ranged to pump from each compartment through a separate range of pipes, and there is a gun-metal drainage foot valve at the bottom of each branch pipe to each compartment of each pontoon. The drainage pump is also connected to a range of pipes which are carried along the top of the side towers for washing decks, or for fire purposes. The compartments in the side towers are filled and drained through the main suction pipes, and they can also be drained into the pontoons by means of scupper valves worked from the decks of the pontoon. There are speaking tubes from each tower to the engine rooms, and also from side to side.

The keel blocks, which are placed 3-foot centers, are of pitch pine, and are 3 feet 6 inches high. The lower blocks are 18 inches square, and each keel block has a cap piece of oak 6 inches thick. The blocks are fitted between angle irons and are securely dogged together. There are twenty-four bilge blocks of very strong construction, placed on the dock, so that they can be shifted in or out, and on the top of each steel bilge block is a sliding block of oak which is pulled into position under water by means of ropes led to the top of the towers.

There are two shoring shelves inside the dock on each side, 2 feet 6 inches wide, with a facing piece of elm 9 inches by 6 inches. The sides and ends of the dock are protected by two American elm fenders securely bolted between angles. On the tower tops are placed fourteen large timber heads for mooring ships using the dock, and four mooring shackles are attached to the pontoon for mooring purposes. Wrought iron ladders lead up from the pontoons to the shoring shelves and tops of towers.

On the inner side of the towers in the stokehold water-tight doors are placed giving access to the deck of pontoon and for discharging ashes. The engine room and stokeholds are ventilated by cowl ventilators and a range of ventilating pipes. Feed tanks are placed on each side above the boilers, each holding 25 tons of fresh water for feed purposes. There are also bunkers which will hold 30 tons of coal in all.

The dock has been so constructed that in the event of damage to a pontoon, or if a pontoon requires bottom to be scraped and painted, it can be detached and docked on the dock itself to be overhauled. This is accomplished by disconnecting the bolts that hold the pontoon to the side girders and to the pontoons adjoining, severing the suction pipes and valve rods and letting water through the sea valve into the pontoon when it is detached. This causes it to sink below the level of the bottom of the side girders, and it can be easily drawn out at either side. It is then turned round so that the narrow part faces the entrance of the dock. The latter is then sunk sufficiently to let the pontoon float over it. The water is then pumped out and the pontoon raised. When the necessary repairs are completed the process is reversed and the pontoon brought back into place and rebolted to the side girders.

The dock was towed down the Tyne by seven tugs. When it reached the mouth of the river it was taken in tow by three powerful tugs belonging to Messrs. Smit & Co., of Rotterdam, who make a specialty of long-distance towing of this description. Two tugs towed the dock with tow ropes of 20-inch manila, and the other tug steered with a check rope of 13-inch manila. The towing journey from the Tyne to Port Mahon, a distance of two thousand one hundred miles, occupied approximately thirty days.

A lightship has recently been launched in Scotland which is unique in many respects, not the least one being that the vessel will carry no crew. What is known as the "compound gas system" provides for the lights for several months at a time, the gas being carried in a large tank and pipes therefrom being led up a hollow mast to the lantern, 25 feet above deck; communication is doubtless made with the shore to extinguish the light during the day. A large fog-bell is also provided which is rung by the roll of the vessel, and also by the passage of the gas to the lantern when there is not sea enough to toll the bell.

SOME REMARKABLE TREE GROWTHS.

Our engravings represent two remarkable examples of tree growth. The first is a famous yew tree near Kü Chou in southeastern Shantung, China. It is a fine specimen of the *Salisburiana adiantrafolia* and is of so large a size that there is space at the head of trunk, where the branches begin to spread, for eight men to take a meal around a square table. Tradition places the age of the tree at three or four thousand years, and Confucius is said to have rested in its shade. The species is of such slow growth that the Chinese have a saying to the effect that you need not plant the Pei Kwo, as they call it, if you have no grandson. The name "maiden's hair tree" is given to it on account of the shape of the leaf. It is also called a yew on account of its botanical relationship. Our photograph was taken by the Rev. W. O. Elterich and was contributed by W. Reid Faries, of Shanghai.

YEW TREE IN SOUTHERN SHANTUNG REPUTED TO BE 3,000 OR 4,000 YEARS OLD.

CURIOUS GROWTH OF A LINDEN TREE, MAHWAH, N. J.

Our other engraving shows the abnormal development of a linden tree (*Tilia americana L.*) which is also known as basswood, lime-tree or bee-tree. It stands on the Havemeyer farm, which is known as the Hillside Farm, Mahwah, in the northern part of New Jersey. The tree is about 120 years old, 30 feet high, and, including both sections, is 30 feet wide. It stands on the Ramapo River in a wet, swampy place. It is one of the most remarkable botanical curiosities in this part of the country. The twin branches really appear to be horizontal trunks. The photograph was made by A. Denninger, and it was contributed by the Rev. Dr. Kimber, of the chapel of St. Augustine, New York city. The linden tree attains a great age. At Neustadt, Germany, there is a linden tree which measures 399 feet in circumference. The most ancient linden perhaps in all Europe is the Donndorf, near Bayreuth. On a map dated 1390 it is mentioned as a very old linden, 24 yards in circumference. The age is given as more than twelve centuries.

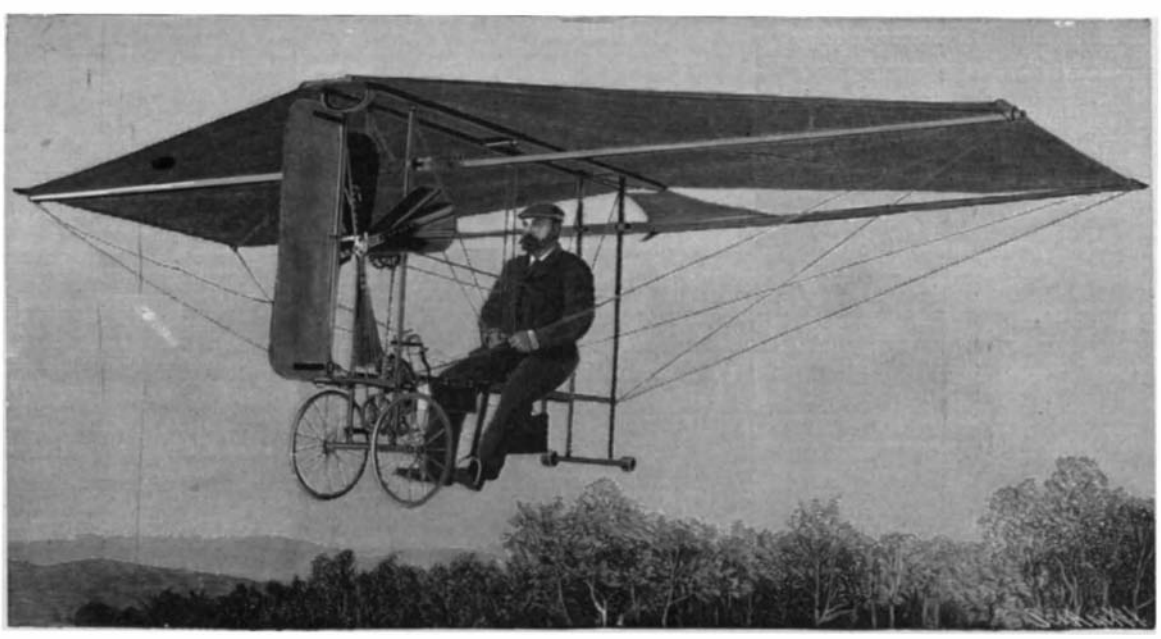
NEMETHY'S FLYING-MACHINE.

Undeterred by the failure of the German engineer, Hofmann, a Hungarian manufacturer, Emil Némethy, has constructed an aeroplane which differs in no essential from the contrivance of his predecessor, but which he believes will meet with considerably more success. Némethy's interest in flying-machines is merely that of a sportsman. Aerial navigation, he argues, can become a sport only if the cost of a flying-machine can be reduced to that of an automobile. His aeroplane is therefore built on a rather small scale. But despite its size, the inventor trusts that his machine will glide through the air as easily as in the somewhat fanciful picture which we reproduce from the Illustrirte Zeitung.

Némethy's machine is an aeroplane weighing only 66 pounds. Originally a motor of three-quarters horse power, weighing 25 pounds, was mounted on the frame of the contrivance for the purpose of driving the single propeller; but the inventor has decided that three-fourths of a horse power are inadequate and has recently fitted the machine with a 2¼ horse power gasoline motor. The current of air driven by the propeller under the wings or air-resisting surfaces will, it is thought, be sufficient to sustain the machine in the air. In order to overcome the inertia of the aeroplane, Némethy will construct a rather steep ramp terminating in a short upwardly inclined path. The machine, according to Némethy, will dash down the ramp at a high speed, then up the short incline, the momentum acquired, supplemented by the power of the rapidly rotating propeller, serving to drive the aeroplane onward in the air.

The saddle for the aeronaut is so connected by wires with the front and rear ends of the machine that, it is claimed, the center of gravity can be shifted longitudinally or laterally in order to change the direction of flight. Némethy believes that, with his machine, the aeronaut will, with a certain bird-like instinct, incline his body to shift the center of gravity in times of emergency.

The wings have an area of 194 square feet. With the new motor the aeroplane will weigh 154 pounds. Hence each square foot of the wings must sustain nearly four-fifths of a pound—a ratio between supporting surface and weight which is said to exist in the case of many birds. The relation of the total weight (300 pounds, including the aeronaut) to the motive power is unfavorable. Némethy has patterned the wings of his aeroplane after those of a swallow.



NEMETHY'S FLYING-MACHINE.

MILK PRESERVATIVES.—M. Wynter Blyth detects the presence of added preservatives in milk by the following simple process. To 10 C.c. of each sample of milk to be tested, and to 10 C.c. of sterilized milk known to be free from preservative, 2 C.c. of very strong solution of alkaline litmus is added. All the tubes are then examined, and if not of the same shade of blue as the control tube, semi-normal NaHO solution is added to them until the tint is identical. All are then plugged with cotton wool and heated in the water bath to 80 deg. C. for ten minutes. After cooling, each tube, including the control tube, is inoculated with 0.5 C.c. of a mixture of sour milk in water (1 C.c. of milk in 200 C.c. of water). They are then allowed to stand at ordinary temperature for twenty-four