arranged at equal distances between the two first, and each end of each is attached by a nipple to a transverse pipe three feet and four inches long, the ends of which are inserted into the corner cubes, and an iron rod three eighths of an inch in diameter, passes through each short pipe and through the corner cubes, and terminates in a screw nut at each end. Another like arrangement of seven pipes is placed four feet above the first, and secured in that position by one hundred vertical copper tubes, two inches in diameter, made of No. 24 copper plate; and each end of each copper tube has a brass head brazed in, with a projecting nipple one inch in diameter, extending an inch and a half from the end of the tube. These nipples are hollow nearly to the ends, and have a half-inch aperture on one side of each, in the center of an indenture curved to fit the sides of the long horizontal pipes above and below; one side of each pipe being perforated to match the corresponding holes in the sides of the nipples; and the nipples being attached to the side of each pipe by short brass straps, the two ends of each of which are fastened to the pipes by screws, while the center, being curved, passes over the nipple, holding it fast to the pipe. Twenty vertical tubes in each of five rows, are thus attached to the ten horizontal pipes above and below, and thus all the pipes and tubes have free communication with each other, and are so connected that one or more of the tubes may be readily detached without disturbing the others; or all the tubes and pipes may be taken apart for cleansing, and reconnected as occasion may require.

A grate nine inches wide, is placed between each two rows of pipes, at the bottom; and the lower portion of the tubes, to the hight of two feet, is incased in a double casing of sheet iron, lined with thin plates of soap-stone, or fire brick. Between each two rows of tubes, is a hollow lid two inches thick, with a handle, to be removed for feeding the fire with charcoal. The edges of these lids rest upon strips of iron plate, fitted to each side of each row of tubes, and plastered over with clay. The entire weight of this boiler is 550 lbs. The water required to fill it half full is 30 gallons. The amount of fire surface is 100 square feet; its working capacity, twelve-horse power. The smoke-pipe—four inch tin—extends horizontally 200 feet, rearward. The two light brass engines, are plain and common, possessing no special novelty.

The buoyant power of the float, as estimated, is 15,051 lbs. The weight of the saloon 1,000 lbs; weight of boiler 550 lbs.; weight of engines, propellers, and other machinery, 200 lbs.; weight of replenishers, 200 lbs.; weight of smoke-pipe, rudder and wires, 201 lbs.; weight of water, fuel, and furniture, 900 lbs; thus leaving a net balance of 12,000 lbs., sufficient to carry 140 passengers with light baggage.

When the float is inflated, the saloon must be partly freighted with boxes of sand provided for that purpose; and when passengers or freight are received, an equal weight of ballast will be discharged, and *vice versa*. When not in use, the aeroport will be safely moored at a convenient hight, to some permanent object. A large screw, on the principle of a cork-screw, to be screwed into the ground by means of a hand-spike, will be employed for holding the aeroport when moored. Moreover, for better security, a small line connected to the large safety valve of the float, will be brought to the ground with a small weight attached: so that should the aeroport escape by any means from its moorings, the weight will hold the valve open until it descends to the earth.

Whenever there is occasion to come to land, the rudder is depressed so as to turn the head of the float downward until the saloon comes near enough to the earth to send down the elevator. If there is wind, the aeroport will be brought to head to the wind, and the motion of the engine slackened until the aeroport becomes horizontally stationary, and descends vertically. When the float is inclined in either direction the tendency of the gas will be towards the highest part, and this tendency must be sometimes counteracted by means of the compressing ropes.

It will not be expedient, generally, to run higher than from 500 to 1000 feet; but in case of an approaching squall, or thunder gust, the aeroport may readily ascend high enough to pass over them. Prof. Wise has on several occasions, enjoyed a beautiful sunshine, and serene atmosphere, while a violent thunder-storm was raging below him. In case of running above the clouds, or in foggy weather, the altitude may be generally ascertained by the barometer; but it will be sometimes requisite, especially for the purpose of ascertaining the course, or direction of the wind, to drop an arrow-shaped rod of light wood, which will descend perpendicularly while the wheels are stopped; and as soon as it strikes the earth or water, the change of the direction of the twine attached to the rod, will show both the direction and velocity of the wind. But when the earth or water is in sight, a simple plano-convex lens, with a piece of semi-transparent paper placed in its focus will promptly show both the direction and velocity of the aerial vehicle.

With regard to guiding the aeroport, when a side wind prevails, the pilot has only to head the float to windward, according to the relative velocity of the aeroport and the wind. For instance, if the aeroport is running due west, with a speed of eighty miles an hour, while a gale from the north is traveling at the rate of forty miles, the float must be headed four points, or twenty-two degrees, to windward, in order to hold its westerly course. The pilot will know what direction he is moving, by the direction which the trees and other objects on the earth, *apparently* move.

A compass with a large dial, may be mounted at the hight of two feet from the floor of the saloon; and near it, an apperture, two inches in diameter, may be made through the floor, and a convex lens, of four feet focus, set therein. Then by adjusting a mirror one foot above the compass dial, the most conspicuous objects on the earth will be reflected upon the dial, and their movements thereon will plainly indicate both the direction and velocity of the aeroport; and the size of the objects upon the dial, will in measure indicate the altitude. For this purpose, the compass dial should be partly shaded from the direct light of the windows; and if the central part of the dial be crossed with lines one fourth of an inch apart, crossing each other at right angles, these indications will be the more readily comprehended.

Whirls or circular currents in the air will be readily indicated by the variation of the course of the aeroport, which will be counteracted by a change of helm; and if not, the aeroport will quickly shoot out of the whirl. And in case of encountering vertical currents in either direction, it is well known that they never occur suddenly, but so gradually as not to change materially the horizontal position of the float; and a ready counteraction may be effected by the rudder, without either expanding or compressing the float.

It has been supposed by some that common linen cloth, either French or Holland, would not be strong enough to sustain so much weight. To refute this conjecture, it may be proper to explain, briefly, the nature and principles of the buoyant power, which is to sustain the aeroport and its freight. Aerial buoyancy, does not, as generally supposed, consist in the tendency of the hydrogen gas to ascend, and press against the upper interior of the float; but in a greater pressure of the atmosphere against the bottom of the float, than upon the top thereof. The weight of a column of air, one square foot and forty feet high (the diameter of the float) is three pounds; therefore, the atmospheric pressure against the bottom of the float is greater by three pounds per square foot, than that upon the top, and this would be the true force with which the balloon would ascend were it not for the weight of the hydrogen gas, which, being three ounces per forty cubic feet, reduces the buoyant force to about two and three-fourths pounds per foot of the central portion of the float, and this is the greatest force or pressure that is to be sustained by the cloth. Yet it is readily shown by experiment that the ordinary linen, will sustain more than twelve times that amount of pressure, when supported by the longitudinal rods of the float. Moreover, the float may be kept so full of the gas, by adding a little additional weight to the bellows of the replenisher, as to counteract, in measure, the atmospheric pressure upon the lower part.

It has been supposed by some, that if a rent should occur in the float, the whole apparatus would rapidly descend. But the float having several compartments, if a rent should occur in either one, the descent of the aeroport would be so moderate, that the pilot would have ample time to select his ground to land upon. And should such descent occur over water, the saloon is to be provided with an ample supply of inflated sacks attached to the floor under the seats, which constitutes it an excellent life-boat. A rent is readily and easily repaired, and a small balloon will be kept in readiness, and may readily be inflated, whereby a man or boy may ascend and repair the rent. But as only the bottom of the float is liable to get damaged, the gas would not readily escape. All parts of the saloon will be rendered incombustible by saturation with borate of soda, applied to the materials prior to its construction.

Mr. Porter thinks there would be no difficulty in constructing an aeroport or flying ship, capable of carrying 500 passengers safely to any part of Europe, in three days or less. Even if strong and heavy canvas should be employed in the construction of the float, there would be ample buoyant power to support it with an engine of 100-horse power, and fuel and provisions for ten days. That disasters *may* occur, he does not deny, but maintains that this mode of traveling will be incomparably more safe than by either marine vessels or railroads.

ORANGE MARMALADE.—Cut the oranges in half, then take out the pulp and juice, separating all the skins and pips. Put the rinds into salt and water for a night; the next morning put them into a stewpan with fresh water. Let them stew until soft, so that a straw can be run through them easily; cut the peels into thin strips. To every pound of fruit add one pound and a half of coarse white sugar. Put the juice, pulp, and peel, with the sugar, into the stewpan, and let it boil twenty minutes. Seville oranges must be used, and the marmalade is better if kept six months. The juice and grated rind of two lemons to every dozen oranges is a great improvement.—*Jessie Piesse.*

NEW PUBLICATIONS.

STRUGGLES AND TRIUMPHS; or, Forty Years' Recollections of P. T. Barnum. Written by Himself. 8vo., pp. 780. J. E. Burr & Co., Hartford, Conn.

Many years ago, Barnum, then in the heyday of his glory as a showman and manager of the American Museum, wrote and printed a book of life sketches, which had a large sale. Nevertheless its publication brought down upon him much undeserved criticism and abuse. The people knew that he styled himself the "Prince of Humbugs," and, moreover, they enjoyed the fun of his book, wherein he told them exactly how, and in what way he had prepared his curious feast of funny things to gratify their appetites; but somehow the newspaper critics made some people believe that it was a naughty thing in any man to humbug and then tell all about how it was done. Well! times have since changed. Barnum has passed through an eventful career, of much tribulation, and more success, and now at the age of sixty years he comes out on the successful side with a new book, very unlike the old one, wherein he tells the story of his career from boyhood, introducing for that purpose many spirited illustrations, unique and laughable anecdotes, and a great variety of personal experiences as a youthful trader. Editor, preacher, traveler, showman, farmer, politician, lecturer, financier—indeed it would be difficult to say what Barnum had not been up to during these 40 years of struggles and triumphs. His hospitality is princely; his fund of humor inexhaustible, and, taken altogether, Barnum is one of the rarest specimen of human nature to be met with. His book will afford instruction and amusement to the thousands who read it.