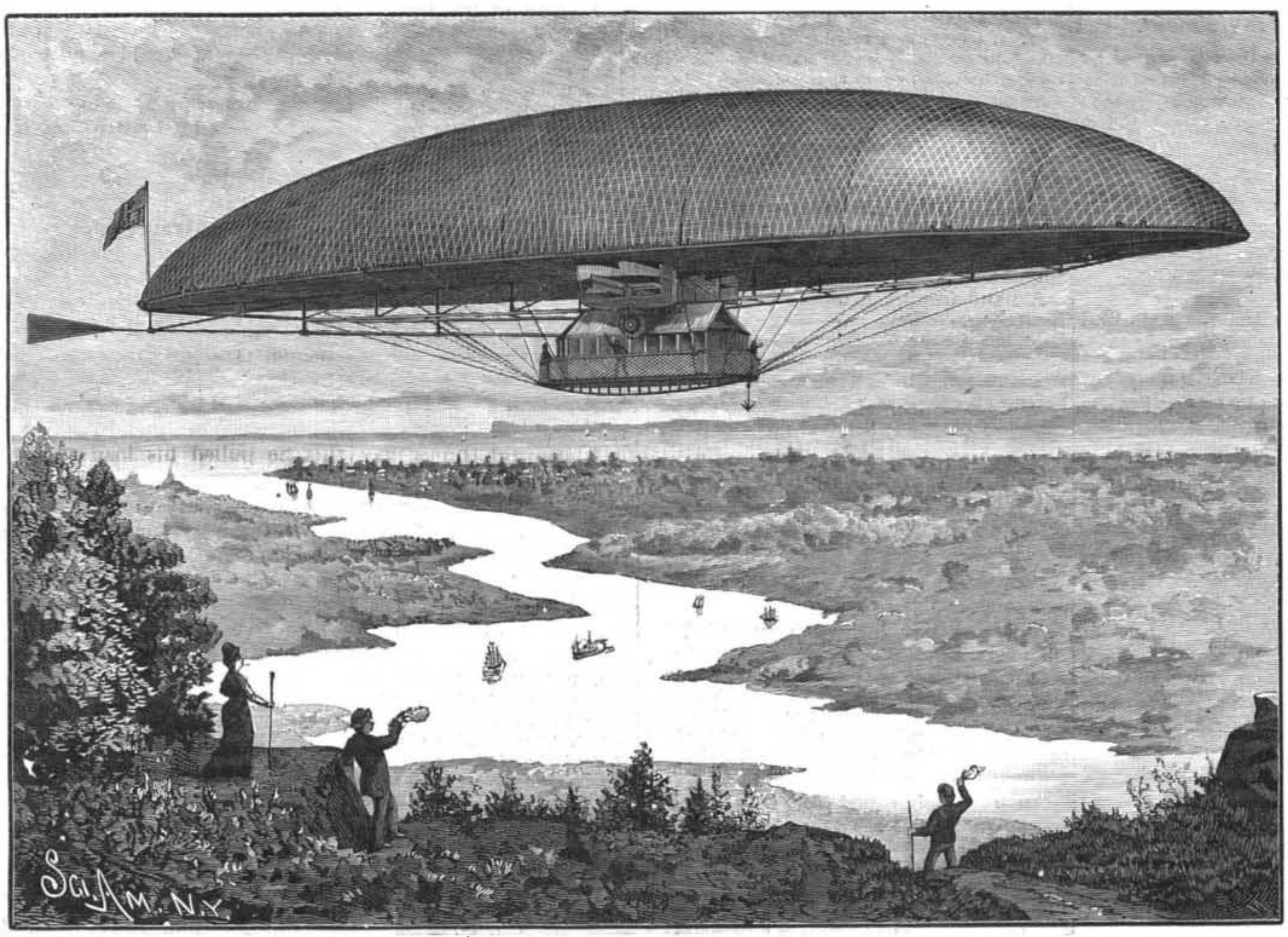
BRAUN'S ELECTRO-DYNAMIC AIR SHIP.

The balloon of this air ship is in the form of half a cigar, presenting a flat under side, and made with a number of independent gas cells, seven of these cells being represented in the view given in our illustration; but these cells are again divided longitudinally with the axis of the ship, thus making fourteen separate compartments in all. The base and contiguous faces of the cells or chambers are straight, their exterior being curved to conform to the desired shape of the balloon, and the walls of the cells may be made of silk or other fabric impervious to air, or they may be made of thin sheets of aluminum. These cells or chambers are surrounded and held together by a netting or covering, making a sectional gas holder, whose bottom is supported upon a framework with horizontal cross pieces, resting in the middle upon a grate-like keel, a binding wire or rope passing around the outer edge, connecting the ends of the horizontal cross pieces, and holding the netting or covering in place. The boat or cabin is suspended from this framework, and from it the elevating, propelling, and steering apparatus is controlled. The cabin carries a battery for the motors, a windlass with cable and grappling hook, compass, electric lamp for night work, instantaneous photographic apparatus, and other conveniences.

The controlling idea in this construction is to have the balloon comparatively small, so that the whole apparatus, when the gas cells are filled, will be about the ordinary weight of air, the ascensional and propelling power to be obtained from an electric motor of any approved form, one of two horse capacity being deemed to have ample power to make a practically operative air ship according to this invention. The elevating and propelling mechanism consists of two horizontally revolving wheels, operated from the main shaft mounted in the car, each wheel being an air screw or an elevator and a propeller combined, the air screw being directly above the propeller, which is designed to act upon the air like the wing of a bird, regulating also the course of the ship to right or left, by means of a hand wheel under the control of the aeronaut in the cabin, whereby also the vanes or blades of the propeller screw may be readily changed to different inclinations. The rudder is operated by a tubular steering rod, supported within the car by a stationary bracket, and having a hand lever, whereby the rudder is adapted to be rotated about its longitudinal axis and be deflected laterally to the axis. In order to compensate for the weight of the occupants, and keep the vessel in a horizontal position, a shifting weight is employed, adapted to run on wire ropes or tracks, the weight being attached to and moved by an endless band; this weight under the framework forward and the rudder at the stern both being made to act as balances, and under control by the aeronaut from a common standpoint in the cabin.

This invention has been patented by Dr. Martin Braun, of Cape Vincent, N. Y.



BRAUN'S ELECTRO-DYNAMIC AIR SHIP.

Determination of High Temperatures.

M. Walrand, a civil engineer, has invented the following highly practical process for determining the temperature of metallurgical furnaces. It has already been applied to a Siemens-Martin furnace, but the principle is equally applicable to other systems of furnaces. It is based on the observations of the oscillations of a seconds pendulum, hung against the wall of the furnace near the furnace tender. It is a simple rod, with suspending eye at one end and screw at the other, for holding and adjusting its bob. It is first regulated by a reliable watch, so as to beat seconds. When the operative wishes to know the temperature of his furnace, he introduces a bar of iron into it by a suitable opening. This bar is made of iron 8 millimeters (one-third inch) in diameter, and is kept 21 seconds in the furnace, according to the pendulum, which is started swinging. It is then withdrawn, and if it has attained a welding heat, that is to say, if it throws out sparks as it is withdrawn, the furnace is hot enough. This method, of course, gives no absolute temperature, but it is accurate enough for practical needs.

Plaster for Interior Work.

The mortars used for inside plasterings are termed coarse, fine, gauge, or hard finish, and stucco. *Coarse Stuff.*—Common lime mortar, as made for brick masonry, with a small quantity of hair, or by volumes, lime paste (30 pound lime) 1 part, sand 2 to 2¼ parts, hair ⅙ part. When full time for hardening cannot be allowed, substitute from 15 to 20 per cent of the lime by an equal proportion of hydraulic cement. For the second or "brown coat" the proportion of hair may be slightly diminished. *Fine Stuff* (*Lime Putty*).—Lump lime slaked to a paste with a moderate quantity of water, afterward diluted to the consistency of cream, and then allowed to harden by evaporation to the required consistency for working. In this state it is used for a "slipped coat," and when mixed with sand or plaster of Paris, it is used for the "finishing coat." *Gauge Stuff*, or hard finish, is composed of from three to four volumes fine stuff and one volume plaster Paris, in proportions regulated by the degree of rapidity required in hardening; for cornices, etc., the proportions are equal volumes of each, fine stuff and plaster. *Stucco* is composed of from three to four volumes of white sand to one volume of fine stuff or lime putty. *Scratch Coat.*—The first of three coats when laid upon laths, and is from ¼ to ⅜ of an inch in thickness. *One coat work* is plastering in one coat without finish, either on masonry or laths—that is, rendered or laid. *Two coat work* is plastering in two coats, done either in a laying coat and set or in a screed coat and set. The screed coat is also termed a floated coat. Laying the first coat in two coat work is resorted to in common work, instead of screeding, when the finished surface is not required to be exact to a straight edge. It is laid in a coat of about half an inch in thickness. Except for very common work, the laying coat should be hand floated. The firmness and tenacity of plastering is very considerably increased by hand floating. *Screeds* are strips of mortar 6 to 8 inches in width, and of the required thickness of the first coat, applied to the angles of a room or edge of a wall, and parallelly at intervals of 3 to 5 feet all over the surface to be covered. When these have become sufficiently hard to withstand the pressure of a straight edge, the interspaces between the screeds should be "filled out" flush with them, so as to produce a continuous and straight, even surface. *Slipped coat* is the smoothing off of a brown coat with a small quantity of lime putty, mixed with 3 per cent of white sand, so as to make a comparatively even surface. This finish answers when the surface is to be finished in distemper or paper hangings. *Hard finish* is fine stuff applied with a trowel to the depth of about one-eighth of an inch.—*C. H. Haswell, in the Architect* (*London*).

Electric Bleaching.

At a recent meeting of the Society of Chemical Industry, a paper by Messrs. Cross and Bevan was read on "Hermite's System of Electrolytic Bleaching." The authors stated that in ordinary bleaching the bleaching powder added to water gives hypochlorite of lime, which acts upon organic compounds by oxidation. Sometimes, however, oxychlorination takes place. In these actions chlorine may be regarded as an accumulator of oxygen. Other suitable oxygen yielding substances are permanganate of potash and hydrogen peroxide, but of the three, bleaching powder is the most economical.

M. Hermite's new source of supply of bleaching compounds consists of the electrolysis of the chlorides of the alkalies and alkaline earths, preferably the latter, and of these chloride of magnesium gives the best results. The whole energy of the current may be utilized when the hydrogen given off in the process is collected and burnt. There is evidence, however, of a retention of a portion of the hydrogen. In the electrolysis of magnesium chloride there are great chemical complications, and the bleaching efficiency of the resulting solution is in excess of that of the chlorine produced, as calculated by the electrolytic law. Its efficiency is also greater than that of a solution containing bleaching powder, although it may be argued that there are theoretical grounds for believing this to be impossible. Time affects the results in bleaching operations, and rapidity of first attack is advantageous, one of the results being a small consumption of bleaching oxygen as compared with that used up from ordinary bleach ing solution. Mr. Cross illustrated this by placing some linen yarn in a solution of bleaching powder, and some more yarn in the liquid produced by electrolysis. The action of the latter was the more rapid of the two. Chlorine, the authors said, can be turned out by Hermite's process at the rate of 100 kilo. per hour, with the consumption of 570 horse power. The authors found that in producing what is known as "the three-quarter bleach" with flax, the electrolytic chlorine, as it may be called, has twice the efficiency of the chlorine of bleaching powder. In this comparison they used the word "chlorine" for convenience. On account of the efficiency just stated, one or more of the usual alkaline treatments of the yarn may be suppressed.

Paper pulps had been bleached by the authors with economy. The bleaching efficiency of the electrolytic chlorine, or rather oxygen, is to that of bleaching powder as 5 : 3. This ratio is also the mean of a large number of determinations on the vegetable substances of various kinds used in textile and paper manufactures. The e.m.f. of the current being taken at 5 volts, the ratio of chemical effect to the power is 1·47 grm. bleaching chlorine for 5 watts. From this fundamental equation, the economy of the system is directly deducible, taking the cost of 1 horse power at £9 per annum, and the effective yield of one h. p. at 600 watts. Taking also the cost of the unit electrolytic installation, *i. e.*, for a current of 1,000 amperes, at 5 volts, at £350 (the electrodes being plantinum and zinc), the costs on one ton of the hypothetical bleaching powder are: For mechanical power, £1 10s.; for the electrolysis (interest and depreciation at 15 per cent), £1; for waste of salt, etc., 10s.; total, £3.

W. McC. writes: I noticed the following question asked by B. T. R. in your journal, under date of 19th March, 1887: "Why is stale bread considered more wholesome than new?" Fresh bread is not allowed in the British army. It must be at least twelve hours old before using. Could not Canadians and Americans learn a useful lesson from the custom in the British army? Experience only solves the question.