

ARTIFICIAL SEA BATHS.
BY DR. ALFRED GRADENWITZ.

A decided novelty for inland summer resorts is provided by the artificial surf bath which is herewith illustrated. The scheme is the invention of Herr Hög-lauer, of Munich, Germany. With the assistance of Herr H. Recknagel, a plant was installed in the Starn-berg lake near Munich, last summer, and proved to be a great success, yielding very satisfactory financial re-sults. The project calls for a tank of water, or the inclosure of a portion of the lake or river in which it is installed, as shown in the photographs. At the outer end of the in-closure is the wave-forming machinery which com-prises either an oscillating partition or a plunger dropped periodically into the water. In this way the waves are formed and they travel the length of the tank. The tank is provided with a sloping bottom so that the reced-ing waters from one wave, meeting the succeeding wave, will cause the latter to curl and break in per-fect imitation of the ocean surf. If the device is in-stalled in a tank, it is possible to exactly reproduce the conditions of ocean bathing by adding salt to the water and thus pre-serving the hygienic and therapeutic properties of the ocean bath. The power necessary to produce the waves is very small, as the motion is rhythmic. For example, in the case of waves measuring 2 meters (6.5 feet) from crest to crest, the best results are secured with a rate of 18 waves per minute, when the expenditure of energy will be 4 horse-power for a tank 1 meter (3.3 feet) in breadth. If steam power be used, the exhaust steam of the engine may be utilized for heating the water. Thus the temperature of a bath may be regulated to the desired degree and by the proper control of the engine the roughness of the waves may also be regulated so as to make the bath an ideal one. The inventor has also designed a small device for use in tubs, whereby the tub is rocked to produce the wave effect. The rock-ing of the tub may be effected either with an electric motor or by means of oars operated by the bather himself.

COUNT VON ZEPPELIN'S DIRIGIBLE AIRSHIP.

General Count von Zeppelin has repeated the Bo-densee experiments with his dirigible airship, which were concluded in 1900, and undertook an ascension on November 30. For several reasons, in no way involv-ing the principle of construction, it was necessary to desist from this attempt for the present. For the sake of completeness, it is necessary briefly to recount the results of the experiments of 1900, which at the time were discussed in well-illustrated articles in the SCIENTIFIC AMERICAN. Three flights

were accomplished five years ago—on the 2d of July, the 17th and 21st of October. In July the craft demon-strated that it could be steered and propelled against a breeze moving at the rate of about 18 feet a second. At that time the full power of the engines was not utilized, as strong longitudinal oscillations had to be contended with, these being due to the fact that the rear retaining ropes of the airship were released too late. In addition, the crank of the adjustable sliding

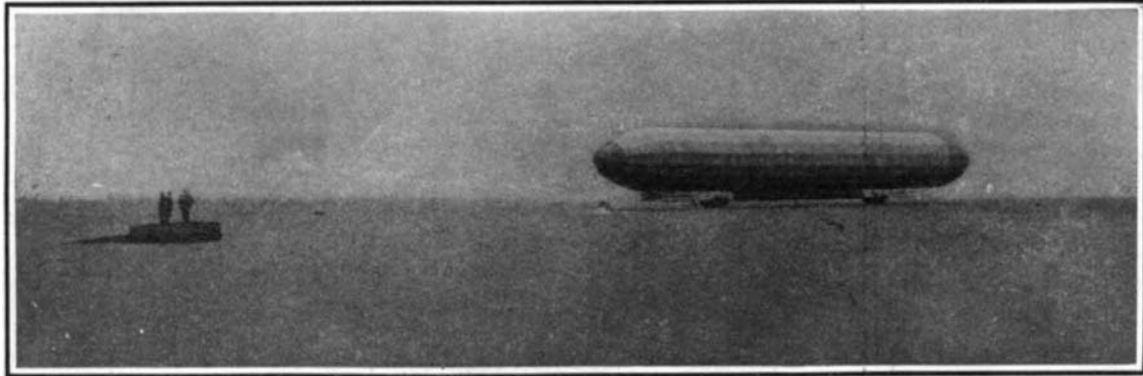
The dirigibility was excellently demonstrated, this time in fact with two instead of four steering surfaces. Several great arcs were described to right and left. After a flight of 23 minutes a landing was made, again because of the lateness of the hour. As the financial resources of the constructing company were exhausted, further experiments were not possible.

The speed attained by the airship itself was found to be 24.5 feet per second, a rate, nearly 18 miles per hour, never before accom-plished. The determina-tion was made by three careful and independent surveyors, stationed at three different points on the shores of the Bodensee. The wind blew at the rate of about 11 feet per sec-ond. Taking into consid-eration the curves of the flight, Prof. Hergesell has calculated the independent speed to have been as high as 28 feet a second. This success was unquestion-able.

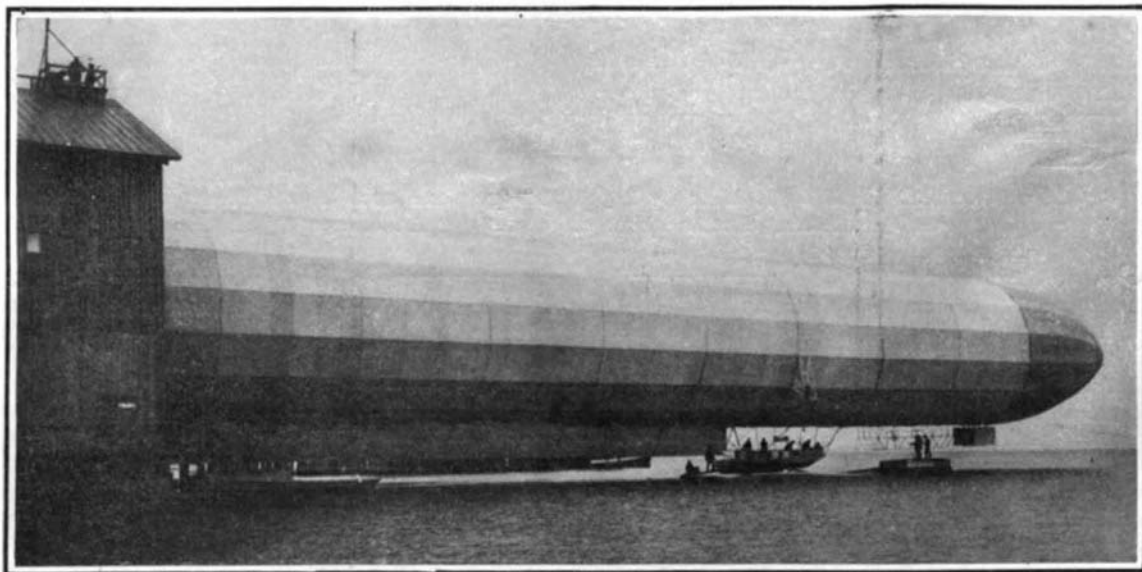
Following the experience gained in 1900, the motor airship was improved in almost all its details. The greatest advance lies in the increase of the motive power with practically no increase of weight. Each of the engines in the two carriages is now of 85 horse-power, so that to-day 170 horse-power is avail-able instead of 30 as for-merly. As this weighs only 11 pounds more than the earlier installation—880 pounds *in toto*—even the layman will recognize that the independent speed of the craft must be far greater. The length of the airship has been decreased by about two yards, the diameter being made some-what greater. With a length over all of nearly 410 feet, the diameter is a

trifle over 38 feet. Instead of seventeen gas compart-ments, the balloon now contains one less, with a total cubical content of hydrogen gas of about 367,120 feet, some 31,700 cubic feet less than in the former model. The total weight to be lifted is about 19,800 pounds, nearly 2,200 less than in 1900. The propellers have been made somewhat larger.

The two steersmen or guides, aeronautic and aero-static, were located in the forward car, where also were the wires, arranged visibly upon a board, which led to the valves of the gas chambers and the ballast bags. The latter, made of a waterproof material and filled with liquid, were equally distributed upon the skeleton; part of the ballast was also located upon the cars, and two of the bags are distinctly visible upon one of the accompanying photographs. Benzine, suf-ficient for a trip lasting 15 to 20 hours, was carried in special tanks in the two cars. In the possibility of long flight duration, the Zeppelin airship possesses a particular advantage which Lebaudy has not yet taken into consideration. This, too, is the reason why Count Zeppelin built his ship of such great size. If it is de-sired to transport large weights, it is necessary to con-



TRIAL TRIP OF ZEPPELIN'S IMPROVED AIRSHIP.

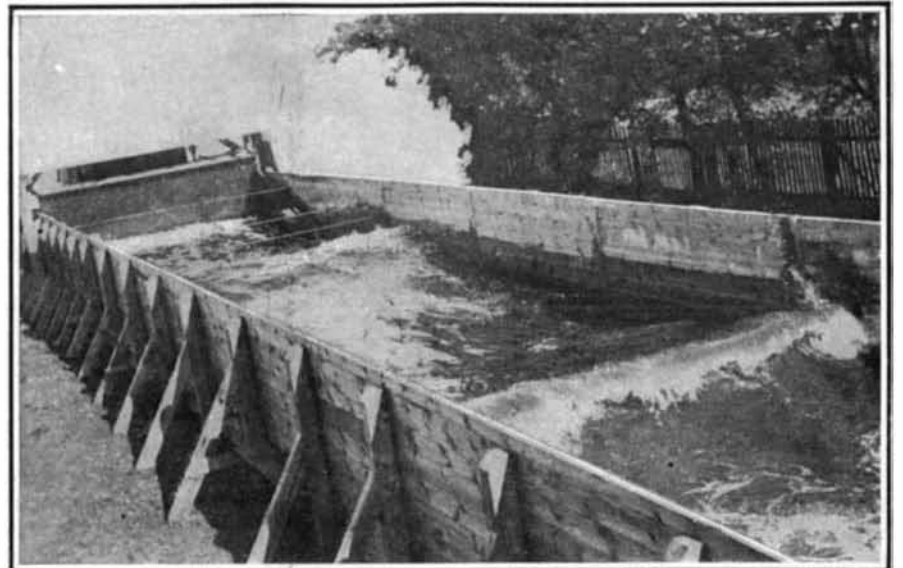
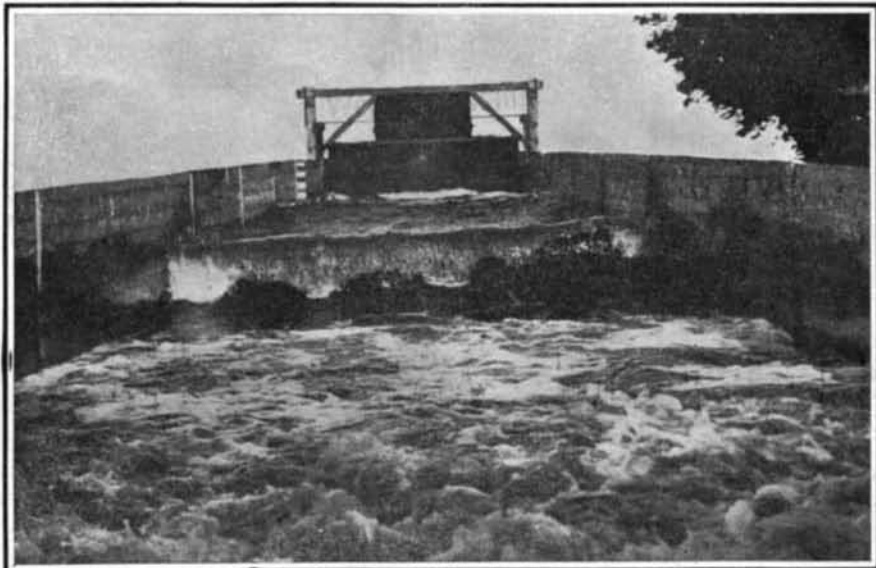


THE IMPROVED DIRIGIBLE AIRSHIP OF COUNT ZEPPELIN.

weight broke, so that it was possible to maintain a state of equilibrium only by running the engines alter-nately forward and backward. The landing upon the surface of the lake, announced beforehand by means of flag signals, was completely successful.

After a number of improvements, complicated through an unfortunate occurrence—the failure of cer-tain fastenings of the framework and the collapse of the middle part—the second trial trip took place. A position of equilibrium was attained successfully at a height of about 300 yards, but the steering-gear caught in the outer portion of the skeleton and was held to port, thus producing a swinging movement. This was counteracted by using the second rudder in opposition to the other; but this time also it was not possible to use full power, as the hour was late and a landing was imperative. This was accomplished sooner than was intended, as a valve in the balloon opened of its own accord, permitting the escape of the gas in a forward compartment. The ship had been in the air for 80 minutes.

Both defects were soon remedied, and four days later the imposing craft rose into the air for the third time.



AN APPARATUS FOR PRODUCING ARTIFICIAL SURF BY MEANS OF AN OSCILLATING PARTITION OR A PLUNGER DROPPED PERIODICALLY INTO A TANK OR INCLOSURE CONTAINING WATER.