Gas Motors for Street Cars.

The *American Manufacturer* says that in several reports made by various authorities recently is given considerable information relative to the progress which has been made in Continental Europe in bringing gas motors into use for driving street cars; one a report by Herr Stucker, read before the last meeting of the Swiss Gas and Water Association, on the gas-driven tram line between Neuchatel and St. Blaise. In that report Herr Stucker says that Neuchatel has extended considerably along the shores of the lake and tramways have become a necessity. In planning the new line from Neuchatel to St. Blaise, the question of the choice of power came up for serious consideration. Horse power, electricity, and compressed air all had their advocates; but all were too dear, and the decision arrived at was one in favor of the use of coal gas.

Compressed air has the advantages of having no noise, no smoke, easy starting and stopping. It gives great satisfaction in Berne, on account of its quietness; but it costs there about 15 cents per car mile, although inexpensive hydraulic machines are used for compression. The line is also too expensive for any suburban district. Steam is somewhat less in its first cost than compressed air, but a locomotive has to be moved about as well as a car, and two persons are required for each machine, while the engines make much noise and smoke. From Wiesbaden to Biebrich there run locomotives which are said to be free from these faults, but they cost $5,950 each. Steam roads pay when there are many passengers; not unless. Horse roads are cheap in first cost, but the current cost is high. None of these is particularly well adapted for a line on which the traffic is expected to be very small, say seven passengers per run.

In the present case, the best means is the use of gas motors, using cylinders of gas compressed to 10 atmospheres, and containing enough gas to do the run out and home. The firm of Gillieron & Amrein, Vevay, undertook to supply the gas motors. They are strong, simple, practical, and safe, and free from noise and smoke; they only require a weekly cleaning. The starting and stopping are instant and free from shock. The weight of the car, with 20 passengers, 1 driver, and 1 conductor, is about 6 tons. The distance is 3⅛ miles, and the highest ground is half way, 40 feet higher than Neuchatel; 7·9 horse power are necessary to get up a speed of 11¼ miles an hour. If another car were hitched on, also fully loaded, the journey would take 27·4 minutes. The cost of gas, with one car, would be at $1.12 per 1,000 cubic feet, ½ cent per passenger and per journey, and with two cars it would be 22 cents.

A report to the municipality of Nordhausen upon the gas-driven street cars in use in Dresden states that the gas is let in at six atmospheres pressure to permanent holders under the car. The gas is always admitted to the motor at the same pressure. The cooling water is in a tank at the top of the car, and it circulates naturally down to the cylinder when cool and up to the roof when warmed. Herr Luhrig, the inventor of the car, finds this simple device very satisfactory as means of cooling the cylinder. Starting and stopping, even on heavy inclines, are quite easy and trustworthy. The report is decidedly in favor of the adoption of the new system by the town of Nordhausen, and points out that the durability of this system, as compared with that of an electric railway, is far greater. There are no wires to lay out upon a compression station. On the other hand, a gas car costs more than an electric one; say $5,000 each, while the Swiss ones, previously referred to, cost $3,000 each. An electric line pays when there is a big traffic. Gas can run a small traffic. A gas car can go anywhere, and there may be few or many in use. Electric cars are a good deal dependent upon one another, and upon the arrangement of the track for them.

Another report to the Nordhausen authorities gives the following as the advantages of gas cars over electric cars: Much less first cost, since the gas company will undertake the supply of gas in a compressed state, and there is nothing farther necessary except a car shed; less current cost, since there are no central stations or conductors to keep up, and the outlay, apart from gas, which costs only three cents per mile, is limited to lubrication and cleaning material, repairs, upkeep of rails, wages and renewals, independent action of the cars, so that there cannot be a general breakdown; ease of making a small beginning, and extending as occasion offers; no consumption of gas when not running, while an electric station must keep going; ease of putting an abnormal number of cars to run on the same line when there is an extra demand; ease of replacing the gas motors by electric motors, if at any time thought advisable, while the inverse change cannot be made in an electric car.

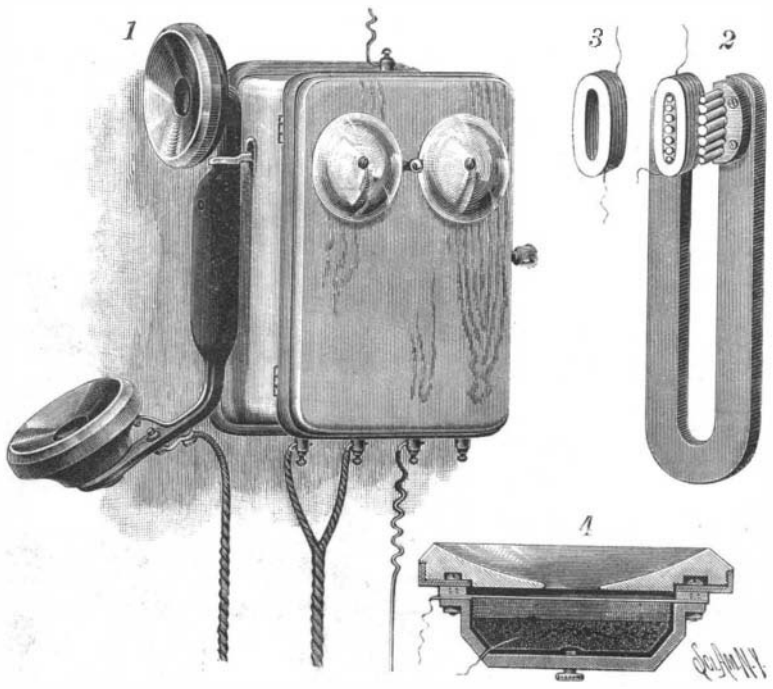
The Dessau German Continental Gas Company in a recent report stated that the application of gas for driving street cars recently introduced in Dresden may stand in importance next to the introduction of the Welsbach lamp, and that the absence of overhead or underground wires and big central stations makes it possible to work such a system with small capital, while the known cheapness of working of gas motors is by this means taken advantage of.

NORIEGA'S TELEPHONE.

For some years past Mr. Eloy Noriega, a Spanish gentleman, residing in the city of Mexico, Mexico, has been devoting a great deal of attention to electrical inventions, especially to the microphone and telephone. An interesting collection of these instruments was shown at the World's Columbian Exposition, Chicago, where they attracted much attention. From these we have selected for illustration one of the simpler forms, which is a practical and useful telephone.

Fig. 1 of the engraving shows the instrument completed, arranged for practical use; Fig. 2 is a perspective view of the receiver magnet detached from the telephone; Fig. 3 is a perspective view of one of the receiver coils; and Fig. 4 is a section of the transmitter.

In the box containing the magneto call is placed the induction coil, the telephone switch, and the transmitter and receiver are connected up in the usual way. A flexible cord carries wires for both receiver and transmitter. As will be noticed by reference to the engraving, the receiver and transmitter are both secured to an adjustable handle, so that while the receiver is at the ear, the transmitter will be in convenient position for receiving speech. The peculiarity of the transmitter is the device by which the necessary variable contact is secured. Behind the diaphragm is placed a layer of carbon filaments, similar to those used in incandescent lamps. This layer of filaments is backed up by an adjustable carbon plate. The diaphragm forms a part of the circuit, and when sounds are uttered in the vicinity of the diaphragm, the vibrations of the diaphragm alternately compress and release the carbon filaments, thus changing the conductivity of the transmitter and producing the variations in the primary circuit necessary to the transmission of speech.



NORIEGA'S NEW TELEPHONE.

The receiver is provided with a U magnet, with pole pieces extending from its sides, the pole pieces being formed of series of studs of different diameter. Upon each pole piece is placed a coil, the two coils being connected up in the line circuit in the usual way.

In this instrument all the conditions for convenience in use and for high efficiency are to be found. Mr. Noriega has thus in one invention materially improved the telephone and reduced it to its simplest form.

Cholera Caused by Nitrous Acid.

The *Universal Medical Journal* calls attention to the fact that animals poisoned by nitrous acid present all the symptoms of choleraic patients. It is well known that Professor Emmerich, of Munich, and Professor Ziro Tsuboi, of Tokio, conclude from numerous experiments that Asiatic cholera is a toxæmia by nitrous acid generated by the comma bacillus of Koch. Notwithstanding the fact that more than ten years have elapsed since the comma bacillus was discovered, no great progress has been made as regards the actual cause of cholera. At the beginning of the last decade, ptomaines were shown to exist in the cultures of bacteria, and it was assumed that in all infectious diseases the symptoms of the malady, as well as death therefrom, were caused by these organisms. A few years later there were also found in older cultures of tuberculosis and diphtheria bacilli certain poisonous albumens, and immediately upon the disclosure of this fact many investigators, adhering to the opinion that disease and death from all contagious maladies are caused by the presence of these albuminous poisons (similar, perhaps, to those of poisonous snakes), spent much time in endeavoring to discover them in cultures of all kinds. The two physicians above named, instead of being influenced by these prevailing opinions, expressed the belief that the nitrous acid generated by the cholera bacilli is to be regarded as the true cause of all the symptoms and of death by cholera. O. Low had already shown that nitrous acid is a powerful toxic. The authors first proved by experiments on guinea pigs, rabbits, and dogs that poisoning by nitrous acid caused precisely the same symptoms in guinea pigs as those induced by inoculation of cholera. They further showed that the type of disease induced by nitrous acid poisoning in man corresponds exactly with all the symptoms of Asiatic cholera. Poisoning by nitrous acid can be proved by examination of the blood by spectral analysis, and it is an interesting fact that the blood of guinea pigs having died of induced cholera presents exactly the same appearance in the spectrum as that of animals poisoned by nitrous acid.

Simulation in the Insane.

Dr. Larrousinie, *These de Paris*, 1893 (abstr. in *Jour. de Med. de Paris*, No. 26), shows very justly how it is for the interest of society as well as for that of the patients that the alienist physician should recognize that simulation is very common among the insane, and that it may lead to serious results if not detected. He shows that this fact, though known back to Pinel, has only of late years attracted much attention, and he regrets that friends, magistrates frequently, journalists invariably, and sometimes even physicians who are not specialists, should be the dupes of the insane, by which fact much of the outcries against asylums and the disastrous disagreements and divisions that are often seen, are caused.

Dr. Larrousinie studies successively the simulation in the non-dangerous and the dangerous lunatics, and gives a special chapter to the pyromaniacs, in whom it is the rule. It may be met with in all forms of derangements, but the impulsive forms, excepting pyromania, are most free from it. It is especially common in systematized delusional insanity, a fact of importance, as this is one of the most dangerous forms. It may present itself as partial or total and in an infinite number of degrees. In general, self-interest is the motive. One tries to deceive to facilitate his escape, another has the notion of revenge. Sometimes shame is the cause, as frequently happens in females with sexual hallucinations. It is of importance, therefore, for the physician to see through the deception; he should be easily suspicious of it, and should study his patients with the greatest care in view of the possibility of simulation. The author ends his thesis with the recommendation that a medical expert should sit with the judge in cases where the question of the retaining or discharge of a patient in an asylum is involved. In case of a disagreement a second expert should be called in to decide the case.—*Amer. Jour. of Insanity.*

Remedial Use of Apples.

Chemically the apple is composed of vegetable fiber, albumen, sugar, gum chlorophyl, malic acid, gallic acid, lime, and much water. Furthermore, the German analysts say that the apple contains a larger percentage of phosphorus than any other fruit or vegetable. The phosphorus is admirably adapted for renewing the essential nervous matter—lecithin—of the brain and spinal cord. It is, perhaps, for the same reason, rudely understood, that old Scandinavian traditions represent the apple as the food of the gods, who, when they felt themselves to be growing feeble and infirm, resorted to this fruit, renewing their powers of mind and body. Also, the acids of the apple are of singular use for men of sedentary hibits, whose livers are sluggish in action, those acids serving to eliminate from the body noxious matters, which, if retained, would make the brain heavy and dull, or bring about jaundice or skin eruptions and other allied troubles. Some such experience must have led to the custom of taking apple sauce with roast pork, rich goose, and like dishes. The malic acid of ripe apples, either raw or cooked, will neutralize any excess of chalky matter engendered by eating too much meat. It is also the fact that such ripe fruits as the apple, the pear, and the plum, when taken ripe and without sugar, diminish acidity in the stomach, rather than provoke it. Their vegetable sauces and juices are converted into alkaline carbonates, which tend to counteract acidity.—*North American Practitioner.*

Torpedo Net Tests.

The question of the protection of our vessels from torpedoes is as important as that of furnishing them with torpedoes, or even more so. An interesting series of experiments on torpedo nets is now being conducted at Newport; in all probability the tests will extend well into the winter, as only one or at most two shots can be fired a day while the present routine of duty and instruction is maintained at the station. The weapon used was the submarine gun of the Destroyer and the projectile weighed 1,600 pounds. The Midgley net was tried first. The net was fifteen feet wide and twenty feet deep and was placed 200 feet in front of the Destroyer, attached to a heavy spar. The net was easily pierced, the projectile remaining uninjured. Another piano wire net twice as strong was used at the same range and was pierced as easily, one of the heavy vertical strands being cut through. The heaviest of the American nets will be moved away until the projectile fails to pass through, then the English (Bullivant) net will be tried. The comparative strength will then be easily determined.

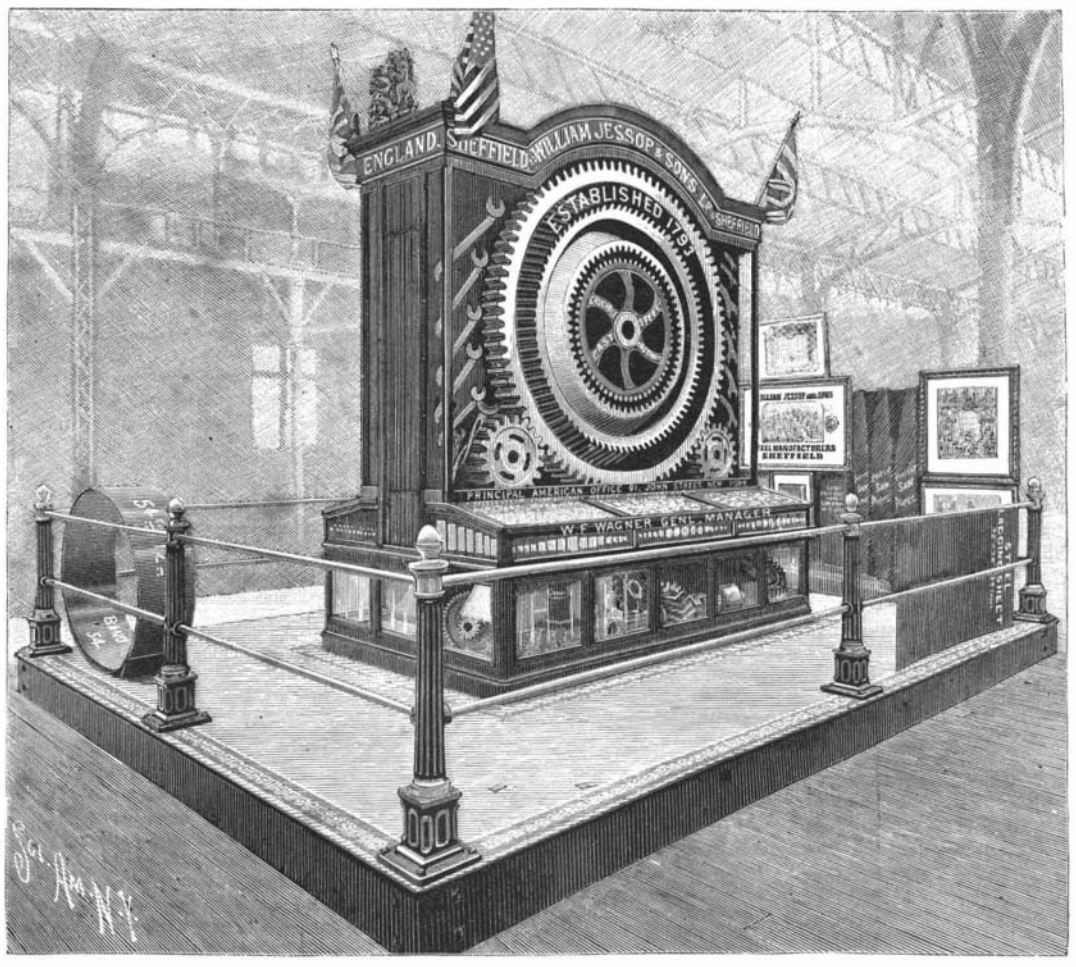
The American net can be more easily handled than the English, as it only weighs 400 pounds, while the English weighs 660 and is so designed that it cannot be rolled up. The effect of the ordinary wash of the sea upon the hang of the net when the vessel is under headway will also be determined. The success or failure of a net depends upon its ability to stop the torpedo or so interfere with or delay it as to cause the explosion to take place before the side of the war vessel is reached. The tests are being well conducted and the results will be looked for with interest.

SHEFFIELD STEEL AT THE EXPOSITION.

In the British section of the Mining building an exhibit of singular interest was that of William Jessop & Sons, Ltd., of Sheffield, England, manufacturers of the celebrated *Jessop steel*, known all over the world for its special adaptability for cutting tools, dies, punches, drills, cutlery, needles, etc., also sheet steel for saws, pens and springs, and crucible steel castings of all kinds and weights. The factory at Sheffield is known as the Brightside Steel Works, covering an area of thirty acres, and including extensive converting and melting furnaces, forges, rolling mills, wire mills, steel foundry, machine shops, etc. Many of the large ocean steamships are now fitted with heavy castings for stern frames, rudder posts, and bed plates from their foundry. The business was established just one hundred years ago, and for sixty years the house has been permanently represented in the United States, its chief American office being at No. 91 John Street, New York City; Mr. W. F. Wagner being the general manager, with Mr. Jas. Jessop as associate.

The large glass case containing the main portion of the exhibit, as shown in the illustration, is filled with samples of the many finished and unfinished forms into which the Jessop steel has been made. The brilliant and artistic setting of these castings has been greatly admired. There are small and large gear wheels, cams, cross heads, cylinder and cylinder cover, spanners and coal mine car wheels. Some of the castings have been broken or bent cold, and drawn out into instruments with a cutting edge, such as razor, carving knife and chisel, in order to show the malleability and quality of the steel. There is an extensive collection of fractures of various qualities of tool steel, hardened and unhardened, arranged in the show case in pleasing geometrical designs, to the number of nearly twelve hundred, and a display of large and small circular saw plates, so neatly adjusted that they seemingly rest lightly in position, whereas the largest of these massive steel disks weighs over five hundred pounds. There are also finished bars of steel; a 12-inch wide band saw fifty-four feet long; and, to crown all, there is an American flag, made up of alternate stripes of polished and black steel, with steel stars, nickel-plated, which makes a very pleasing effect.

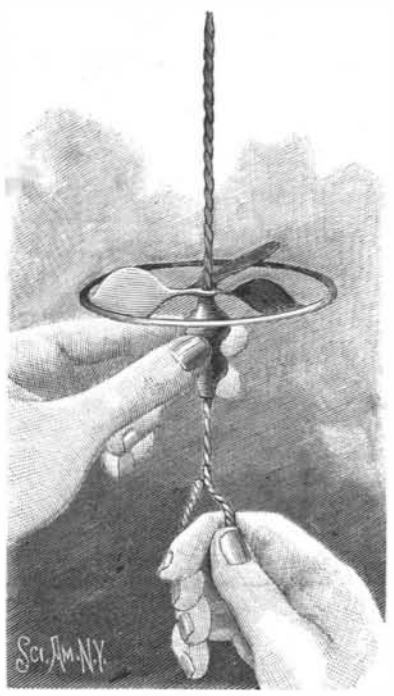
The firm was awarded the medal for highest excellence on their goods shown at the Exposition, but such award was, in their case, notable only as being a continuation of the highly favorable recognition the firm had previously received in two exhibitions at Paris, and at London, Melbourne, Antwerp, Liverpool, and other places. It is the intention of the firm, we understand, to donate the exhibit to the Columbian Museum to be founded in Chicago, and for which many prominent exhibits have already been secured.



THE WORLD'S COLUMBIAN EXPOSITION—EXHIBIT OF WILLIAM JESSOP & SONS, LIMITED THE SHEFFIELD (ENGLAND) STEEL MANUFACTURERS.

THE FLYING PROPELLER.

This is the name given by the manufacturer to a new form of an old toy which has always been interesting and popular in whatever form presented. This one is the simplest, cheapest and it seems to be the best. The wheel is punched out of a single piece of tin. It has three arms or vanes, which near the rim are in the form of disks inclined at an angle of about thirty-five degrees to the plane of the wheel rim. At the center of the wheel there is a square hole in which is loosely fitted a twisted square rod, and upon this rod, below the wheel, is placed a wooden sleeve, the bore of which is large enough to allow the rod to be readily drawn through it.



AERIAL TOP.

The wheel having been placed upon the rod—as shown in the engraving—the wooden sleeve is grasped between the thumb and finger of one hand, the eye at the lower end of the rod is grasped by the other hand and the rod is drawn quickly downward, thus imparting to the wheel a very rapid rotary motion which causes it to rise to a great height in the air. Sold by the Magic Introduction Co., 321 Broadway, N. Y.

IN Dakota, with a four-horse gang plow, from six to seven acres a day is commonly plowed.

What is Electricity?

Prof. Galileo Ferraris, the genial Italian scientist, whose name is known to all electricians, was recently asked by a young lady what electricity was, but, unlike most others when asked that question, he ventured to answer it, and according to *Cosmos*, wrote in French in her autograph book the following, of which we venture to give a translation, even though the English language hardly does justice to the original in French: "Maxwell has demonstrated that luminous vibrations can be nothing else than periodic variations of electro-magnetic forces. Hertz, in proving by experiments that electro-magnetic oscillations are propagated like light, has given an experimental basis to the theory of Maxwell. This gave birth to the idea that the luminiferous ether and the seat of electric and magnetic forces are one and the same thing.

"This being established, I can now, my dear young lady, reply to the question that you put to me: What is electricity?

"It is not only the formidable agent which now and then shatters and tears the atmosphere, terrifying you with the crash of its thunder, but it is also the life-giving agent which sends from heaven to earth, with the light and the heat, the magic of colors and the breath of life. It is that which makes your heart beat to the palpitations of the outside world, it is that which has the power to transmit to your soul the enchantment of a look and the grace of a smile."

The Third and Fourth Generations.

M. G. Lagneau communicated to the Academie de Medecine, recently, the concluding part of an interesting statistical paper on the population of Paris, in which he proved that the extinction of families of Parisians proceeds with extraordinary rapidity. A little over 60,000 children are born annually in Paris, and the expectation of life at birth is 28·05 years. The population of Paris at the last census was 2,424,703, and M. Lagneau calculates that, if not recruited from the country, the population, at the end of one generation, would be reduced to 1,698,679, a diminution of more than a third; at the end of a second it would have fallen to 1,190,100, at the end of the third to 833,720, and so on, until at the end of the eighth generation *la ville leumire* would contain only 140,700. Probably the real figures would be even less favorable. for, as a matter of fact, it is almost impossible to find a Parisian whose ancestors for three generations have been Parisians. The same, or very much the same, holds good in London. Some ten years ago Mr. James Cantlie, in a lecture which he gave for the National Health Society, challenged any one to produce a Londoner of the fourth generation, a challenge which was not, we believe, taken up. The causes of this dying out of town populations are, no doubt, complex; but M. Lagneau points out two which, in Paris at least, are the most important—the enormous mortality during the first year of life and the very high death rate from tuberculous diseases. This death rate appears to be twice as great in Paris as in London, and M. Lagneau appears to attribute a part of this difference at least to the less density of population on the surface in London. The Londoner has 84 square meters, whereas the Parisian has only 39.—*British Medical Journal.*

The Scientific American.

This paper has stood for the last forty years at the head of its class of publications. It has no superior. As a scientific and mechanical journal it cannot be excelled. The patent agency of Munn & Co., connected with it, is one of the few strictly reliable agencies in the United States. Those of our readers who desire to obtain a patent, and wish to have their interests well attended to, cannot do better than to address Munn & Co., Solicitors of Patents, No. 361 Broadway, New York, for their pamphlet containing full information about patents, caveats, etc.

[To the *Sewing Machine Times* we are indebted for the above kindly notice, a favor unsolicited and hence the more appreciated.—EDS.]

THE cost of the Union Pacific was reported as $112,259,360, an average of $108,778 a mile.