### Household Tests for Oleomargarine and "Process" Butter.

Every householder should know how to distinguish between genuine butter on the one hand and oleomargarine and renovated, or "process," butter on the other, and also to distinguish between the two last named; for despite restrictive legislation, the public is often imposed upon. Renovated or "process" butter is often substituted for the genuine article, while oleomargarine is made to take the place of renovated butter. So clever have the manufacturers of these articles become, that in the absence of some tests the differences are difficult of detection.

The real harm begins when the "process" is sold as genuine butter, for they are not the same thing. While the fats in the two are practically the same chemically, the nitrogenous quantities are not. Moreover, since the article known now and for ages past as "butter" is an article the last step in whose manufacture is the churning of the cream, it is evident that the product of an elaborate subsequent process, a process entirely foreign to the manufacture of "butter," should be designated by a distinctive name, and many of the States have enacted laws which require the distinctive labeling or branding of the "process" product. The same requirements safeguard the sale of oleomargarine.

A boiling test has been found most practicable for household purposes in distinguishing between genuine butter and the renovated article. The test consists simply in boiling briskly a small portion of the sample and observing its behavior the while.

The test can be made in the kitchen, and requires only a few minutes' time. Using as the source of heat an ordinary kerosene lamp, turned low and with chimney off, or a gas jet turned low, melt the sample to be tested (a piece the size of a small marble) in an ordinary tablespoon and hasten the process by stirring with a sliver of wood. Then increase the heat and bring to as brisk a boil as possible, and after the boiling has begun, stir the contents of the spoon thoroughly two or three times at intervals during the boiling, always shortly before the boiling ceases.

Renovated or "process" butter boils noisily, sputtering (more or less) like a mixture of grease and water when boiled, and produces no foam, or but very little. Genuine butter boils usually with less noise, and produces an abundance of foam. The difference in regard to foam is very marked as a rule. Rarely is a butter found which yields an uncertain result; such a butter should receive the benefit of the doubt.

To distinguish oleomargarine from renovated and genuine butter, the required utensils are:

A half-pint tin "measuring cup," common in kitchen use, marked at the half and quarters, or a plain half-pint tin measure, ordinary narrow form; or an ordinary small tin cup, two and three-quarter inches in diameter and two inches in height, holding about one gill and a half; a common kitchen pan, about nine inches in diameter at the base; a small rod of wood, of convenient length for use in stirring; and a clock or watch. With this simple outfit proceed as follows:

Half fill with sweet skimmed milk the half-pint cup or measure, or two-thirds fill the smaller cup mentioned, measuring accurately to the gill of milk when possible; heat nearly to boiling, add a slightly rounded teaspoonful of the fat (butter or butter substitute), stir with the wooden rod, and continue heating until the milk "boils up." Remove it at once from the heat and place in the pan (arranged while the milk and butter or substitute are heating) containing pieces of ice with a very little ice water, the ice to be mostly in pieces of the size of one or two hen's eggs (not smaller, as small fragments melt too rapidly) and sufficient in quantity to cover two-thirds of the bottom of the pan; the water to be in quantity sufficient, when the cup is first placed in the pan, to reach on the side of the cup to only one-fourth the height of the milk within; any water in excess of that amount must be removed. (This is a cooling process, and refers to the condition at the beginning; later, as the ice melts, the water will naturally rise to a higher level.) Stir the contents of the cup rapidly, with a rotary and crosswise motion in turn, continuously throughout the test, excepting during the moment of time required for each stirring of the ice and water in the pan, which must be done thoroughly once every minute by the clock. This is done by moving the cup about, in a circle, following the edge of the pan. Proceed in this manner for ten minutes, unless before that time the fat has gathered or has allowed itself to be easily gathered, in a lump or a soft mass, soon hardening. If it so gathers, the sample is oleomargarine; if not, it is either genuine or renovated butter.

The boiling test ("spoon test") enables one to distinguish between genuine butter on the one hand and oleomargarine and renovated butter on the other; the test last given enables one to distinguish between oleomargarine and renovated butter; and so, by the use of the two tests, one can determine in every instance which of the three he has in hand. There are those who are able to recognize oleomargarine, almost without fail, by taste and smell alone. To those possessed of this power the "spoon test," which is performed with almost no trouble, will serve every needful purpose.

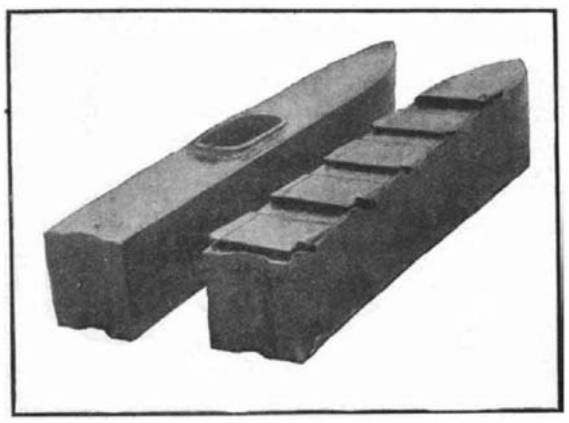
### WATER-WALKING SHOES.

Frederick A. Oldfield, of Memphis, Tenn., has invented a pair of water-walking shoes with which he hopes to cross the English Channel some time during the present summer. Each shoe consists of a beechwood box four feet in length, eighteen inches in depth, and one foot in width. In order that the shoes may skim easily over the surface, five planes are secured to the bottom of each shoe. The shoes are fastened to the foot by means of clamps such as those used on roller skates, the foot being inserted through a hole in the top of the shoe, and the ordinary leather boot being clamped in place. A covering of rubber around

THE INVENTOR EXPERIMENTING ON THE MISSISSIPPI RIVER.

the opening protects the wearer of the shoe from splashing of water. The shoes weigh five pounds each.

Mr. Oldfield has just completed a trip from Cincinnati to New Orleans, which consumed forty-one days, twenty-four more than the time in which he expected to fulfill the task. In the photographs here presented, Mr. Oldfield is pictured in the Mississippi River off



THE WATER SHOES, SHOWING THE TOP AND BOTTOM. THE FIVE PLANES ON THE BOTTOM ACT AS HYDROPLANES.

Memphis. He has just completed the feat of turning a circle.

The Massachusetts automobile traffic is so heavy that it has caused marked wear on the State highways, and the commission having charge of these roads states in its last annual report that the destructive effect is "extraordinary." Practically all the main roads are thus affected. It has been noticed that the binder is swept from the road, and the stone from ½ to 1½ inch in size has been disturbed, in some cases standing on the surface, and in other cases being left in windrows along the roadside. The effect of wear of this sort is such that the commission is satisfied a material change in the methods of maintaining stone roads must be made. The report indicates that the commission believes some kind of treatment with tar will probably be successful.

Plant Lice Preventive.—Boil 250 parts by weight of quassia wood chips in 5,000 parts by weight of soft water and strain. 1,000 parts by weight of common soft soap dissolved in 5,000 parts of hot water. Mix both solutions, add 40,000 parts of water, and use it for washing leaves and stems.

### SANTOS DUMONT'S COMBINED AEROPLANE AND AIRSHIP.

BY THE PARIS CORRESPONDENT OF THE SCIENTIFIC AMERICAN.

Aeronautic affairs have continued to be very active in and about Paris during the last three or four weeks, though the rainy weather which prevailed during the spring prevented the trials of aeroplanes and other fliers which are now constructed. Most active in the field of aeroplane work are MM. Santos Dumont, Bleriot, Vuia, and Delagrange, and we have already given an account of some of the newest fliers and the experiments which have been made with them. It will be remembered that Santos Dumont made several trials with an aeroplane which he built at St. Cyr, in the neighborhood of Paris, but up to the present he has not been very successful with it, and found that it would need to be remodeled according to the results of the tests he carried out. He expects eventually, however, to perfect it sufficiently to make long flights with it.

While waiting to do so, however, he decided to carry out some experiments which he had in view in regard to the stability of aeroplanes. For this purpose he set about constructing a new flier which differs from anything built up to the present in this line, since it is a combination of a balloon body with a couple of aeroplanes suspended beneath it. The whole machine is, however, heavier than air; and, should it succeed in flying, it will do so largely on the aeroplane principle. It is one of the smallest fliers which has yet been constructed, the balloon body having a capacity of but 99 cubic meters (3,496 cubic feet). The "Santos Dumont No. 16," as it is known, is merely an experimental apparatus, and as yet it has not made an actual flight, having had an accident which was not serious, and the damage resulting from which will soon be repaired. The balloon consists of a fusiform envelope having a length of but 21 meters (68.89 feet) and largest diameter of but 3 meters (9.84 feet). It has a long pointed shape, as can be seen from the diagram and photograph. The surface of the balloon is 151 square meters (1,620 square feet). As the total weight of the balloon body and the lower framework exceeds the lifting capacity by 120 kilogrammes (264½ pounds), the apparatus acts upon the "heavier than air" principle, and is of interest as a combination of a balloon body and an aeroplane. Inside the balloon is a small ballonet, *B*, of canvas, which measures 2 meters (6.56 feet) in diameter.

Instead of using suspension wires to hold the framework to the balloon, the frame is hung from a long bamboo pole attached directly to the bottom of the envelope by two overlapping flaps of canvas. The frame is very simple in character, consisting as it does of a series of steel tubes. The main piece forming the bottom of the frame is attached at either end to the bamboo pole and runs down to a point under the middle of the balloon, giving space for the two movable planes, the motor, and the aeronaut's seat. In the middle and widest part is mounted the motor with its propeller placed directly on the end of the crankshaft, and the frame gives just sufficient clearance to allow the propeller to revolve inside of it without touching the under side of the balloon. The frame of tubing is braced by steel wires.

The motor, *M*, is an Antoinette 50 horse-power of the light-weight, eight-cylinder type, and is held somewhat above the center of the frame upon a light steel rod support. Directly against the motor and in front of it is fixed the paddle-shaped propeller, *H*, which measures 2.05 meters (6.72 feet) in diameter, and has a pitch of 1.70 meters (5.57 feet). At the rear of the motor is the radiator, which consists of two sets of long flat copper tubes placed at a slight angle and extending upward on each side of the motor. The aeronaut's seat is a simple motor-cycle saddle, *S*, fixed upon the lower part of the steel frame.

As to the aeroplane part of the apparatus, this is formed of two flat canvas-covered frames of same size mounted at either end of the main frame. These will be noticed at *P* and *R*. Both the frames can be inclined at the proper angle by means of wires within reach of the aeronaut. The frame *P*, in the front part, measures 3 meters (9.84 feet) in length across the balloon and 0.50 meter (1.64 feet) in width, having a surface of 1.5 square meters (16.14 square feet), while the second plane, *R*, measures 4 meters (13.12 feet) by 1.20 meters (3.93 feet) with a surface of 4.8 square meters (51.66 square feet). Mounted in the rear of the main frame and under the balloon is the rudder, *G*. It is of hexagonal form and covered with canvas in the usual way, the diameter being 2 meters (6.56 feet). It can be worked from the aeronaut's seat by a set of wires.

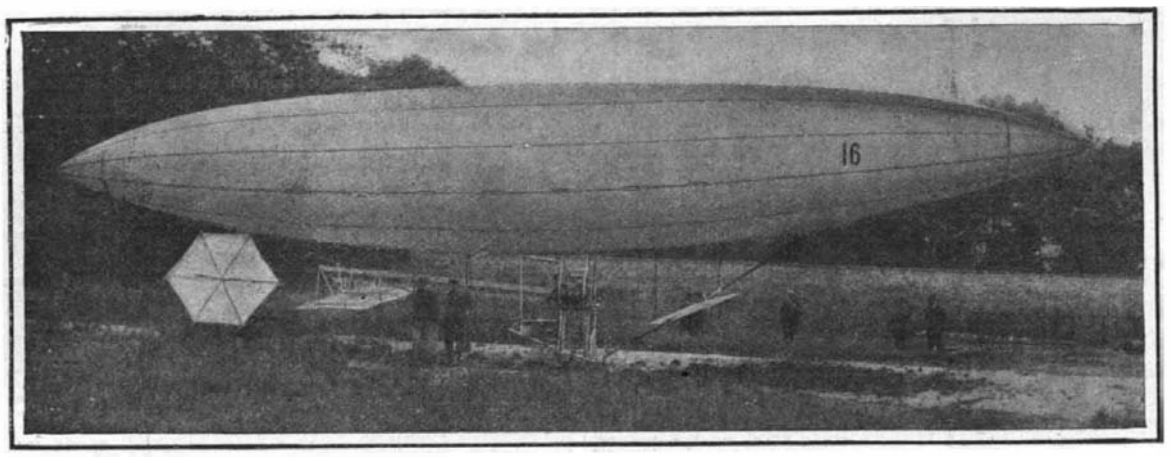
The whole apparatus is arranged to run upon the ground, and to enable it to do this, it is mounted upon a pair of bicycle wheels about two feet in diameter, so that the lower point of the frame nearly touches the ground.

This very curious flier has not as yet shown what it can do, inasmuch as the first experiment, which was made in the Bois de Boulogne on the 7th of June,

resulted in an accident which put the apparatus *hors de combat*, and it will take some time to make the repairs. Far from being discouraged, however, Santos Dumont expects to be soon in the field again. In this experiment the propeller was started up and the flier ran along the ground on its wheels at a moderate rate. The rear end was held by a mechanic, who let go after about a hundred feet. But owing to an accident, the flier did not rise as was expected, but ran head down upon the ground. The propeller struck the balloon and tore it, letting out the gas. It also struck the ground and was consequently somewhat injured. The upper bamboo pole broke, and the frame in general was damaged. Santos Dumont did not suffer from the fall. He explained the probable reason of the mishap, stating that he was not aware that the flier had been held in the rear, and in consequence thought it was free at the start. Thus he did not handle it properly, and it was owing to improper management of the planes that the machine acted as it did. On the other hand, it is thought that the accident was due to the fact that the column of air driven by the propeller was directed against the rear plane frame and also against the under side of the balloon in the rear, and that this caused the back end of the balloon to rise, tilting the front end downward. It will no doubt take a number of trials to find out the best conditions for running the machine, since there are several new conditions involved. The repairs are being made at the new shed which Santos Dumont recently erected on the same grounds as before, at Neuilly, near the Bois de Boulogne. At the same time his aeroplane No. 14 has been brought there and is being overhauled and strengthened after the last accident.

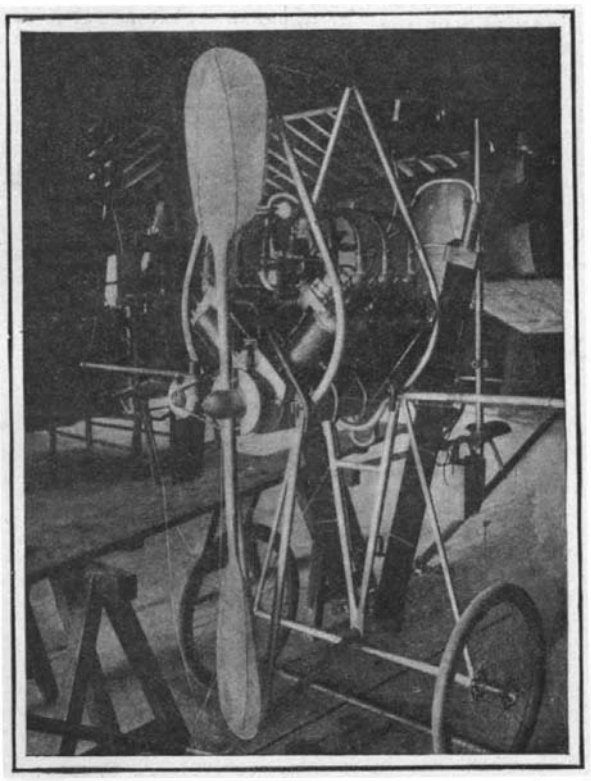
M. Louis Bleriot, some of whose experiments we have already illustrated, is at present engaged in building a new flier, and has practically completed it. This apparatus is quite different from the one which he used in his last trial at Paris, constructed as it is according to the principles of the Langley flier, with some modifications of this type. It has two pairs of planes mounted in tandem. The total supporting surface is about 18 square meters (194 square feet). Upon the frame is mounted an Antoinette eight-cylinder motor of the 24-horse-power type. M. Bleriot expects to commence work with the new apparatus very shortly.

Somewhat of a sensation has been caused by the visit of Messrs. Wilbur and Orville Wright to Europe. It appears likely that they are carrying out negotiations both in Germany and France with the expectation of disposing of the rights for their aeroplane. They decline, however, to give any information about what they are doing, and the matter is more or less of a secret. It appears, nevertheless, that Mr. Wilbur Wright made the trip to Paris with Mr. Hart O. Berg, who is well known in automobile circles, in order to complete, if possible, negotiations begun in France as far back as 1905. It was known that they had made some propositions to the War Department in this connection, and it seems that they asked the sum of $200,000 for the rights to use their system, should its success be demonstrated upon actual trial, upon a flight of a certain length and duration. At present the affair seems to be making progress, although it is being kept very quiet and but little definite information is to be had about it. We may say, however, that the inventors have been making arrangements with several persons who are prominent in political circles, notably Senator Henri Deutsch, whose interest in aeronautic work is well known and who has been liberal in founding prizes and otherwise aiding the experiments of aeronauts. He may agree to furnish at least a part of the amount which is asked by the inventors for the rights in France. M. Henri Deutsch presented the matter before the Minister of the Marine, to whose department the apparatus will belong in case it succeeds. But the Wright brothers will not grant the exclusive rights of their system for Europe, and this will not prevent them from making negotiations with other governments. It is not known what is the result of their trip to Germany.




**Santos Dumont's New Dirigible Balloon Fitted With Aeroplane.**

Length, 68.89 feet; diameter, 9.84 feet; capacity, 3,496 cubic feet. The excess weight to be lifted by the aeroplanes is 265 pounds.



**The 50 H. P., 8-Cylinder Motor, Showing Propeller and Radiator.**

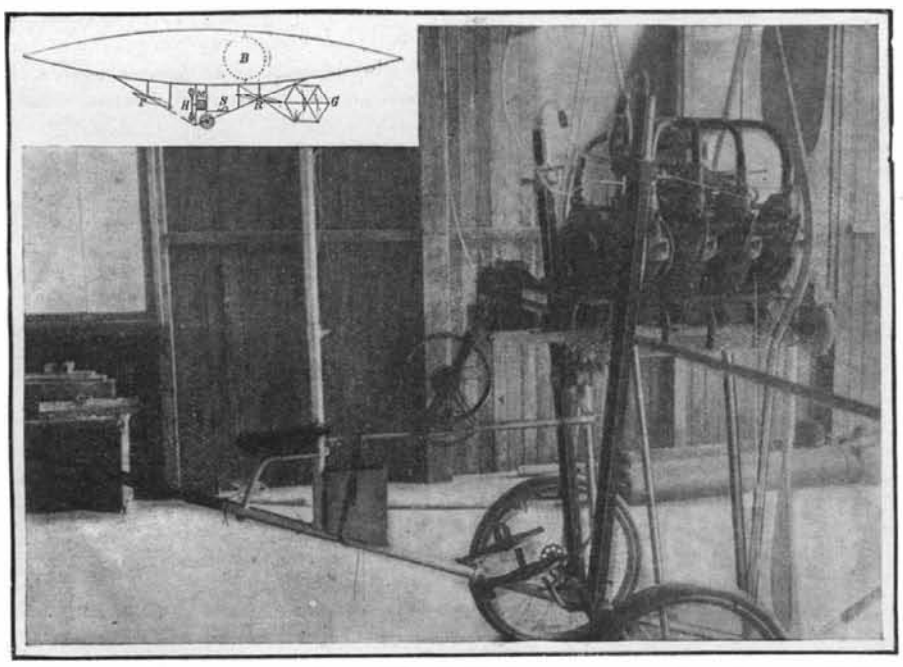
**Comparative Efficiency of Various Electric Lights.**

Comparative tests have been made between Moore tubes, Nernst lamps, and the usual type of incandescent electric lamps, says the Electrical World. The Moore tube used was 179 feet long and 1¾ inches in diameter. It was located 17 inches below the ceiling, which latter was 10 feet 11 inches from the floor. There were seven six-glower Nernst lamps, with opalescent globes of a bluish tint. The incandescents were 113 in number, 88 being of 8 candle power each, and 25 of 16 candle power. All were wired to molding on the ceiling, excepting 20 of the larger ones, which were used with opaque reflectors and had very little effect on the ultimate results. Measurements of illumination were made by means of a Weber photometer located successively at seven different points throughout the large room, and uniformly 34 inches above the floor.

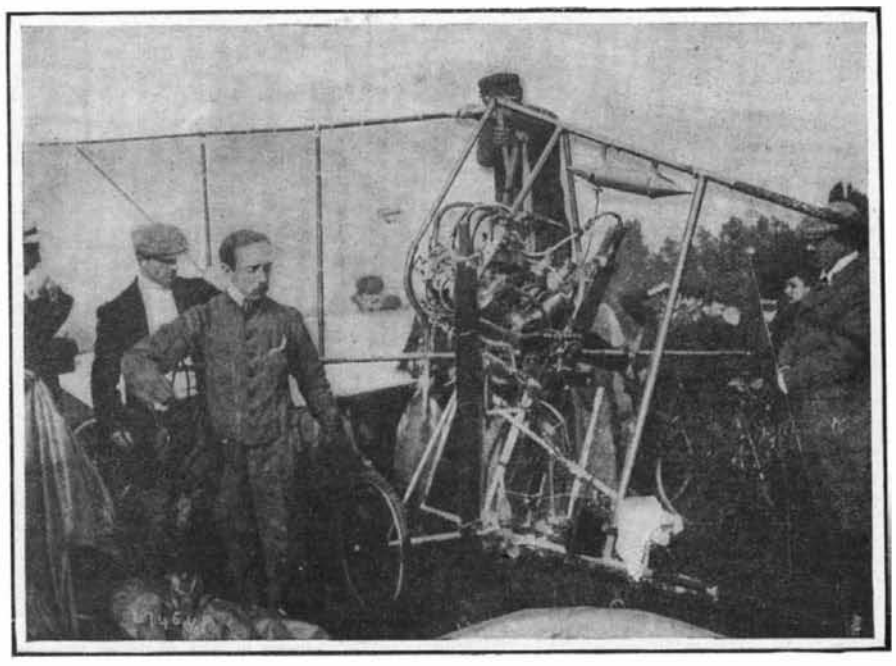
The unit of illumination used was the lux, which is the illumination produced on a plane surface by a source of 1 candle power at a distance of one meter, the rays striking the surface perpendicularly. The periodicity of the current was 60 cycles. The average voltage during the test was 243 for the Moore tubes, 244 for the Nernst lamps and 117 for the incandescents. The illuminants were located above the plane of illumination at different distances, being 6 feet 8 inches for the Moore, 6 feet for the Nernst, and 7 feet 10 inches for the incandescents. The current consumption in kilowatts was 3.15 for the Moore, 3.92 for the Nernst and 4.13 for the incandescents. The average intensity of horizontal illumination was 63 for the Moore, 44 for the Nernst and 15 for the incandescents. This made, per unit of power, an average of 20 luces for the Moore, 11.2 for the Nernst and 3.6 for the incandescents. To bring the illumination from the two latter up to the standard of the former, without altering the heights of the illuminants, would have required an output of 7 kilowatts for the Nernst lamps and 23 for the incandescents, as compared with 3.15 for the Moore. Placing all illuminants at the elevation of the Moore tube, and obtaining equivalent illumination from all, the required output would be 3.15 kilowatts for the Moore, 8.65 for the Nernst, and 16.65 for the incandescents.

In a paper read before the Society of Arts by Mr. Herbert Wright on "Rubber Cultivation," the author said that Ceylon alone had already planted land sufficent to supply London with about 7,000 tons of rubber per year in place of the 70 tons she sent in 1905. Land was being applied for and purchased at very high prices, and very soon a prominent and permanent position would be established. When one considered what had recently happened in Ceylon, the Federated Malay States, and India, it was obvious that the export in a few years would be as suddenly increased as had the planted acreage in these places, and for this we must be prepared.

Tin Varnish.—Asphalt 10 parts by weight, rosin 5 parts, linseed oil varnish 20 parts, oil of turpentine 8 parts.



**View Showing the Aeronaut's Seat, Foot Rests, Control Wheel and Levers.**



**The Rear of the Motor. The Radiator Tubes Form a Letter V at the Back.**

**A COMBINED DIRIGIBLE BALLOON AND AEROPLANE.**