Mount McKinley, and in five days had reached tide water at Cook Inlet."

The trip was one of great hardship, on the return trip especially the men's clothing being drenched constantly by frequent immersions in the glacial streams. They opened up the best hunting grounds in America for caribou, mountain sheep, and moose, Dr. Cook says, the western foothills being a great game preserve.

"Mount McKinley is of granite weighted down with not less than fifty disconnected glaciers, with everywhere precipitous walls," said Dr. Cook. "It is probably the most difficult mountain in America to ascend on account of the distance from the coast line, supplies having to be carried 400 miles through difficult country, and the Arctic conditions encountered from the start. On the east side there are three glaciers, which terminate at an altitude of about 11,000 feet and over these a route to the upper valleys of the summit may be found."

High mountains are always conspicuous, and we invariably find in descriptions of the continents and islands mention of the culminating points of those lands. The following table gives the names and heights of the twenty-four great mountains of the world which are the highest points in all the continents and in the most important islands, arranged in the order of their altitude:

Mount Everest, Asia	29,000
Aconcagua, South America	23,091
Mount McKinley, North America	20,467
Kilimanjaro, Africa	19,680
Mont Blanc, Europe	15,800
Mauna Kea, Hawaii	13,808
Kinabalu, Borneo	13,094
Mount Victoria, New Guinea	13,202
Gunung Korintji, Sumatra	12,480
Fujiyama, Japan	12,400
Mount Erebus, Victoria Land	12,365
Mount Cook, New Zealand	12,350
Pico de Teide, Canary Islands	12,234
Gunung Semeru, Java	12,037
Lompobattang, Celebes	10,069
Petermann, Greenland	9,184
Cinto, Corsica	8,888
Tsiafajavona, Madagascar	8,626
Pedrotallegalla, Ceylon	8,331
Ida, Crete	8,058
Mount Townsend, Australia	7,347
Oreafa Joekul, Iceland	6,428
Chydenius, Spitzbergen	5,576
Cradle Mount, Tasmania	5,395

DR. GRETH'S AIRSHIP.

BY ARTHUR INKERSLEY.

Dr. August Greth, an Alsatian by birth and a physician by profession, made an ascent over the city and bay of San Francisco on Sunday, October 18, in an airship of his own invention. For twenty years he has taken an interest in aeronautics, and has had nine patents for airships granted by the United States. The ascent was made from Market and Eleventh Streets, San Francisco. The airship sailed over the westerly part of the city, sometimes at a height of 2,000 feet, and at times at half that altitude. When it reached 2,000 feet, the motor was started, and the airship responded by descending several hundred feet and moving in a semicircle, first to the north and then to the south. While passing over the Presidio reservation, the craft first ascended quickly and then began to descend. At last it fell into the bay, on the surface of which it floated, the navigator swinging from his car into the rigging. Dr. Greth and the balloon were picked up and towed to the shore by a crew from the life-saving station of the Presidio reservation. The doctor was wet only up to the waist, and explained that he could easily have crossed Golden Gate and made a landing in Marin County, or have gone over to Alameda County and descended there, but that the expense of bringing back the airship from either of these counties would have been much greater. So he purposely descended in the bay.

Dr. Greth said that the balloon was entirely under his control for the greater part of the time that he was in the air, and would have been completely so except for certain defects in the motor and the balloon. The motor is a gasoline one, nominally of 10 horse power, but really developing only 6 horse power, and weighing 500 pounds. The balloon is not provided with automatic expansion-valves such as are fitted to the airships of Santos-Dumont. At 2,000 feet the motor failed, and the gas in the envelope, under the hot sun, expanded rapidly. Not being able to descend by the aid of the motor, Dr. Greth was obliged to let some gas escape from the balloon, which was so tense from the expanded gas that there was danger that it might burst. After letting out a quantity of gas, Dr. Greth tried to get the motor to work again, but was not able to do so.

The inventor and his associates are not men of means, and are handicapped by the lack of funds to equip the airship properly. Dr. Greth says that a motor suitable for his purpose will cost $1,000, and that, when he has it, he will sail the airship at will at a speed of thirty miles an hour in calm air. When the wind is favorable, its velocity will be added to the rate at which the airship will travel.

The inventor has had to be content with two propellers, but his intention is to have four, two at each end of the frame. The propellers are to work separately or together, and at any desired angle, so that the ship can be turned in any direction, even against a strong wind. The propellers are all to be run by one motor in the body of the car. Dr. Greth believes that the only practicable airship is one that is supported by a gas lighter than air. He is satisfied that a dirigible airship buoyed up by a balloon is practicable, and says that his own craft, if properly equipped, will go through the air under all conditions of weather at a high rate of speed and will be perfectly under control.

Dr. Greth's airship consists of a balloon, which, when inflated, has a length of 75 feet and a maximum diameter of 25 feet. From the balloon is suspended a frame, which supports the motor and the platform for the navigator. Dr. Greth has done away with the balloonette used by Santos-Dumont and Stanley Spencer, which nitrates the hydrogen gas by mixing air with it. Dr. Greth has a netting over his balloon, which keeps it taut on the top and at the ends, preventing it from buckling. The frame is only seven feet below the balloon, thus rendering the ship more dirigible. By proper manipulation of the four propellers, the balloon can be kept always in a horizontal position, can be raised or lowered, and driven in any direction at will. All that the inventor wants is a powerful enough motor of light weight, and then he will demonstrate the practicability of his theory of navigating the air. He hopes that the partial success of his machine, poorly equipped as it is, will prove the means of supplying him with the funds necessary to equip his airship properly. His machine is more buoyant and more dirigible than those which have the frame swung at a distance of twenty feet below the balloon.

The Current Supplement.

The current SUPPLEMENT, No. 1453, opens with a most striking picture of a peak in England's mountainous region, a peak which may be ascended only at great risk to life and limb. An article on the operation of gas ranges gives a vast amount of practical information that will surely be found of value. McLennan and Burton present the results of some experiments on the electrical conductivity of air. Mr. Emile Guarini describes the De Mare electro-thermic fan. "The Light Aluminium Alloys" is the title of a very instructive paper read by Dr. Joseph W. Richards before the American Society for Testing Materials. Prof. Léonce Fabre tells much that is of value in an article on the treatment of finely divided ores. "How Woven Hose is Made" is a subject which is discussed by Mr. Day Allen Willey. The paper on Geography read by Capt. Ettrick W. Creak before the British Association for the Advancement of Science is presented in full. Miss Mary Proctor describes the proposed Amherst College Observatory in full. A horological curiosity in the way of a one-wheel watch is also described.

Failure of the Second Ziegler Expedition.

Dispatches from Europe state that the second Ziegler North Pole expedition has failed to reach Franz Josef Land. Mr. Ziegler does not credit the report. A letter was received not so very long ago from Mr. Fiala, who stated that it was probable that his ship would reach Franz Josef Land and winter there. Otherwise it would have been necessary to return to Norway before this. The ship had not coal enough to keep under steam all this time. Had she failed, Mr. Ziegler believes he would certainly have heard from Mr. Fiala by this time.

Extermination of the Clam.

The clam seems to be sharing the fate of the lobster. It is fast disappearing—so fast, indeed, that the United States Fish Commission is endeavoring to propagate the mollusk by artificial culture. The Fish Commission has confined its attention to the soft or long clam. The State of New York, on the other hand, is studying the round or hard clam. Both researches seem promising from the results thus far obtained.

The total power generated and used by the St. Louis Exhibition will be in the neighborhood of 50,000 horse power. Over 80 per cent of the electric energy will be in 6,600-volt, three-phase, 25-cycle current. The largest unit will be an 8,000-horsepower steam turbine, and the next largest a 5,000-horsepower compound horizontal and vertical reciprocating steam engine. The largest steam engine in the Paris Exposition of 1900 was rated at 4,000 horse power.

General Programme of Competitive Trials of Subsurface and Submarine Torpedo Boats.

The following rules have been drawn up for governing the competitive tests of the new Holland boat "Fulton" and the Lake boat "Protector." The trials are to be held at Newport, R. I., November 16.

Each boat must be provided with a small mast whose top is 25 feet above the water line of the vessel when she is afloat, and 5 feet above any of the other pipes or apparatus projecting above the deck. The mast of the "Protector" will be painted with alternate bands of black and white, and that of the "Fulton" with alternate bands of red and yellow, and on top of each mast will be mounted a small sheet of metal which will act as a pennant and be painted a distinguishing color. By means of the mast and pennant, it will be possible to at all times know the exact position of the competing boats, even when they are submerged.

The tests will be of such a character as to determine the following points:

1. The maximum speed at which the boat can be operated under the conditions of service for which it was designed. Speed trials will be made in (*a*) the light condition, the vessel having all ballast tanks empty and being propelled by its gasoline engines; (*b*) in the awash condition, in which the boat is ready for instant diving and propelled by its electric motors, a dive being made at the end of the measured mile; and (*c*) in the submerged condition at a sufficient depth for not more than 3 feet of the mast to project above the surface.

2. The maneuvering powers of each boat under various conditions of operation for which the maximum speeds as described above are determined, will be noted during the different trials, and special tests may be made to demonstrate further the character of the qualities possessed by each vessel. These tests will include those necessary to show the ability of the vessel to remain in any position and to reverse her direction of motion when submerged, i. e., when going ahead submerged, to stop and go astern with as slight changes as practicable in her trim and depth of submersion.

3. The ability of each vessel to maintain steadiness of route in both the horizontal and vertical directions, when navigated in either the awash or submerged conditions, will be noted during the various trials and extra tests may be made to further demonstrate the character of these qualities possessed by each vessel.

4. The times to pass from the light condition to the awash condition, and to dive from the awash condition to certain prescribed depths, will be noted during the various trials.

5. Trials will be made to show the times required by each vessel to discharge the full number of torpedoes carried, and to fully demonstrate the ability of the vessel to perform with efficiency all functions connected with her torpedo outfit.

Torpedoes will be fired while the vessel is on the surface and also when totally submerged. The firing trials will be made either as separate tests or as part of the service trials.

6. Trials will be made to show the radius of action when running totally submerged.

7. Trials to demonstrate the habitability of the vessel by requiring the entire crew to remain on board 24 hours, during which time the vessel shall be self-sustaining. An air supply for 12 hours for full crew and two additional persons must be carried.

8. Service trials approximating in the closest possible manner the probable and reasonable requirements of submarine warfare will be held. They will fulfill the following conditions:

(*a*) Service test of submarine operating from a shore base against a vessel in the open sea, by the boats going in light condition out to a stake vessel, submerging, approaching a second stake vessel, and discharging torpedoes between two cutters 300 feet apart. Two target spaces will be provided, so that both boats can fire at the same time. The use of periscopes or other sighting apparatus is permitted, but account will be taken of the time such instruments are visible, the least possible surface disturbance being the desideratum.

(*b*) A second similar test will be made for demonstrating the conditions of operation when the periscope is not used.

(*c*) A test with the boats starting from open sea, approaching and entering the harbor in a submerged condition, and cutting and removing a length of cable such as is used for harbor mines. The time required will receive consideration, and vessels must be navigated at the highest speed possible under the circumstances.

Marconi Receives a Nobel Prize.

The Academy of Sciences, which awards the Nobel prize, has decided that the recipients for this year shall be as follows: Literature, Henrik Ibsen and Bjornstjerne Bjornson; physics, Signor Marconi; and medicine, Dr. Finsen.

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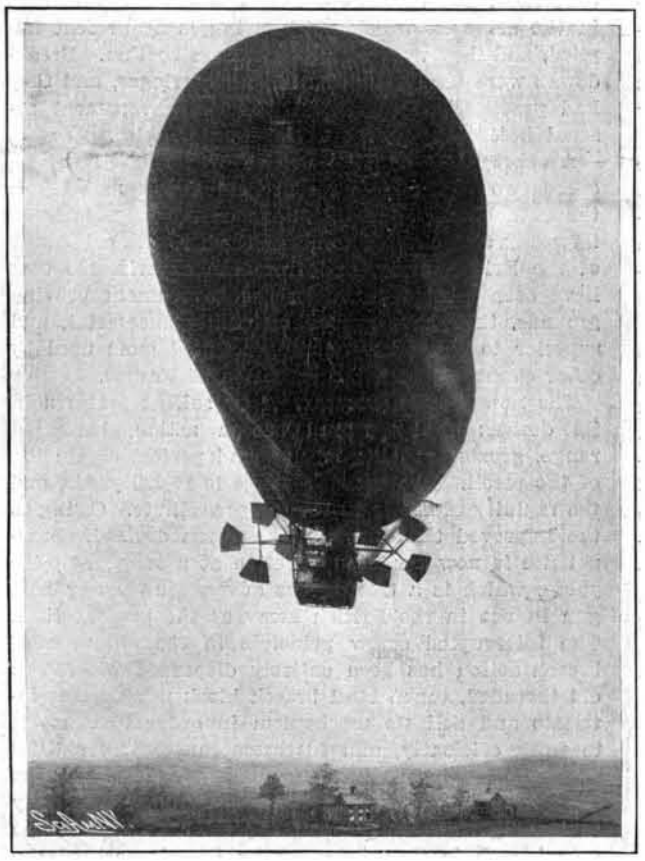

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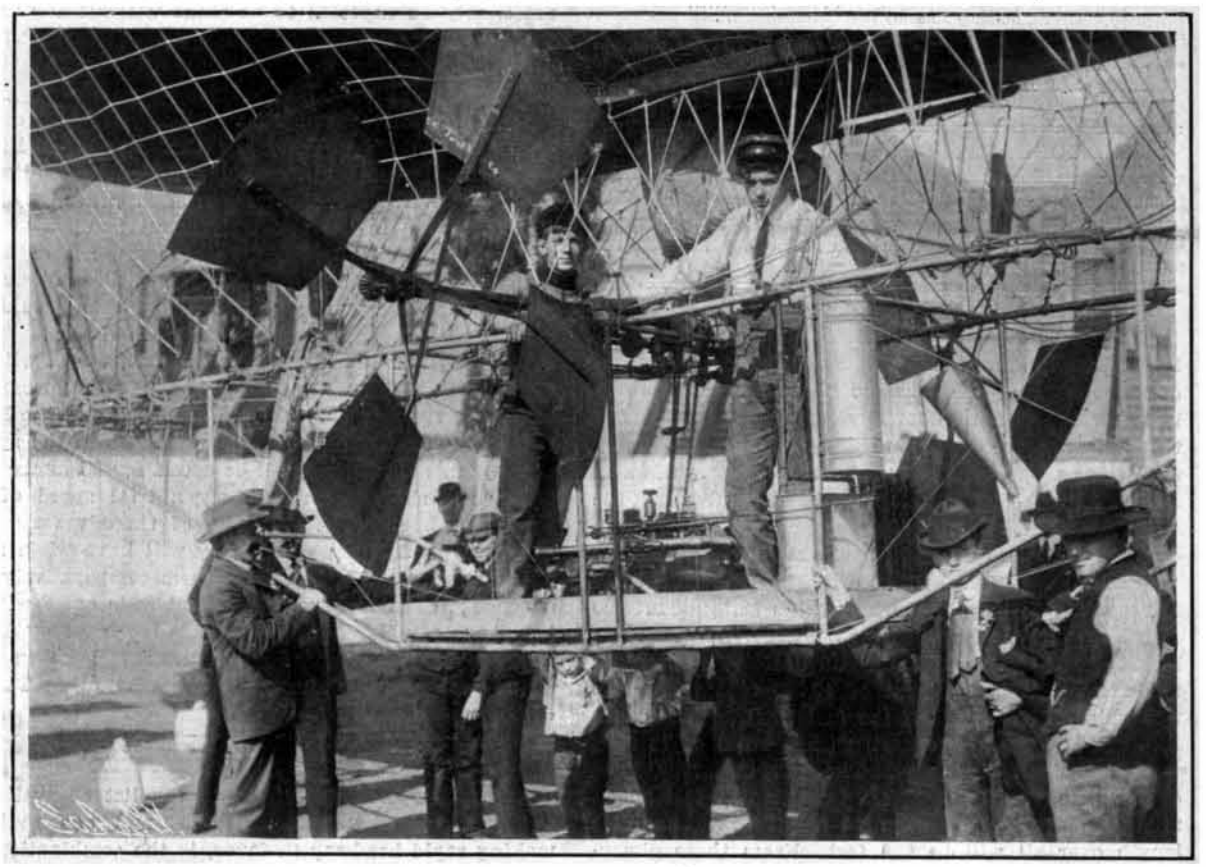
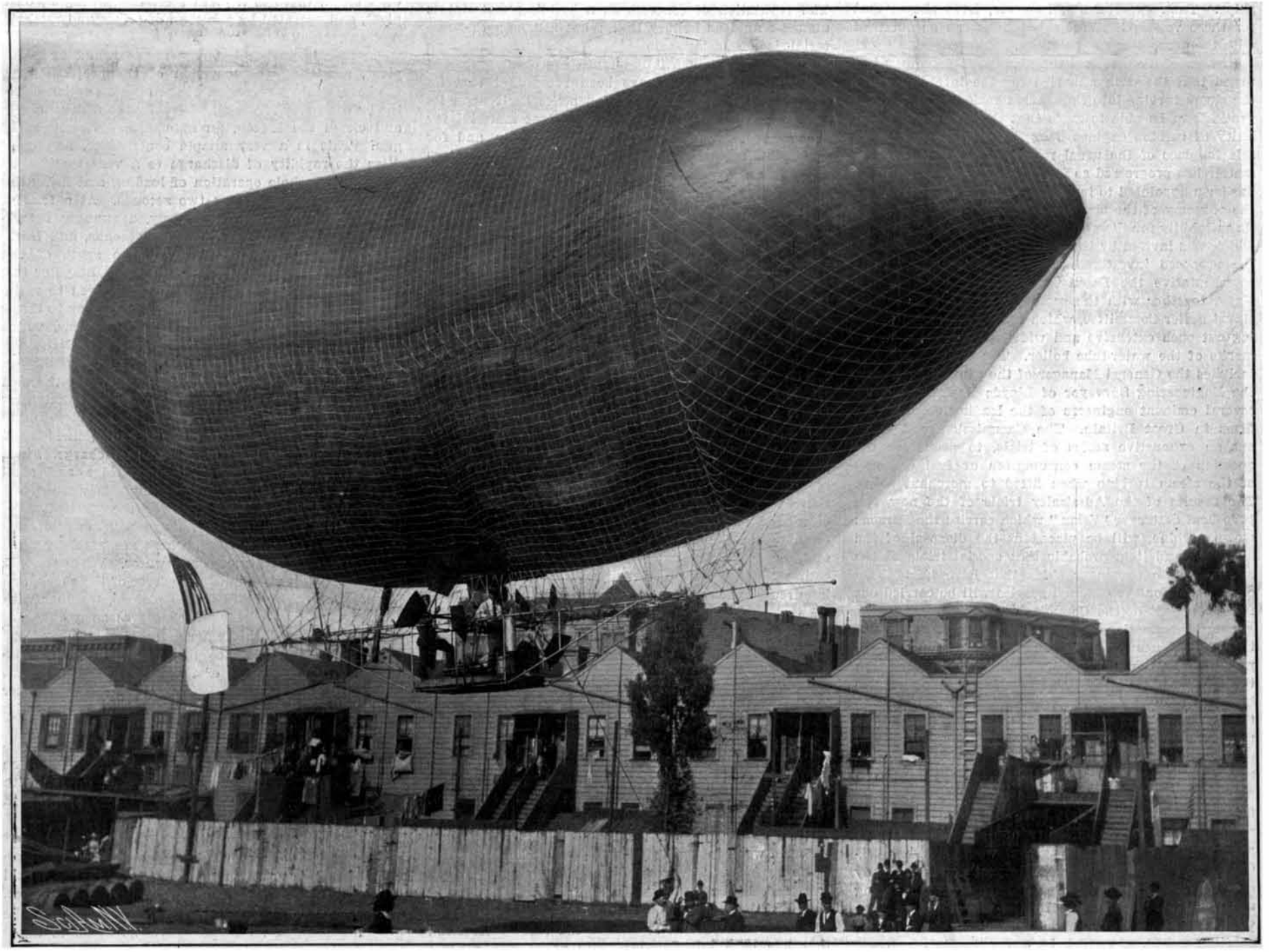


The Car, the Motor, and One of the Propellers



Photographs by the Backus Studio.

DR. AUGUST GRETH'S AIRSHIP BEFORE ITS START ON OCTOBER 18 FROM SAN FRANCISCO.—[See page 327.]