

acquired its first appreciable velocity there. As might be expected in that case, the subsequent cumuli wave-crests became less pronounced in character with the settling down of the two current strata into their normal uninterrupted courses."

In this ascent a steel cylinder of 1,000 litres of oxygen was carried for the use of the two observers when above 16,400 feet. The value of oxygen-carrying in high ascents is obvious from the following experiences of this ascent.

"The physiological effects of the rarity of the air at 7,000 m. (23,000 feet) were interesting, one of the observers finding that a stoppage of oxygen breathing for a minute or two caused a general greyness to overspread the whole view gradually, but without giving any feeling of sickness, while resumption of oxygen inhalation caused an instantaneous renewal of the actual colours of the landscape, but with greatly enhanced vividness, which, however, very rapidly decreased to the normal hues. Difficulty also in reading the instruments, except after a few seconds' oxygen breathing, was found at levels higher than 5,000 m. (16,400 feet).

The First Observations with "Ballons-Sonde" In America.

The following communication has been received from Mr. A. Lawrence Rotch, Director of the Blue Hill Observatory in America, in relation to his recent experiments with Ballons-Sonde at St. Louis.

"The balloons used in the experiments are the closed rubber balloons devised by Dr. Assmann, Director of the Prussian Aëronautical Observatory. These balloons are inflated with about 100 cubic feet of hydrogen gas; they expand in rising until they burst, and then the attached parachute moderates the fall. In some cases two balloons, coupled tandem, were employed, and as only one balloon bursts, the other is borne slowly to the ground and serves to attract attention. The instruments, which were furnished by M. Teisserenc de Bort, of Paris, record the temperature and barometric pressure upon a smoked cylinder, turned by clockwork; and the lightest of them in its basket weighs about one and one-half pounds. A notice attached to each requests the finder to pack the instrument carefully in a box and

return either to St. Louis or to Blue Hill, with promise of a reward for the service.

"Owing to delays in obtaining the gas and apparatus, the experiments were not begun until the middle of September, during which month four ascensions took place. All of the balloons fell within a radius of fifteen miles, about fifty miles east of St. Louis. Twice the height of nine or ten miles was attained where a temperature of 68° F. below zero was recorded. These experiments were conducted by Mr. S. P. Fergusson, of the Blue Hill Observatory staff. Another series of ten ascensions was executed by Mr. H. H. Clayton, meteorologist at the Blue Hill Observatory, during the last part of November and the first days of December, mostly after sunset, in order to avoid the possible effect of insolation. Fortunately, all these balloons were also recovered, though the stronger upper air currents carried them further from St. Louis, three of them travelling more than two hundred miles, and two, at least, with a speed exceeding one hundred miles an hour, the direction of every balloon being toward the easterly semi-circle. Ten of the fourteen ascensions furnished good records, and the reduction of the later ones reveals lower temperatures than in September, for example, 72° below zero at the height of seven and three-quarter miles on November 25, and 76° below at six and one-quarter miles on the following day.

"The fact that all the balloons were recovered indicates the excellent topographical situation of St. Louis for dispatching them."

Letters to the Editor.

THE RIGIDITY OF KITES.

To the Editor of the Aëronautical Journal.

SIR,—Will you oblige by inserting a correction in our widely circulated "Journal"? The error is a statement by Mr. W. H. Dines on page 6 of the issue for January, 1905, to the effect that I consider it a barbarous practice to make a kite rigid. The paragraphs to which Mr. Dines alludes will bear repetition; they are as true now as when made in May, 1899:—

"The continuous diagonal struts boom out the lower jack-yards, and the cut diagonals keep the upper corners out, and when the centre tackles are set up the kite is perfectly rigid."

"The American copies of my cellular kites have no diagonal struts, the corners being pushed out by horizontal and vertical pieces of wood. In addition, they require to be guyed in

every direction by steel wire stays. This style appears to me barbaric. Horizontal pieces of wood adjacent to the horizontal or lifting calico surfaces must impair their efficiency. However tightly the calico may be stretched, the cobweb of wire stays used to keep the affair cubical must tend to slacken it. Again, if all is perfectly square and rigid before the kite is flown, the moment the wind blows on the calico, half the wire stays must slack up and allow the instrument to assume a rhomboidal form."

Yours faithfully,

LAW. HARGRAVE.

Woollahra Point,
Sydney, N.S. Wales.
February 25, 1905.

With reference to this subject the following has been received from Mr. W. H. Dines:—

"I much regret having misrepresented Mr. Hargrave's opinion as to the rigidity of a kite, through the carelessness of not having verified my reference. Recent experience has confirmed my opinion that there are great advantages in using a flexible kite, provided that deformation proceeds symmetrically under increasing wind pressure, and in such a way that the pull on the wire is lessened.

The introduction of a spiral spring into one of the cross bamboos of the kites I use has reduced the jerkiness of the pull, and greatly increased the reliability of the kite in bad weather.

W. H. DINES.

June 22, 1905.

Notes.

The New German Aeronautical Observatory.—In a published description of the proceedings of the St. Petersburg Conference on the exploration of the atmosphere, Mr. A. Lawrence Rotch mentions the description given by Dr. Assmann, of the new aeronautical observatory to be erected in large grounds thirty-five miles south-east of Berlin. The reason for planting the observatory at that distance from the capital is that at the existing observatory in the suburbs of the city the trailing kite wires constitute a danger to life and property. The new establishment is to be in every respect a model one, where balloon and kite ascents will be made several times a day. A boat will be provided on the lake, which will permit the kites being flown even in calm weather, and in this way it is expected that practically continuous meteorological records will be obtained in the free air. As an indication of what had already been done in this way, Dr. Assmann exhibited a chart, encircling the hall, on which were plotted the isotherms at different heights above Berlin, obtained from the ascents of kites and captive balloons made daily for more than a year. From this Dr. Berson showed that the wind direction shifted to the right hand with increasing altitude.

M. Jacques Faure's Recent Balloon Journey of Fifteen Hours in a Storm.

—M. Jacques Faure has added yet another to his ballooning exploits. Accompanied by Le Comte de la Salle and M. Tollander Basch, he recently ascended from Havre in the Aéro Club No. 3 and went over the sea. It appears that he successfully applied the apparatus for steadying the balloon, which travelled in the direction of Cherbourg at an altitude of only 30 feet above the surface of the water. About nine o'clock a severe storm arose, and the balloon was driven towards Havre at a speed of 50 miles an hour. When the balloon arrived at the shore it was found necessary to rise to 4,500 feet in order to get beyond the reach of the storm currents. He was successful in finding a current by which he traversed the whole of France from west to east. At 10 o'clock he landed in Belgium, having been fifteen hours in the air. M. Jacques Faure may be congratulated on his skilful utilisation of the upper current, by means of which he escaped out of ill-threatening circumstances.

Recent Experiments with Aéroplanes.

—The *Edinburgh Evening Dispatch* of June 5 gives a somewhat full account of an experiment with Professor Montgomery's aéroplanes in America. The Professor is stated to have been enthusiastically working at his idea for 20 years. Unlike most inventors of aerial apparatus, he appears to have preferred that the first experiment should be performed by a deputy, and an aëronaut was entrusted with the demonstration of the gliding powers of the machine. The aéroplane to which the aëronaut was attached was towed up into the air until a height of 4,000 ft. was reached, when the rope which held the aéroplane to the balloon was cut, and the aéroplane was left dependent on the sustaining powers of the air.

The aéroplane, which weighs 42 lb., consists of two wing surfaces, curved after the suggestions afforded by bird wings, a flat tail, and a vertical keel. There are relative adjustments, partly automatic, partly under the control of the operator, for maintaining equilibrium.

But this experiment resolved itself into being not much more than a descent with a parachute, and one infinitely more dangerous than one of the approved form. If the descriptions of the descent are correct, the aéroplane appears to have been in the air twenty minutes, to have described circles, gone backwards and forwards, and to some extent risen after descending on ascending currents; but, in the absence of motive power to overcome gravity, the experiment cannot be called an attempt at flight.

The *Car*, which makes a feature of aeronautical notes in its issue of June 21, describes some recent but abortive experiments with M. Earnest Archdeacon's aéroplane: "The huge machine was placed on the Seine, near the Pont de Sèvres. It is ten mètres long, and covers sixty mètres of superficial area. Its weight is over 650 lb., and it is actuated by a 15 h.p. motor. The aéroplane was drawn by the auto-