The Infection of American Cattle on English Ships.

A very instructive report has been submitted to the Department of Agriculture by Dr. Charles P. Lyman, veterinary surgeon, who was sent by the department to England last summer, to investigate the origin of the foot and mouth disease which had appeared in certain shipments of American cattle. The course of the cattle on this side had been carefully traced, and no signs of the disease had been detected along the roads or in the stockyards the cattle had passed over and through.

It appeared certain, therefore, that the disease was caused by infection, communicated to the cattle after they were shipped from American ports. After very careful inquiries, Dr. Lyman discovered that the vessels, portions of whose cargoes of cattle were condemned, had brought to the United States on their outward voyages general cargoes, among which, in many cases, were such articles as "bales of goat skins," "casks of salted skins," "bales of unwashed Australian wool," "bales of Russian wool," "bales of raw skins," "casks of wet skins," "bundles of grain bags," and "bundles of head ropes." In many cases these articles were carried in those portions of the vessel which were occupied by cattle during the return voyage. Dr. Lyman found, however, that upon some of the vessels upon which the disease was found to prevail upon their arrival in England, no such articles had been carried on the outward voyage. The fact that hides, skins, and wool had been carried was not, therefore, sufficient to explain the subsequent outbreak of the foot and mouth disease on apparently uninfected vessels.

Cattle shipped to Great Britain, whether from the United States or from the continent of Europe, are tied to stanchions by ropes passed around their horns, these ropes being technically known as "head ropes." Dr. Lyman found, after careful investigation, that it is a common practice to drive the animals ashore with these "head ropes" still attached to their horns. Sometimes these ropes are detached before the cattle leave the stockyards, but frequently they go with the animal to the butcher. Dr. Lyman also discovered that these "head ropes," gathered from cattle received from France and Germany, as well as from the United States, are often shipped to the United States to be used in tying other animals shipped to Europe.

Following up this clew, Dr. Lyman became convinced that in most cases the infection had been conveyed by the indiscriminate use of head ropes impregnated with the virus of the disease. It was by means of such head ropes, according to Professor Brown, of the British Veterinary Department, that the disease had been introduced into the London yards from France, in September, 1880, and subsequently conveyed to the Liverpool stockyards.

Dr. Lyman proposed, as a preventive of future outbreaks among American cattle in transit, that the department ask Congress to pass a law prohibiting the introduction of all articles from the foreign animal wharves of Great Britain. One would naturally think that the hazard attending the use of old head ropes would be sufficient, now that it is known, to deter our enterprising cattle shippers from using them.

Touching the condition of American cattle on their arrival in England, Dr. Lyman says, that notwithstanding the much greater distance they are necessarily carried, they arrive with fewer bruises and in better condition generally than do those from some of the neighboring European ports. This gratifying condition of affairs is due to the good care and improved methods of ventilation, etc., adopted by the owners of steamships. The losses of cattle on shipboard from January 1, 1880, to September 30, 1880, exceeded five per cent; in the corresponding months of 1881 the losses were about two and one-half per cent.

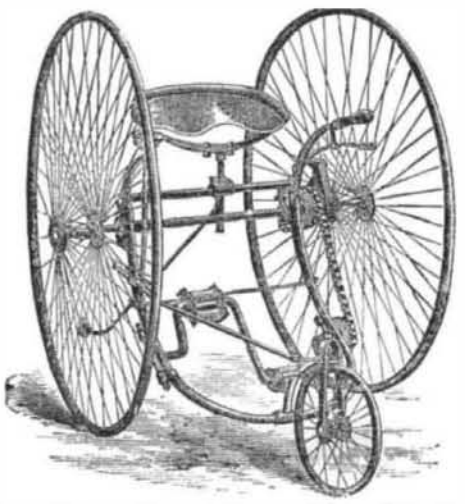
Torpedo versus Fire.

Torpedoes had been up to a very recent date considered in the exclusive light of their destructive properties—it is gratifying to see that they can also be put to the use of preserving property from fire. On the 10th of August, one of the magnificent steamers belonging to the French Transatlantic Company was at Goletta, discharging. Her name is a well known one, as it reminds us of one of the founders of that company; it was the Isaac Pereire. So late as one o'clock in the morning the work of discharging had been going on under the superintendence of Captain Araud, the commander; he then went a last time round the ship, and retired to rest. At two o'clock he was roused by an alarm from the fore part of the ship. The Isaac Pereire was on fire, and the fire had spread with such a rapidity that the crew had to leave their quarters without saving anything. The steerage passengers, surrounded as they were by the raging element, were saved only owing to the unremitting exertions of the crew and the skillful maneuvering of the commander, who swung his ship, and, placing her before the wind, thus limited the advance of the fire and kept the stern untouched. Meanwhile the purser and doctor were busy protecting the saloon by closing the bulkheads and disposing the hose. The sound of the bell had called the assistance of the men-of-war at anchor in the harbor, and soon twenty-two steam launches and other boats had come to the rescue. Commander Araud wanted to scuttle the forepart of the ship, but the heat was so intense that the men who attempted it, although protected by a continuous and powerful stream of water thrown upon them, had to fall back, not without having been severely scorched. Commander Araud then applied to the officers from the men-of-war for a torpedo, but they at first declined to take such a responsibility upon themselves, a responsibility which the commander did not hesitate to assume. A torpedo was procured, and everybody taken away from the ship, with the exception of Commander Araud, who stood on the bridge. A first torpedo missed fire, a second sent the Isaac Pereire down stem foremost. Her commander, who had not left the bridge, was safely rescued from the water, having only by a miracle escaped being hurt by the explosion. The Isaac Pereire will be easily raised.—*London Review.*

Double-Driving Tricycle.

Considerable activity has of late sprung up in the manufacture of tricycles, which are considered as safer vehicles than the bicycles, especially for those who are not gifted with the natural skill necessary for working the latter. We here give a cut of a new English tricycle by Hillman.

The driving wheels, 50 inches in diameter, run in double ball bearings, affixed to the back of the frame, which is composed of seven-eighths inch steel tubing. A single length of tube bends in hook form at the top above the bearings, being strengthened close to the bearings by a transverse tube, carrying the seat socket. The loop formed by the main portion of the tubing sinks in a hollow curve forward, the sides running parallel and uniting in a bowed front, from the center of which the backbone of the rudder wheel departs. This rudder wheel is 17 inches in diameter, runs in ball bearings, and works in a fork head, with gaping slot, to allow of greater facility in turning. The hook-like ends of the upper part of the frame are used for affixing the handles to an ordinary pear-shaped, purchase handle finding a place on the left-hand side, while the right-hand end of the frame finishes in a socket, in which an upright rod works,



bearing a spade handle at its upper end and a pinion wheel at its base, which, working in a ratchet in connection with the rudder wheel, forms the guiding communication. The pedal shaft is double-cranked, provided with rubber pedals, and works at each end in parallel bearings. The safety of the rider is secured by light rods proceeding backward, and carrying a small safety-wheel at their junction. The spring is placed at right angles to the machine when a seat is supplied, and in a line with the running when a saddle is preferred; it is adjustable to height of rider, and places him well over his work.

The chief feature of the machine, however, is the double driving action. It consists of a stout toothed wheel and box, all in one piece, the outside of this box forming a fine broad surface for the strap brake to work upon. On the inside of the box there are two toothed wheels and two pinion wheels; the former are placed about an inch apart; they are the same size, and are each connected with one of the driving wheels. The pinion wheels are fixed upon studs projecting from the side of the case, and are so arranged that, while each pinion gears with a different toothed wheel, they gear with each other in the space between the main wheels, one pinion projecting forward, the other backward, for the purpose. This arrangement causes both wheels to be driven when running straight, at the same time allowing the outer wheel to travel faster as requisite for turning purposes, and when driving ahead an equal amount of power is imparted to each wheel.

A New Application of the Radiometer.

A new application of the radiometer to photometrical purposes, suggested by M. Coulon, is described in *La Lumière Electrique*. The instrument is really a photometrical balance, and is simple in principle, although some rather complicated arrangements are required to prevent disturbance from surrounding influences. It is generally known that the movement of Crookes' radiometer is now ascribed to the action of radiant heat, although at the time of its discovery the motive power was thought to be light. M. Coulon, however, claims to have proved by experiment that a radiometer of which the temperature is constant, revolves solely under the influence of light. Whether this contention is well founded or not remains to be proved by independent observation. Upon this principle the Coulon photometer is based, and the name *athermanous* which it bears is a further evidence of the importance attached to this rehabilitation of Crookes' supposed discovery of the motive power of light. The apparatus consists of a radiometer bulb, fixed in the middle of a cube-shaped metallic box, having four glazed apertures in its sides. Horizontal rays of light from two opposite sources can enter by two of these openings, while the others allow of observations being made of the bulb. The box is filled with water, which, by means of four vertical pipes surmounting spirit lamps, is maintained at a constant temperature above that of the radiant heat, at this point, of the light-source to be measured and compared. In practice about 100° Fah. is found sufficient. The radiometer bulb contains, *in vacuo* as usual, a disk movable round a vertical axis; the half disk on each side of the axis being black and the other white. Suppose, now, a single source of light to be directed on the bulb from one side, it attracts the white half and repels the black, so that the disk turns edgewise to the light, and presents a side view to the observer in front. If another light of equal brilliancy acts simultaneously on the other side, and at the same distance from the disk as the first, the counteraction of the two lights results in the disk presenting its sides to the direction of the light and its edge to the observer. When unequal lights are to be compared, the disk or one of the lights may be shifted until the relative distances of the two sources determine their intensity in the usual way. It is stated that the apparatus is not patented.

Correspondence.

The Principle of Mutual Accumulation.

To the Editor of the Scientific American:

In the issue of your SUPPLEMENT, date of November 19, appears a special article by Dr. Gustave Glaser. This article contains some historical remarks that I am sure you, with the usual American desire to give every man a fair hearing, will allow me to object to. Dr. Glaser offers therein what he is pleased to think unimpeachable evidence of the prior right of Dr. Werner Siemens to the discovery of the principle of "mutual accumulation" in dynamo-electric machines. But Dr. Glaser is too evidently biased. He does not accord to Sir Charles Wheatstone that preparation of a great discovery that he accords to Dr. Werner Siemens, unwittingly thereby paying Sir Charles the greater compliment, since he acknowledges a difference only of a month in publication. Now, sir, I have had the honor of having been chief assistant to Sir Charles Wheatstone for a considerable period, and the greater honor by hard work to have been placed in close familiarity with so eminent a man of science, who was pleased to show me, many years before this claim of German priority became so pressing, the notes of his experiments on this principle of "mutual accumulation," made several years before publication. Before his death, however, Sir Charles told me that he believed that priority was really due to Hjorth, the Swedish electrician. As Sir Charles Wheatstone has been dead some years, I have, of course, no personal interest other than that due to the memory of an old master, in claiming for him the priority due to him, except it be a new version of the trite saying, "Dead men can tell no tales" (for themselves).

Dr. Glaser says: "But by a comparison of both lectures it is plain to see that Mr. Wheatstone mentions nothing that had not been said six weeks before publicly by Dr. Werner Siemens in Germany." There is, sir, a great deal, which even the Dr. C. William Siemens, of London, is good enough to acknowledge in his paper read before the Royal Society recently on March 4, 1880. PAGET HIGGS.

Self-Acting Car Couplers.

To the Editor of the Scientific American:

In an article from W. S. Huntington, published November 19, on requirements for car couplers, he says: "Any number of cars coming in contact should be coupled automatically; but it should be so arranged that no coupling will be effected unless so desired."

Admitting, for the present, that the first requirement has been filled, does Mr. Huntington believe that it would not be practically easy to fill the second requirements? It is so natural for most draw heads not to couple that a hundred different modes can be suggested to prevent an automatic coupler from working, but with all of them it is necessary for the brakeman to do something; either pull a chain, drop a pin, or move a lever, thus throwing some obstruction in the way of or changing the position of the parts and preventing coupling. But if they are left in that position, the next time the draw heads came together they would not couple, and so would not fill the first requirement until the obstruction was removed and the parts rearranged. So that simply to keep the cars from coupling, it is necessary to make two trips, one to set the obstruction and one to remove it afterwards.

Another of Mr. Huntington's requirements is that the draw heads can be uncoupled from the ground or top of the cars without going between them. If this was complied with would it not be much easier, quicker, and safer to allow the cars to couple and then go there and uncouple them, making only one trip instead of two?

Of course, with an automatic coupler, it is necessary, after uncoupling, that the draw head remain uncoupled until the cars separate; and it is also necessary that the uncoupler adjust itself, so as not to prevent another coupling. These last are practical, but think it will be some time before a draw head is invented that will decide for itself when the brakeman wants it to couple and when not to. F.

AN interesting note from Paget Higgs, the well known author of the work on "Electric Light," and of other volumes, appears in this column. He corrects the statement of a correspondent who gave to Dr. C W. Siemens the priority of the "mutual accumulation" principle.