

of the ladder. The continuous bucket chain comes up the top side of the ladder on rollers round the top tumbler and back in a catenary curve to the lower tumbler. The top tumbler is driven through a rope transmission and heavy gears by the engine, a vertical compound condensing one, which also drives the pump and indicates 35 horse power.

The buckets discharge the material onto a delivery plate, down which it shoots into a revolving screen or grizzly. The centrifugal pump, throwing 3,000 gallons per minute, supplies water to a perforated pipe inside the screen. This water thoroughly washes the material, the finer wash dirt and gold going through holes in the screen and falling into a distributing box. From the distributing box it passes onto a set of gold-saving tables, 11 feet wide, over which the wash dirt runs in a thin or shallow stream, and thence into a flume. The tables are covered with cocoa matting and expanded metal, a finer gold saver than which was never used. The stones and rocks pass through the screen down a stone shoot, either direct into the river, or, when working into a high face of gravel, onto a tailings elevator.

Broadly speaking, with such a dredger as is above described, any ground which is not deeper than 60 feet below water level nor more than 20 feet above, and which contains boulders of not more than say one ton weight, can be handled at from 3 to 5 cents per cubic yard. The ground need not be in a river, provided the seepage is sufficient to float the dredger and keep the water clean enough to wash the dirt with. The introduction of this dredger will revolutionize placer mining in this country and will render valuable large tracts of land heretofore, on account of their low grade condition, unworkable and consequently worthless.

How it Feels to be Asphyxiated.

Philip Rearden, superintendent Abbott Quicksilver Mining Company, of Illinois, Sulphur Creek, California, relates his experience with mining gas in The Mining and Scientific Press, San Francisco, as follows:

In our mine we sometimes have to contend with sulphureted hydrogen, chlorine gas, carbonic acid gas and marsh gas, sometimes called fire damp; and lately have had all these to contend with at the same time and place. We had struck the ledge, finding, in addition to these gases, some petroleum, with a heavy flow of water equal to about 4 miner's inches when we were driven out of the tunnel by the excess of sulphuric acid gas, called by our miners sore eye gas, owing to the fact that it affects the eyes so that the men are temporarily blind, and suffer great pain while the eyes are affected. We had discontinued work temporarily, while preparing to put in artificial ventilation. I and my brother went in to examine the tunnel. He had stopped to look at something about 250 feet from the breast. I went ahead to the breast carefully trying for carbonic acid gas along the floor with a candle, also along the roof of the tunnel for marsh (or inflammable) gas. I found neither with the light, but within a few seconds after reaching the breast, where a large flow of water was coming out of the ledge, I found that I was getting very short of breath. I tried to recover, but could not do so. My candle was burning brightly. I turned and ran back toward the mouth of the tunnel, perhaps 100 feet, at the same time calling to my brother to come to me. I began to get weak, lose consciousness, and fell to the floor. I could not rise again, although trying hard to do so. I felt just like one in a nightmare, trying to move, but unable to do so; but felt no pain whatever, not even strangling or coughing sensation. At this point my brother reached me, and pulled me back toward better air, where I revived within a minute or two. In this case asphyxia was probably caused by chlorine gas.

I have several times helped to take men who had been suffocated out of mines, and their faces and positions showed no signs of pain or any suffering. I had wondered at this, but now I know how a person might be asphyxiated while his light burned brightly, and would suffer no pain whatever to warn him of approaching danger.

Feeding Plants.

The following note by Mr. Paul, of Cheshunt, in The Gardeners' Chronicle, October 23, 1897, on the method employed by M. Georges Truffant of administering artificial food to plants, is of considerable interest to horticulturists. After an analysis of the ash of the living plant, the necessary salts for a given time, such as six months, are weighed out and inclosed in a metal cover to form what is called a "pill," which is presumably inserted in the pot, diffusion of the salts taking place through the folds of the metal, and the thicker the metal, the slower the diffusion. As the salts dissolve and disappear they are replaced by a core which expands until it completely fills the "pill." The salts have no action on the metal cover, which remains firm and hard. It is stated that the solubility of the salts can be so regulated that a "pill" may be made to last three or six months, as may be desired. By this method of feeding large well colored plants are grown in pots of less than half the usual size.

A LATEEN ICE BOAT.

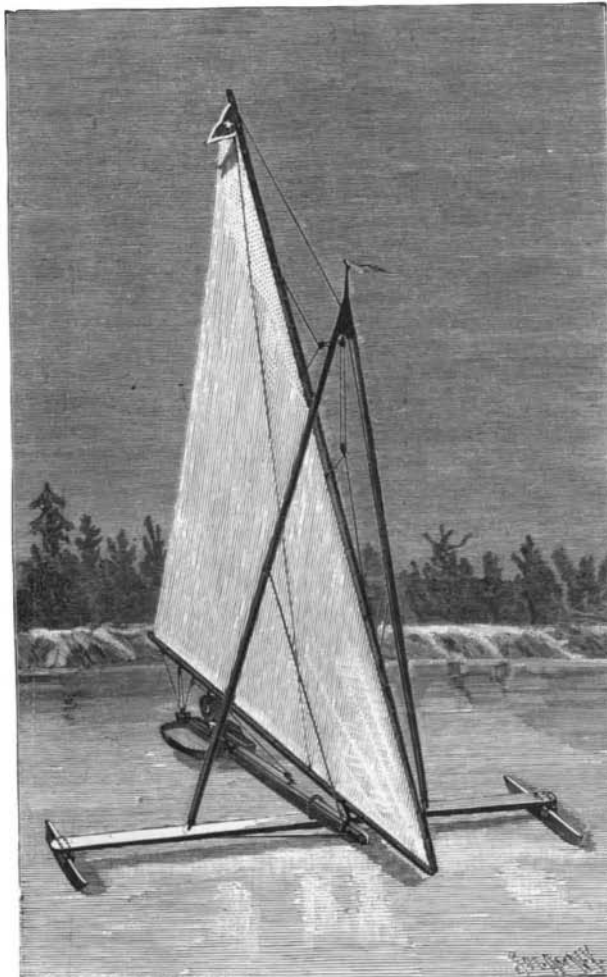
During the past few years much study has been given to the best form of a sail for an ice boat for the purpose of obtaining the greatest propelling result under a given force of wind pressure.

One fault of the ordinary square sloop sail was that the force exerted above the center of the sail was so great at times as to cause the windward runner to rise from the ice and tilt the sail to such an angle that the wind would spill over the top of the sail and prevent the attainment of high speed.

Lately it has been the study of ice boat experts to overcome this defect and provide a sail and rigging which would remain in a vertical position and prevent the leakage or loss of wind power. This has been successfully accomplished by the adoption of the lateen triangular sail especially rigged and designed by H. Percy Ashley, of this city.

It will be seen from the illustration that the center of pressure is quite low near the boat, and by making the sail taut or by bagging it the proper wind angle can be easily ascertained. The area of the top of the sail is so small as compared with the lower portion that there is never top pressure enough to raise the windward runner off the ice.

The mast, it will be observed, is composed of two parts forming an inverted A, or it may be called a wish-bone mast. The sail is held by a bridle which is raised and lowered by a halyard in the usual way. The runners are of the rocker type, curved at each end.



AN IMPROVED ICE BOAT.

Practical trials of lateen boats on the Shrewsbury River, Hudson River and in Canada have proved them to be more comfortable and speedy than the ordinary style. A model of one was exhibited at the Sportsmen's exhibition in this city lately and attracted considerable attention.

Working plans of this ice boat will be found in the current issue of the SUPPLEMENT, No. 1154.

The Largest Steamship Companies of the World.

According to the latest edition of the "Repertoire General" of the Bureau Veritas, there existed upon the registers of the various maritime nations at the time of the publication of the work 29,315 sailing vessels measuring 8,894,732 register tons (against 29,348 ships and 9,136,560 tons in the previous edition of the book), as well as 11,271 steamers measuring 17,889,006 register tons (against 11,155 steamers and 17,089,596 tons). These figures show that steam tonnage is still increasing at the expense of sailing tonnage, but that the latter is decreasing in a smaller proportion than was noticeable a few years ago.

The publication of this new volume renders it possible, says The Marine Record, with the added assistance of Lloyd's Register and other authorities, to complete a list of the most important steamship companies of the world, and to show precisely how they compare with each other. According to the statistics thus available, it appears certain that the claim which has been frequently put forth on behalf of the Hamburg-American Packet Company of being the largest shipping company in existence is a just claim, beating as it does the largest

British company (according to tonnage, the Peninsular and Oriental Steam Navigation Company) by 3,805 tons gross and 10,154 tons net. The following is the list:

| Companies. | No. of vessels. | Gross tonnage. | Net tonnage. |
|---|-----------------|----------------|--------------|
| British. | | | |
| P. & O. Steam Navigation Co. (London)..... | 60 | 252,140 | 164,836 |
| British India Steam Navigation Co. (London)..... | 97 | 251,429 | 162,482 |
| T. Wilson, Sons & Co. (Hull)..... | 82 | 159,793 | 103,450 |
| Pacific Steam Navigation Co. (Liverpool)..... | 41 | 128,336 | 77,774 |
| Cunard Steamship Co., Limited (Liverpool)..... | 27 | 119,471 | 65,011 |
| Ismay, Imrie & Co. (White Star Line) Liverpool..... | 21 | 114,290 | 68,264 |
| Union Steamship Co. of New Zealand (London)..... | 52 | 65,239 | 39,371 |
| Irrawaddy Flotilla Co., Limited (Glasgow)..... | 42 | 20,393 | 12,367 |
| German. | | | |
| Hamburg-American Packet Co. (Hamburg)..... | 69 | 296,945 | 174,990 |
| North German Lloyd (Bremen)..... | 67 | 265,613 | 152,126 |
| Hamburg S. American S. Nav. Co. (Hamburg)..... | 32 | 100,646 | 65,422 |
| Hansa Steamship Co. (Bremen)..... | 37 | 84,867 | 54,446 |
| French. | | | |
| Messageries Maritimes Co. (Marseilles)..... | 63 | 229,837 | 114,000 |
| Comp. Generale Transatlantique (Paris)..... | 64 | 166,701 | 72,713 |
| Italian. | | | |
| Navigazione Generale Italiana (Rome)..... | 96 | 171,041 | 105,598 |
| Austrian. | | | |
| Austrian Lloyd (Trieste)..... | 72 | 146,560 | 87,800 |
| Spanish. | | | |
| Compania Transatlantica (Barcelona)..... | 36 | 121,161 | 78,702 |
| Danish. | | | |
| United Steamship Co. (Copenhagen)..... | 109 | 85,525 | 50,719 |
| Russian. | | | |
| Russian Steam Nav. and Trading Co. (Odessa)..... | 75 | 80,659 | 53,342 |
| Turkish. | | | |
| Idarei Massousich (Constantinople)..... | 69 | 57,842 | 35,664 |
| Japanese. | | | |
| Nippon Yusen Kabushiki Kwaisha (Tokio)..... | 68 | 161,698 | 101,383 |

The following are seven of the largest steamers afloat:

| Name. | Length, feet. | Breadth, feet. | Depth, feet. | Gross tonnage. | Net tonnage. | Displacement, tons. |
|------------------------------------|---------------|----------------|--------------|----------------|--------------|---------------------|
| Kaiser William der Grosse (Ger.).. | 625 | 66 | 43 | 14,349 | 5,521 | 20,500 |
| Lucania (Brit.)..... | 601 | 65 | 37 | 12,952 | 4,975 | 18,000 |
| Campania (Brit.)..... | 601 | 65 | 37 | 12,950 | 4,974 | 18,000 |
| Kaiser Friedrich (Ger.)..... | 600 | 64 | 41 | 12,000 | | 17,000 |
| Pennsylvania (Ger.)..... | 560 | 62 | 42 | 12,261 | 7,861 | 23,500 |
| Pretoria (Ger.)..... | 560 | 62 | 42 | | | 23,500 |
| Augusta-Victoria (Ger.)..... | 523 | 56 | 33 | 8,479 | 3,563 | 15,260 |

Washington's Tree.

The great court of the pension office at Washington has, since the advent of the present administration, been turned into a scene of tropical beauty and freshness second only to the government greenhouses of the capital city. Through the efforts of Commissioner Evans, Chief Clerk Bayly, and especially Superintendent Barnes, donations of trees and plants have been secured from the National Botanic Garden and other sources.

A valuable addition to the collection was recently made by Col. Bingham, who has charge of the White House conservatories. As the palm house adjoining the Executive Mansion was needed to accommodate the Marine Band on state occasions, the largest trees were transferred to the pension office. Among the number are some noble specimens of Sabal, Cocos and Seaforthia, but by far the most interesting tree is a venerable sago (Cycas revoluta) which once belonged to George Washington. This priceless relic is known to be at least two hundred years old, and yet it appears to be in its prime, putting forth regularly every two years a new crown of beautiful, feathery leaves and a mass of woolly, yellowish-white flowers and fruit.

Many unsuccessful attempts have been made to obtain a complete history of this tree, which is perhaps the oldest specimen of its kind in the United States. The following facts were obtained from Mr. Pfister, head gardener of the White House, and it is probably all that will ever be known of the past life of the wonderful old sago:

About the year 1780, a Baltimore merchant, owning a line of small vessels plying between that city and Havana, brought over from Cuba this tree, which was then of advanced age. As it was probably the only specimen of its kind in this country at that time, it was a genuine curiosity, and the merchant presented his prize to the first president. The tree stood about ten years in the grounds at Mount Vernon, and then it went back to Baltimore, Washington having given it to a lady of that city. For many years it remained in her family.

Fifty years ago there was a public sale of this lady's estate. Hearing of this, the head gardener hastened to avail himself of the opportunity to gain possession of the historical tree. He attended the auction for that purpose, and, after some sharp bidding, secured the prize (at what figure is now unknown) and placed it in the conservatory at the Executive Mansion, where it has stood ever since, until removed to the pension office.

The tree stands about six feet high above the surface of the earth in its box.

For these particulars we are indebted to Mr. L. S. Perkins, of the pension office.