(For the Scientific American.)

A DAY'S ICE YACHTING ON THE HUDSON.

By invitation of Commodore Irving Grinnell, of the New Hamburgh Ice Yacht Club, the writer spent Monday, February 19, in the interesting sport of ice yachting on the Hudson, at New Hamburgh, 65 miles up the river. Mr. Grinnell and the writer prepared for the cold by donning warm overcoats and gloves, and protecting the feet and lower part of the legs from the wind by placing thick knit stocking legs over the junction of pants and shoes and under the indispensable "arctics." When ready, they proceeded from the house down to the river through the grounds, noting before starting that the thermometer was in the vicinity of the freezing point. There was a slight breeze, which soon freshened up, and the ice was in good condition, the morning's sun having as yet had but little effect on it. A safe course could be had for about two and a half miles from just above the New Hamburgh dock, up the river. With some misgivings, the writer lay down on the narrow deck of the Flyaway; and with the commodore at the helm the yacht was soon flying across the river. Flying expresses it; the sensation is like nothing else, and it is very pleasing, though at first one feels like holding on very tight, naturally expecting to be shot out on the glossy surface every time the direction of the craft is reversed. This turning around, with the speed abating but a little, is a queer sensation. The yacht is steered so as to spin around inside of her own length, or a little over, the skates scraping sideways along the ice, and the adhesion being such that she does not, as would naturally be expected, slide sideways for some distance over the ice before getting on her course again, but makes a perfectly circular track around. There were some eight or ten yachts sailing to and fro, tacking here and there on the ice; and occasionally two or three coming up the river together for a friendly trial, made fine pictures with the ice-bound river stretching down, the Tanzkammer bluff to the left, with the grand old Storm King in the distance.

The craft Flyaway has an extreme length of 25 feet from the end of her boom to the tip of her bowsprit; she is built very narrow, in more of a boat form than most ice yachts, the side timbers running past the mast and curving in to the bowsprit as in form of a sailboat; she is sloop rigged, and carries 342 square feet of canvas. When, from the number of times the yacht had been up and down the river, zigzagging here and there, the writer judged that he had been fully an hour on the ice, his watch recorded but 15 minutes. It is fast living; more impressions are received, and more events take place in a given space of time, than under any other conditions. One minute the boat was at New Hamburgh, and in another, before the observation was noted, she was a mile up the river. Time is constant, but distance loses its ordinary relations to it.

Strange to say, from the slight jarring produced by the runners on the ice way, those who are new to the sport feel a sensation much like that felt on the approach of seasickness; and it has even happened that persons have been veritably seasick. The rearing, which frequently occurs, does its share in causing this feeling, as does the quick spinning around before described. This rearing usually happens with a strong wind, and generally when the yacht is on a curve just after going about, and results in the windward runner rising some two or three or even four feet above the surface of the ice, the rest of the frame, and consequently the deck, rising in proportion, so that the uninitiated voyager naturally expects a capsize, the yacht running for a few seconds entirely on the leeward and rudder skates. The voyagers sailed with the wind abeam or from the west, the river's course at New Hamburgh running about a point east of north; and the boat usually made a tack and a half in a mile of straight course, keeping, as is always the case in ice yacht sailing, the sails flat aft, and steering so that the pennant at the masthead flew in a line with the gaff. When put directly before the wind to slow up, the pennant still flew aft, until the yacht's speed dropped down to that of the wind, the canvas shivering as if in the eye of the latter. At this diminished speed the yacht can be easily stopped by being spun around and brought head on to the wind. This is the method most generally adopted in heavy winds, instead of luffing up in the usual way from a beam wind. The vessel is anchored by placing the rudder at right angles to the keel, and lowering the jib.

In ordinary sailing, a vessel would be at her greatest speed before the wind; while in ice yachting it is just the contrary. Curiously, when sailing at a great speed with the wind abeam, or three quarters free, the yacht travels so much faster than the wind that the latter seems to blow from ahead. In beating to the windward, an ice yacht is pointed more closely, and her speed is about the same as that of the wind. An ice yacht attains her greatest speed when running in a direction somewhat similar to that in which the wind is blowing, making long legs to the leeward, or, as ice yachtsmen say, she "beats to the leeward." The resultant wind strikes her on the bows; and on changing from one leg to another, instead of "jibing," she goes into stays, with the wind, as before stated, apparently ahead.

A ice boat makes a good deal of noise, though it is not noticed much by the sailors. However, when standing on the ice and watching them, the "roar" of the skates can be heard over a mile away. The Flyaway, with Mr. Grinnell and the writer on board, participated in the morning in a scrub race with seven other yachts; but no fast time was made, the wind being fickle. The winning yacht made the six miles sailed in some 20 minutes. About midday, the Flyaway was headed for the shore; and it seemed to the writer as if she were going to run into the stone embankments of the railroad; but by a dexterous turn she was spun half around and stopped.

Mr. Grinnell and the writer then embarked on board the Whiff, the beautifully finished yacht which attracted so much attention at the Centennial Exhibition. The wind being somewhat more steady, some fine spurts were made; and with a ten mile breeze, the swift craft made successively, ½ mile in 45 seconds, 1 mile in 70 seconds, and finally 1 mile in 69 seconds, the latter being at the rate of 52⅕ miles per hour. The Whiff in the afternoon won a 12 mile race, to which about six miles should be added for tacking, in thirty-three minutes, there being two other contestants, the winner coming in a minute ahead.

As results of this day's yachting, the writer found that his face was burnt somewhat by the wind, that the muscles of the upper part of the body were somewhat sore from the straining in holding on to the yacht, and that, as he dropped off to sleep, ice was all around him, and he seemed to hear the crunch of the skates, and to be spinning around *ad infinitum*.

[Those of our readers who desire to construct ice boats on the most approved plans will find the full working drawings of the Whiff in SCIENTIFIC AMERICAN SUPPLEMENT, No. 63. Every detail, including runners, framing, rudder, sails, and rigging, is given to scale, with full particulars. We believe that no publication of the actual plans for building fast ice boats was ever made until those given last year, in our SUPPLEMENT No. 1, appeared. The two sets of plans (SUPPLEMENTS No. 1 and No. 63) cover the subject very fully; and as a result, the adoption and general use in all cold climates of the American forms of ice yachts may be expected. From Norway, Sweden, Russia, Germany, and Canada, many copies of these ice boat plans have already been ordered.—EDS.]

NEW YORK ACADEMY OF SCIENCES.

The chemical section of the Academy held their regular monthly meeting at the School of Mines, Columbia College, on Monday evening, February 12. The first paper of the evening was by Professor C. F. Chandler, Ph.D., on the

COMPOSITION OF PETROLEUM AND THE PROPER STANDARD OF SAFETY.

Professor Chandler stated that, although petroleum had been known for centuries, it had only recently come into general use for illumination, for the reason that suitable lamps had been wanting. Lamp chimneys were invented about the beginning of the present century, previous to which time there had been only smoky lamps such as are found at Pompeii. The inventor of lamp chimneys had done a great deal for civilization, by making it possible to read at night. In 1856, the manufacture of oil from Boghead coal was begun, and in a short time coal oil, or kerosene, had come into extensive use. Lamps had been devised for burning this coal oil, and proved suitable for burning petroleum. A company was organized to collect the petroleum, which was soaked up by blankets from the surface of pools of water. The speaker then described the boring of the first well by Colonel Drake, the subsequent excitement, the quantity of oil produced, and other incidents connected with it. The oil, he said, usually comes from Devonian rocks, which are much older than the carboniferous or coal measures. Petroleum contains about 85 per cent of carbon to 15 per cent of hydrogen. It consists of a series of hydrocarbons of the simplest kind known as the marsh gas or paraffin series, CH_4, C_2H_6, etc., or of the general formula $C\ H_{2n+2}$ The oils of Italy do not contain any of the lighter oils, which have already evaporated. In Pennsylvania, the rocks are impervious, and evaporation was consequently impossible.

In California, where the oil is more plentiful on the surface, there is but little beneath, as it has all run away or evaporated. There is another series of hydrocarbons called olefines, of the general formula C_nH_{2n}, but these do not occur to any considerable extent in American petroleum. They are distinguished from the paraffin or marsh gas series by the fact that they are attacked by sulphuric acid and converted into alcohol, so that the manufacture of alcohol from illuminating gas is a possibility. Alcohol was exhibited at the Paris Exhibition made in that way. There is some doubt at present whether the white solid which we call paraffin belongs to the paraffin or the olefine series; probably there are some of each series. There is another series of hydrocarbons known as the aromatic series, benzol C_6H_6, etc., which is found in Rangoon tar, but not in our petroleum. When benzol is treated with nitric acid, it is converted into artificial oil of bitter almonds. Dr. Chandler thought he had noticed this odor in treating petroleum with nitric acid. After a digression on artificial alizarine, the speaker described the method of refining petroleum by fractional distillation, the destruction of coloring matter and gummy substances by sulphuric acid, and washing with soda, to remove traces of the acid. Slugge acid is the name given to the acid after it has been in contact with the oil, and it is from this acid that we derive the foul odors wafted to this city from Long Island City by every easterly breeze. This acid is used in the manufacture of fertilizers In regard to testing safe and dangerous oil, Dr. Chandler showed some interesting experiments. Some oil was placed in an open tester and gradually heated on a water bath with a thermometer It was found to flash, or give off combustible vapors, at 110° Fahr.; and it burned at 118°, being what is called very safe oil. He then placed some of this same oil in a closed vessel resembling a metal lamp, but provided with a cork instead of the common head or burner, and having electric wires attached. On heating the oil to 85°, and sending a spark through the vapors, an explosion took place which blew out the cork with a loud report, showing that oil, which has been considered safe, gives out explosive vapor at ordinary summer heat.

DEVICES FOR SECURING PRESSURE IN FILTRATION

was the subject of a paper by Professor C. A. Seeley. He obtains the pressure on the principle of an aspirator, two bottles being employed and the water allowed to flow from one to the other.

This meeting was largely attended, a number of ladies being present, as is usually the case when the meetings are held at the School of Mines. Nor are we surprised at this, for Dr. Chandler's museum of chemical curiosities is always open to the inspection of the visitors, and recently this collection has received several important additions from the Centennial Exhibition. Among the finest of these is Bayer & Co.'s complete set of coal tar colors, both aniline and alizarine, with the intermediate products, each specimen being elegantly mounted with distinct gilt labels bearing the English and German name, and in many cases also the chemical formula. They are also numbered to indicate the order of manufacture; thus, Nos. 1 to 4 are coal, German, English, Scotch, and American; 5, coal tar; 6, benzol; 7, nitrobenzol; 8 aniline oil; 9, diamond fuchsine in large crystals; 10, silk dyed with fuchsine; and so on through each of the principal colors. Then came the rarer homologues of the benzol series, toluol, nitro and benitro toluol, chloride of benzyle; cumol, xylol, and toluidin; then naphthalin, nitronaphthalin, and napthylamine, muriate of aniline, a full set of methyl violets (ten in number), iodides of ethyl and methyl, wood tar, phenol (carbolic acid), rosolic acid, picric acid, and corallin. In the alizarine section, the same order is observed, coal, coal tar, anthracene (crude and pure), bibromanthracene, anthraquinone, sulphanthraquinonic acid, alizarate of sodium, and alizarine of seven different kinds, with specimens of cottons printed with them. Dr. Chandler has been particularly fortunate in securing to our city this beautiful and instructive exhibit, which he kindly places where all may see it free of charge.

American Fire Arms for the Turks.

The Providence Tool Company is at present filling the largest contract for arms ever given to a private armory. It is making six hundred thousand Martini-Henry rifles for the Turkish Government. At the close of last year there had been about one half of these rifles made and delivered. Recently the Turkish Government has been very urgent for the rapid fulfilment of the contract, and the works for some time have been turning out these arms at the enormous rate of one thousand per day.

Fire at the St. Louis Bridge.

A destructive fire took place a few days ago in St. Louis, Mo., among some shanties and frame buildings at the east end of the great bridge. A stiff breeze was blowing at the time, and the fire spread so rapidly that it was some hours before it could be checked, and by that time 1,000 feet of the approach to the bridge was rendered impassable, and it is likely to remain so for some time. The skeleton of the approach remains, all the woodwork having been destroyed. The damage to the bridge is estimated at $125,000.

Fruit Trees.

It is a good practice to wash the trunk and main branches of fruit trees with lime wash. If the white color is not agreeable, a little soot can be put in to neutralize the glare. The wash destroys the eggs of insects and the germs of fungi, and keeps the bark free to swell as the cells grow. Where the white scale abounds on the bark the branches may be painted with linseed oil. It is a sure cure, and really seems to make the tree more healthy and vigorous than it would be without the wash.

A New Anæsthetic.

A new anæsthetic has been described by M. Rabuteau before the Academy of Sciences, Paris. It is hydrobromic ether, which, he says, can be administered without difficulty, and which is, moreover, eliminated almost completely by the respiratory passages. It holds an intermediate place between chloroform, bromoform, and ether. Considering the frequent recurrence of chloroform accidents, any new anæsthetic which promises to yield a greater degree of immunity from danger of a fatal result is worthy of trial.

Inventions Patented in England by Americans.

From January 17 to February 1, 1877, inclusive.

CONNECTING LINK.—J. Mann, Buffalo, N. Y.
DRAWING WIRE.—American Screw Company, Providence, R. I.
DRYING LUMBER, ETC.—P. Pfeffer, New York city.
ELECTRIC LOG.—J. P. Haines, New York city.
EQUALIZING MOTION.—R. D. Milne, Santa Barbara, Cal.
INFUSION POT.—J. Cromwell, Cranford, N. J.
KNITTING MACHINERY.—C. J. Appleton, Philadelphia, Pa.
LIFE BOAT, ETC.—M. Bourke, Mineral Ridge, Ohio.
MAKING BRUSHES.—J. L. Whiting, Boston, Mass.
MARINE GOVERNOR.—G. Steele, New York city.
OIL STOVE, ETC.—J. J. Jarves (of Boston, Mass.), Florence, Italy.
PIANOFORTE KEYBOARD, ETC.—E. Esbelby, Whitestone, N. Y.
PICKLING WIRE.—American Screw Company, Providence, R. I.
PIPE JOINT.—J. F. Parsons, New York city.
PRINTING FABRICS.—J. Harley, Lowell, Mass.
PULVERIZER, ETC.—A. B. Lipsey *et al.*, Hoboken, N. J.
PUMPING ENGINE.—J. B. Waring *et al.*, Stamford, Conn.
REFRIGERATING, ETC.—J. J. Bate, Brooklyn, N. Y.
SCALLOPING BOOT UPPERS.—W. Manley, Rochester, N. Y.
SETTING BOILER TUBES.—Tube Setting Company, Salamanca, N. Y.
TRANSMITTING MOTION, ETC.—T. A. Weston, Stamford, Conn.
WATCH MOVEMENT.—Elgin Watch Company, New York city.
WEAVING TUFTED FABRICS.—A. Smith *et al.*, Yonkers, N. Y.
WIRE FENCE.—T. Seabury, St. James, N. Y.