light still acted as an irritant of muscular fibers. There it was impossible to admit that there was nervous action. The muscular fibers themselves were considerably altered. Still they acted.

THE HEART AND THE NERVOUS SYSTEM.

It has been questioned whether the thermical movements, such as that of the heart, depend upon the nervous system. It has been found that, 48 hours after the heart has been separated from the chest of a dog, it continued to beat. There is recorded the case of a man at Rouen in whom the heart