Correspondence.

Air Resistance.

To the Editor of the SCIENTIFIC AMERICAN:

In the September issue of the SCIENTIFIC AMERICAN, in the first article, "Air Resistance of Electric Cars," the figures for the flat front fall somewhat short of Smeaton's table of wind pressures, in which the square of the miles per hour is divided by 200 to find the wind pressure in pounds per foot; whereas in the article mentioned, for the rates 20, 60, and 80, the respective pressures are 1.4, 8.2, and 14 unit pounds. The ratios of $\frac{(20)^2}{1.4}=286$, $\frac{(60)^2}{8.2}=439$, $\frac{(80)^2}{14}=457$ increase with the speed, but do not vary much between 60 to 80. I suppose the reason why these ratios are so much higher than in other tests, is that in the above tests the suction element was eliminated largely by the body of the car, both in deflecting the wind behind the flat testing front and by the eddy formed between the front of the car and the testing flat, which would tend to push forward on the latter.

I am interested in these experiments, as I am making some such tests for my own use. I think the above ratios in a free air test would come nearer 100.

IRA J. PADDOCK.

Percival, Iowa, September 6, 1906.

Aeronautic Terminology.

To the Editor of the SCIENTIFIC AMERICAN:

I was much interested in reading Mr. Joseph A. Blondin's letter in the issue of September 8, of the SCIENTIFIC AMERICAN. His classification of aeronautic terms (or rather that of the International Aeronautic Congress of 1889) is excellent as far as it goes; but aeronautics, as a science, is developing very rapidly, and it seems to me that the state of the art warrants a substitution for the term "aeroplane" (when applied to a complete machine) which is one of the three subdivisions of "aeronef" or "flying machine."

Properly speaking, an aeroplane *can only be one of the parts*, and not the whole, of an aeronef; for aeroplanes are used in kites, in soaring machines, and in *aerodynes*, which is the term I wish to propose to denote *aeroplane-supported machines, driven by mechanical power* (i. e., by a prime mover).

The Greek roots of aerodyne are obvious and expressive, and while I have always thought Langley's term of "aerodrome" was euphonious, it has been pointed out very properly by Capt. Ferber (Revue d'Artillerie, March, 1904) that "aerodrome" really means an *air course*, just as hippodrome means a course for horse races, etc., and in France "aerodrome" is also used to denote a balloon-shed.

The word *aerodyne* should be capable of international acceptance, and I would therefore suggest that in future the subdivisions of aeronef be: helicopter, orthopter, soaring machine, and aerodyne.

The term "flying machine" should be dropped, as it is too suggestive of the orthopter, or wing flapping device, to be synonymous with aeronef; and the term gliding machine (meaning soaring machine) should also be dropped from the nomenclature of aeronautics, as it is liable to be confused with the hydroplane or gliding boat, which is also a gliding machine.

W. R. TURNBULL.

Rothesay, N. B., Canada, September 8, 1906.

"Vacuum Preservation."

To the Editor of the SCIENTIFIC AMERICAN:

I am much interested in Beatty's article on the vacuum process for preserving edibles. The Mason jar, so much used, is about as unsanitary as it can be. The fruit juices come into contact with the zinc cover around the porcelain lining of the same, and also between the zinc cover and the porcelain lining, making the lining useless. I have put up fruit in the West Indies, and on reaching home the zinc was corroded entirely through, and the contents of the jar had evaporated and spoiled. There is a number of jars on the market in which the contents only come into contact with a glass top and a rubber ring packing; these are sanitary, but for some unknown reason the price is more than that of the Mason jar. I have been a reader of the SCIENTIFIC AMERICAN for over half a century, and rejoice in the good work along such lines as this.

WILLIAM B. REED.

Hastings, Minn., September 9, 1906.

To the Editor of the SCIENTIFIC AMERICAN:

Referring to the series of inquiries in regard to vacuum preservation, I wish to say that such methods have been experimented on largely, and have been applied practically to a limited extent. A company in Philadelphia has for years been putting up an infant food in cans which are sealed under a vacuum of about twenty-eight inches. This preparation is a finely-powdered solid, among the constituents of which are dried egg-albumen and cereals. The conditions necessary for preservation of meat, ripened fruit, fruit juices, milk, and eggs are much more difficult to obtain, because these articles are always more or less impregnated with micro-organisms of sturdy vitality.

As you remark in your editorial comment, many of the questions asked by your correspondent cannot be answered without elaborate research; a few, however, can be answered from known data. The sterilizing effect of heat is due to the temperature almost entirely, and not to the pressure. If, therefore, water boils at, say, 120 deg. F., the fact of such boiling will not accomplish sterilization. A perfect vacuum is 30 inches only when the surrounding air-pressure is equivalent to 30 inches of mercury.

In the letter there is a statement which seems to me to mean that by mechanical means your correspondent obtained a vacuum equivalent to more than the surrounding pressure. This is impossible, and the observation has been evidently based on error.

Anaerobic bacteria may occur in any raw food product; some of them may be able to maintain their vitality for a long while under unfavorable conditions. Many persons overlook the fact that the simpler forms of life can remain long inactive without dying. Hence microbes live in ice for months; as soon as the ice melts and the temperature rises to about blood heat, the organisms begin to multiply. Satisfactory sterilization is not likely to be obtained by boiling under reduced pressure.

HENRY LEFFMANN.

Philadelphia, September 10, 1906.

Motor-Boat Races on the Hudson River.

Some interesting races were held last week on the Hudson River under the auspices of the Motor Boat Club of America. The first day was given up to reliability trials. In these trials a number of the smaller boats competed. Points were given for different features, such as reliability, speed, condition after trial, economy of fuel, etc. The test consisted in making as many rounds as possible of the 10¼ nautical mile course within a given time. Several boats dropped out for various causes, such as stoppage of the water circulation, lack of sufficient fuel, etc.; but the two boats which made the best record were the "Simplex VI.," fitted with a 30-horse-power Simplex, four-cylinder engine, and the "Sparrow," another small speed boat under 33 feet in length and fitted with a 31.8-horse-power Packard four-cylinder, automobile motor. These two boats made eight and nine rounds respectively, and their best times were 41 minutes and 50 seconds, and 36 minutes and 28 seconds, the latter time corresponding to a speed of 19.43 miles an hour.

The second day's event consisted of a long-distance race from New York to Poughkeepsie and back, a total distance of 115⅝ knots, or 133.3 statute miles. Nine boats started in this event. These boats ranged from 60 to 30 feet in length, and carried engines of from 200 down to about 30 horse-power. Of the nine boats which crossed the starting line at the foot of West 112th Street at 9:30 A. M., but three returned late in the afternoon. The first of these to arrive was Mr. Harry Payne Whitney's large yacht the "Artful." This boat is some 60 feet in length, and is fitted with twin screws and two six-cylinder 6½ x 8 Speedway engines. She covered the course in 6 hours, 5 minutes, and 33 seconds, or at an average speed of 21.87 miles an hour. The next arrival was the 31-horse-power "Sparrow." This small craft, because of her fine lines and her reliable motor, was only 40 minutes longer than the "Artful" in covering the 133 miles. Her time was 6 hours, 45 minutes, and 55 seconds, corresponding to an average speed of 19.7 miles an hour. The third and last boat to finish was the 30-horse-power "Simplex VI." Her time was 7 hours, 43 minutes, and 59 seconds, which corresponds to a speed of 17.33 miles an hour. This was about 16 minutes slower time than that made last year by "Simplex III.," which won the race.

Wednesday, September 12, was given up to speed trials for mile and kilometer records, and also to a free-for-all race for the American championship. In the speed trials the "Standard," a large boat equipped with a new 300-horse-power, 10 x 10, six-cylinder, double-acting, Standard marine motor, made the fastest time. This boat covered a mile with the tide in 2 minutes and 10 seconds, and against the tide in 2 minutes and 34 seconds. The average figured out 25.56 knots, or 29.46 statute miles an hour. The next best mile record was made by the "Dixie," which is equipped with an 8-cylinder 6½ x 6¾ engine, rated at 132.72 horse-power. This boat made the mile with and against tide in 2:35 and 2:44 respectively, or at an average speed of 22.57 knots, or 26.01 miles an hour. The "XPDNC," fitted with Mercedes engines of 60.83 horse-power, made 22.22 knots, or 25.61 miles in the mile trial, and the "Mercedes U.S.A.," which likewise had a 60-horse-power Mercedes engine, made 19.09 knots, or 22 miles an hour. The "Vesuvius," a new boat fitted with a Hurd & Haggin engine of 40 to 50 horse-power, attained a speed of 20.64 miles an hour in a mile trial. The best records for the kilometer were 1:07 and 1:37 with and against tide, made by the 300-horse-power "Standard." This was an average of 1:22. By making this distance in 1:18 and 1:46 with and against tide, the 60-horse-power "XPDNC" attained the same average (1:32) for the kilometer as did the 132-horse-power "Dixie," which covered the distance in 1:23 and 1:41 respectively.

The free-for-all race for the American championship consisted in making three rounds of the 10¼ nautical mile course. But two boats succeeded in finishing this race. These were the 132-horse-power "Dixie" and the 190-horse-power "Skedaddle." The latter 60-foot boat had a 9 x 10, 6-cylinder, Craig engine. It did not succeed in making any extraordinary time, however. The race was won in 1 hour, 20 minutes, and 1 second by the "Dixie," while the "Skedaddle" required 1 hour, 44 minutes, and 39 seconds. The "Dixie" averaged 23.06 knots, or 26.58 miles an hour, in this race, which was 35½ statute miles in length. The second day after, the "Dixie" ran this distance for a third time in the race for high-speed boats of 12 meters (39.37 feet) length and under, in 1 hour, 19 minutes, and 6 seconds, thus making 23.39 knots, or 26.96 miles an hour. In the race for high-speed boats of 40 feet and over, the "Skedaddle" won in 1 hour, 27 minutes, and 49 seconds, which corresponds to an average speed of 21.01 knots, or 24.22 miles an hour. The following day she did somewhat better, covering the 35½ statute miles in 1 hour, 22 minutes and 10 seconds, and winning from the "Dixie" on time allowance, because of her lower rating. In the race for high-speed boats of 33 feet and under, the "Sparrow" won in 1 hour, 44 minutes, and 46 seconds, or at an average speed of 17.59 knots (19.27 miles) an hour. Her fastest lap was made in 34.19, or an average speed of 20.38 miles an hour.

The races were marred by an accident which occurred on Friday afternoon to Mr. L. L. Haggin's "Vesuvius," and as a result of which the two men who were running this boat were drowned. The "Vesuvius" had trouble with her steering gear, which suddenly gave way and caused her to swerve, thus precipitating one of the men into the river. The other man attempted to rescue him, and both were drowned. On the third day of the races the steering gear of the 300-horse-power "Standard" broke while she was making a sharp turn, thereby disabling her. These accidents seemed to show that builders of motor boats do not realize the tremendous strain put upon the steering gear of such craft when making sharp turns at high speed.

In the races which have just been held no remarkable records were made. The long-distance race was a fizzle, owing to the unreliability of the competing boats, and the time made by the winner was by no means comparable to the record run from Rouen to Trouville made recently in France by "La Rapiere II.," in which she covered the 70 miles between the two places in 2 hours and 9 minutes, or at an average speed of 32.9 miles an hour.

From the performances of the boats in this meet it would seem as if the present scheme of placing tremendous horse-power in a light hull has been pushed to its limit, and that in order to realize any increased speed, some new form of hull offering less resistance must be designed.

The Elimination Race for the Vanderbilt Cup.

On Saturday, the 22d instant, the elimination race to select a team of five machines and drivers to represent America in the Vanderbilt cup race of October 6 will occur on Long Island. The course used will be much the same as that traversed last year. It has been changed somewhat, so that the bad S turn will be avoided, but in place of it there will be a very sharp "hairpin" turn near Roslyn. The start will be near Mineola, as heretofore. The race will consist of ten circuits of the 29.7-mile course. Fifteen powerful cars are expected to compete. Among the entries are three Thomas machines, three Frayer-Millers, a Locomobile, a Christie, a Haynes, an Apperson, Oldsmobile, Matheson, Maxwell, Pope-Toledo, and a B. L. M. Most of these machines are specially-built racers of from 100 to 130 horse-power. Even if all do not start, there will be a sufficient number to make a most exciting and interesting event. The first five cars to finish will form the American team in the subsequent race.

The Current Supplement.

The current SUPPLEMENT, No. 1603, is of more than usual interest. The new Morrison Street bridge at Portland, Ore., is illustrated and described. "Modern Manufacture of Alcohol" is the beginning of a specially translated treatise on this subject which is very much in the public eye at the present time owing to the passage of the free alcohol bill. The first installment deals with the chemistry of the subject. "Meteorites" is by Oliver C. Farrington and is illustrated by the most interesting engravings. "The Art of Inventing" is a most important article by E. J. Prindle. Among the other articles are: "Large Electric and Steam Locomotives," "The Queen Ant as a Psychological Study." "Clearing New Land" is concluded. "Malleable Cast Iron" describes an important process. The usual notes will be found in this issue.