THE METROPOLITAN CLUB.

New York is now as much a city of clubs as London, and it is possible to find in the metropolis clubs for nearly every phase of social life, religious belief, or political opinion, while nearly all professions and nationalities are represented in the long list of clubs devoted to riding, driving, fencing, whist, chess, dancing, dining, and many other interests and amusements. One of the youngest but most prominent of the clubs in New York is the Metropolitan Club, whose palatial club house at Sixtieth Street and Fifth Avenue forms one of the ornaments of that beautiful part of the city. The Metropolitan was organized February 20, 1891, in order to fill the want of those living in the upper part of the city near the Central Park, none of the leading social clubs being within a mile or more of that part of the city. The club house was opened last spring, and is probably the most magnificent club building in the world, costing, including the ground and furnishings, about two millions of dollars. The plot of ground measures one hundred by two hundred feet, while the building is ninety by one hundred and eighty-five feet, and is one hundred feet high. The edifice was constructed from designs furnished by Messrs. McKim, Mead & White, the well known architects of the Madison Square Garden.

The club house is built of white marble and is constructed throughout in the most fireproof manner. Our illustration shows one of the salient features of the entire structure, the main entrance. The beautiful gates and grilles were made by John Williams, of this city, and are fine examples of artistic iron work. The portion of the building shown through the main gate is the ladies' annex, an arrangement similar to that adopted in the Somerset Club, Boston. The court yard is of ample size.

The great hall is a magnificent affair fifty-two by fifty-five feet and forty-five high, and is lined entirely with marble of different kinds.

The rooms are furnished in the most sumptuous manner, and by no means the least successful feature of the large drawing and lounging rooms are their magnificent proportions. The main room on Fifth Avenue is 85 feet long, and the ceilings throughout are of magnificent altitude. There are three distinct dining rooms, besides a number of private dining rooms. There is the main dining room for the use of members only, and a large dining room for use of visitors, guests of members of the club, who are not admitted to the main room, and in the ladies' annex a delightful suite of rooms, where members may entertain ladies as their guests. At the top of the house are a number of bedrooms rented to members of the club, and above all the kitchen. A delightful roof garden has been arranged for the use of the members during the summer months. The outlook from the club windows upon the plaza at the main entrance of Central Park and up and down Fifth Avenue is not surpassed by anything in the city. The illustration gives a view of the main entrance and driveway on Sixtieth Street.

MAIN ENTRANCE, METROPOLITAN CLUB, NEW YORK.

Petroleum as a Lubricant.

We give below an abstract from a paper read by A. W. Harris, Providence, R. I., president of the Harris Oil Co., on the history and use of petroleum. After reviewing the history of the discovery of petroleum, the writer says:

The peculiar advantages of petroleum as a lubricant over all other oils are its non-oxidizable properties. This means its freedom from gumming and acids. All other oils, animal, fish and vegetable, which were used prior to petroleum, are destructive to metals, and this destructive action is more noticeable where these oxidizable oils are used to lubricate the valves, cylinder and other internal parts of the steam engine. This destruction is accelerated by the high degree of steam heat, which causes the quick generation of stearic, margeric and oleic acids, that rapidly act on the metal surfaces, honeycombing them and eating them away.

I wish now to add a word on the importance of temperature to lubrication. The uniform temperature where machinery is operated is a very important factor, as well as the uniform gravity and cold test of the oil to lubricate it, as is illustrated by the ordinary drop-feed lubricating cup, which is regulated by the opening or closing of an aperture near its base. It is plain to be seen that as often as the temperature of the atmosphere changes, or the gravity or cold test of the oil is changed, so will the quantity of the oil fed through the aperture of the cup vary in furnishing the uniform quantity necessary to lubricate the machinery properly. Many expensive accidents have been caused by neglecting to observe the above factors.

Lubrication is a very important factor in engineering; every engineer should understand how to determine its value by testing. The various tests to determine the value of petroleum are as follows: The flash or fire test; the cold test; the endurance or lasting qualities; the viscosity. The instrument used for determining the flash or fire test of oils is very simple. It consists of a vessel that has a holding capacity of two ounces of oil, of the following dimensions: One and a quarter inches diameter by one and three-quarter inches long. A holder is arranged to hold this cup that will admit of an alcohol lamp being applied at its base. A thermometer is immersed in it when the oil is sufficiently heated to generate a flash by the application of a lighted taper to its surface. The gas will ignite and produce a flash. Quickly observe the record of the thermometer. If it registers 360°, the oil is called 360 flash test oil; if the heat is continued, the oil will take fire on its surface, say, at 400°. This is the fire test, and would be known as 400 fire-test oil. Cold test can be made by using an ordinary four-ounce bottle filled with oil to be tested, a thermometer immersed in the oil and set in a cool place; when the oil congeals at a temperature of 35°, this is denoted the cold test.

The machine for testing the endurance of oil is constructed as follows: A shaft thirty inches long, turned and ground to two and one-half inches in diameter, supported at each end by bearings and arranged to rotate at various speeds; a pair of half-moon boxes is nicely fitted to this shaft. Immersed in a cavity filled with oil in the top box is a thermometer, and oil holes made to receive a given quantity of oil to be tested. The boxes are held together by a weighted lever, thrusting the boxes against the shaft with the required pressure per square inch. One end of this shaft is fitted to a dynamometer to denote the friction between boxes and shaft. When the shaft is set in motion the temperature of the boxes is noted; also the increase of friction by the dynamometer. As the box commences to increase in temperature, and the oil is partly consumed, the friction on the dynamometer increases. The number of minutes is noted from the starting up to stopping, and the result of the test is as follows: Eight drops of oil are used for the test of 30 gravity and of 350 flash test, which lasted, under a pressure of 400 pounds to the square inch, twenty minutes. The reading of the thermometer to start with was 70°; at the close of the test, 140°. Amount of power consumed by the dynamometer to start with was one-sixteenth of a horse power; at the termination of the test, one-eighth horse power; revolutions of shaft, 400. Another oil may be tested under the same conditions and the relative qualities of lubrication and economy in telligently compared.

The viscometer is a substitute for the hydrometer, for testing the gravity or density of oils. It is constructed as follows: A vessel containing one pint, arranged with an orifice of one-sixteenth of an inch in diameter, is made at the bottom of the vessel, a thermometer is immersed in the oil and a uniform temperature is maintained. The quantity of oil that will flow through this orifice in a given time at a given temperature is called the viscosity of the oil.

The refiners and dealers have not, to my knowledge, agreed to adopt any particular construction of viscometer as a standard. When there is one universally adopted, and the tests come from reliable sources, we shall have a standard unit of viscosity which we shall have confidence in.

Spanish Iron Ore.

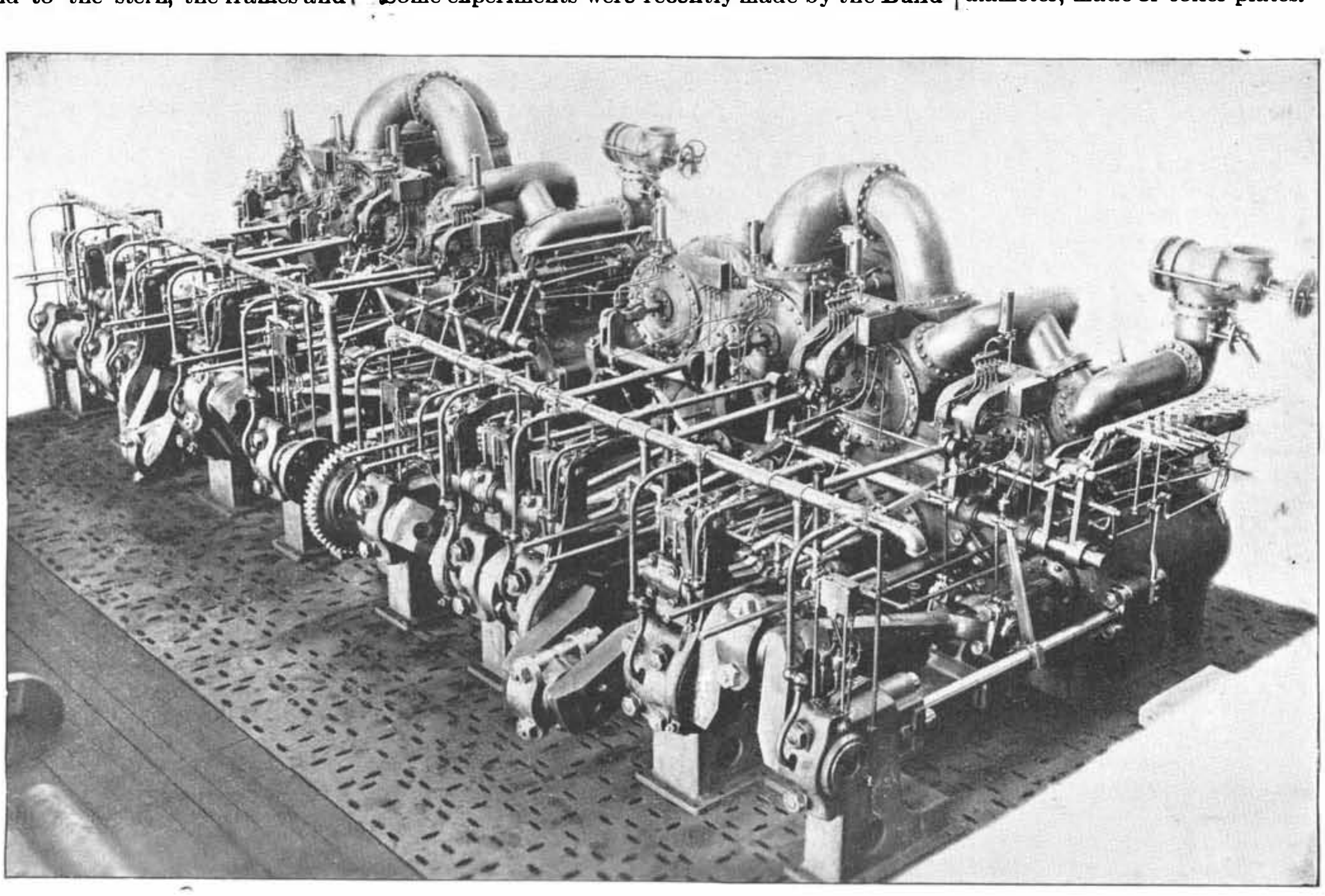
Bilbao now supplies about a fifth part of the iron ore yearly consumed in the United Kingdom. With regard to the output of iron ore in Biscay, and exports for the last 16 years at the rate of 3,000,000 to 4,000,000 tons per annum, the question has often been raised how long the mines may be expected to continue this yield. This is a matter very difficult to forecast, but it may be observed that the number of mines yielding good quality ores is becoming smaller, with the inevitable result that in the course of time the exportation will decrease, while the quality will deteriorate.

A Wire Fence Telephone Wanted.

"Down in Texas," says an electrical salesman, in Electrical Review, "I think there is a good demand for a telephone that can talk over 100 miles of barbed wire fence. On the ranches cowboys are kept 'riding the fence,' that is, riding up and down a section of barbed wire fence, inspecting it and keeping it in order. Many ranches are twenty, thirty, and fifty miles square, and if a serious break in a fence is found, the cowboy must ride back to the ranch to report. Now if a good telephone could be provided for each section, it would save all that riding. The staples holding the two top wires to the posts could be removed, insulators put in their places, and a man would have a complete metallic telephone circuit around his ranch."

THE UNITED STATES RAM KATAHDIN.

The possibilities of what may be accomplished by the ram in naval warfare have long been the subject of argument among naval experts, but the most important vessel ever specially designed and built for this purpose expressly is now nearly ready to be put into commission, i. e., the ram Katahdin, the engines of which are shown in the accompanying illustration. She was built after the plans of Rear Admiral Ammen, with whom the subject had been a favorite one for many years. She is a twin screw armor-plated vessel designed on the longitudinal and bracket system, with an inner bottom extending from the collision bulkhead to the stern. The longitudinals and girders supporting the deck are to be continuous, converging to the stem casting and to the stern, the frames and beams to be intercostal; the depth of longitudinals and vertical keel throughout their length to be 24 inches. the girders supporting the armored deck to be 15 inches. The vertical keel, two longitudinals, and armor shelf on each side of the vertical keel are to be watertight, forming transversely six compartments, these being divided longitudinally by watertight frames. By this means the space between the inner and outer skins is subdivided into seventy-two compartments. The transverse and longitudinal bulkheads between inner skin and deck armor divide this space into thirty compartments, making a total of 102 compartments in the vessel. The vessel is to be provided with a removable wrought steel ram head, to be accurately fitted and securely held in position in the cast steel stem. The principal features are:



ENGINES OF THE NEW UNITED STATES RAM KATAHDIN.

Length over all	243 ft.
Length on load water line	242 " 9 in.
Breadth, extreme	43 " 5 "
Breadth on water line	41 " 10 "
Draught amidships	15 "
Displacement	2,050 tons.
Indicated horse power	4,800 "
Speed	17 knots.

The outside strake of the deck armor is to be six inches in thickness, the next strake inboard to taper in thickness in its breadth from 5½ to 2½ inches, the remainder of the deck plating to be 2½ inches in thickness, including the lower course of plating. The side armor is to be two strakes in depth, the upper 6 inches in thickness and the lower 3 inches, to be secured by bolts with countersunk heads, driven from the outside through wood backing of yellow pine and two backing plates, each 20 pounds per square foot, and set up with nuts on rubber washers. All hatches through the armored deck are to have battle plates, and the smoke pipe and ventilators to have inclined armor 6 inches in thickness. The conning tower is to be 18 inches in thickness.

There are two engines, horizontal, direct acting, triple expansion, driving twin screws, the cylinders 25, 36, and 56 inches diameter, respectively, and with 36 inches stroke, common, with 4,800 horse power when making 150 revolutions per minute. The main steam valves are of the piston type, one for each high and intermediate and two for each low pressure cylinder, driven by Marshall radial gear, with compensating rock shafts, and all the valve gear except the rock shafts being interchangeable. The engine keelsons are built in the ship and the cylinders cast with brackets attached to be bolted together and to the keelsons. The cylinders are also attached by forged steel tie rods to the bed plates and engine frames. There is one forged steel piston rod for each engine, with a crosshead working on a cast iron bar guide, the valve stems being of forged steel. The crank shafts are in two sections for each engine, of mild forged steel, 10¾ inches in diameter in the journals and 11 inches in the crank pins, there being axial holes 5 inches in diameter through shafts and pins.

There is to be a complete installation of electric lights sufficient for lighting all parts of the vessel, and arranged in duplicate so as to guard against accident. The drainage system is to be so arranged that any compartment can be pumped out by the steam pumps. The vessel is to be submerged to fighting trim by means of valves, one in each transverse watertight compartment of the double bottom; and sluice valves are to be fitted in the vertical keel and the watertight longitudinals in these compartments. The only projections above the armor deck are the conning tower, smoke pipe ventilators, hatch coamings and skid beams on which the boats are supported. The vessel has no armament, and is to rely entirely on the ramming for her offensive power.

Protection of Iron Columns.

Some experiments were recently made by the Buildings Inspection Department, Vienna, on the protection of iron from fire by incasing it with brick. A wrought iron column, 12 ft. long, and built up of two channels connected by lattice bars, was used. This was set up in a small chamber constructed of brick, and the column was loaded by levers. This done, it was surrounded by a 4½ in. brick wall laid in fireclay mortar. The wall did not fit closely round the column, and advantage was taken of this to fix there samples of fusible metals, and which should serve as a gauge of the temperature attained. Various samples of stone concrete and other materials were also placed in the chamber within the column. This chamber was then filled with split firewood, which was lighted and the doors immediately walled up with slabs of plaster of Paris. After the fire had burned out, the doors were broken in and a stream of water turned into the room from a 14 horse-power fire engine. An examination of the room next showed that the walls of brick laid in Portland cement retained their strength, while most of the natural stones left in the chamber had been destroyed. The ceiling had been lined partly with plaster of Paris and partly with terra-cotta tiles. Both were damaged. The inclosure round the iron pillars was still standing firm, though corners of the brickwork were chipped 1 in. or so, and the fireclay mortar was largely washed out of the joints. On removing the casing, however, the pillar inside was found to be uninjured, even the paint being unscorched, and the fusible plugs only showed a temperature of 149 deg. Fah.

ACCORDING to a French journal, a Geneva firm is manufacturing phonographic clocks which talk the hour instead of striking it.

Mending Cracked Negatives.

To make a cracked negative fit for use, Dr. Miethe recommends the following process: Place the broken negative, the film of which must be intact, film side down upon a metal plate which has been heated so that it can hardly be touched by the hand. The break is then covered with Canada balsam, which readily melts and fills up the cracks. To give the negative more stability, a large piece of the Canada balsam is put upon the center of the back of the negative, and a clean glass plate the same size as the negative is laid over all. The melted balsam spreads out evenly, the excess being squeezed out. After cooling, the plates are still further fastened around the edges with strips of Sheplie gum paper.

Explosive Coal Dust Experiments.

It is reported that, at the recent meeting in Newcastle of the Federated Institution of Mining Engineers, some experiments were shown by the Flameless Explosions Committee of the North of England Institute of Mining and Mechanical Engineers, with the object of illustrating the effect of coal dust in explosive atmospheres composed of a mixture of fire-damp and air. The experiments consisted in firing gunpowder into the ordinary air; into an inflammable mixture of mine gas, direct from Hebburn Colliery, and air; into ordinary air with coal dust in suspension, and into ordinary air with coal dust lying quiescent. The shots were fired into a specially prepared chamber, consisting of a cylindrical tube, 100 feet long and 3 feet in diameter, made of boiler plates. The tube had safety vents at intervals along the top, closed by wooden plugs loosely knocked in; and its far end was closed before commencing any experiment with a sheet of brown paper. In the experiment with common air, fired into by gunpowder alone, a bright flash was observed in the chamber; and the brown paper was blown off the end of the tube. When coal dust was present, without gas, either in suspension or quiescent, the flash was considerably brightened and lengthened; and not only was the brown paper blown off the end, but a huge cloud of smoke was propelled for more than 30 yards from the mouth of the chamber, and many of the plugs were forcibly projected from the safety vents, being followed by rushing jets of thick black smoke, and in some instances flame—suggestive of the explosiveness of the mixtures of coal dust and air. The force of the explosion of fire-damp and air was also well exhibited.

A Train Wrecked by a Tornado.

On the afternoon of Sept. 12, a west-bound passenger train on the Iron Mountain Railroad at Charleston, Mo., had just reached the city limits when the passengers and crew noticed the approach of a funnel-shaped cloud which was dealing destruction to everything in its path, uprooting trees and hurling missiles before it. The train and the tornado met, and the wind lifted the cars and landed them 20 feet from the track, almost turning them over. Two persons were killed, and 11 injured.

Aside from the wreck, the damage done by the tornado was slight. Its path was not over 30 yards wide, and it did not extend more than a mile.

Wave Power.

A correspondent from Maryville, Mo., who obtained the idea from a spouting rock in California similar to the spouting rock of Newport, suggests a plan for collecting and utilizing sea water for power. His idea is to excavate a conical tunnel in the rock or the building of such a tunnel in the sand, through which the waves may force water intermittently into an elevated reservoir; the pipe between the tunnel and the reservoir being provided with a check valve. The water stored in the reservoir could be utilized for power at pleasure.