

THE RADIOMETER IN A BALLOON

THE Count Elemer Bathyani made a private ascent in the *Tricolore* balloon on Monday, August 28, with Duruof as an aëronaut. The balloon started from La Villette Gasworks at 11.50 in the morning, and descended at Chevru, near Coulomiers, about forty miles from Paris, at 2 o'clock, after having run little short of a hundred miles. The aerial craft had been overtaken by a series of winds in different directions. The culmination of the ascent was 2,500 metres.

The objects of Count Bathyani were to rotate the radiometer at different altitudes, so as to illustrate the augmentation of the luminosity of the sun, and to condense the vapour of clouds with an ether evaporator, in order to collect moleculeæ suspended in the air, and ascertain whether vapour was mixed with a certain quantity of ammoniac, nitrous or nitric compounds, or ozone. The last operation could not be executed, because the balloon did not meet a true cloud, having passed in the superior zone through lacunæ, between the several cumuli. But the radiometer experiments were successful, and we are enabled to give a correct table of the results obtained. The radiometer was blue-red, constructed by Gaiffe.

In the Shade.—On the ground (at La Villette), 35 revolutions per minute, with a pressure of 750 mm., sky half covered by disconnected cumuli, temperature, 26° C., at an altitude of 1,750 meters.

In the Tricolore floating between cumuli at a distance of 1,500 metres from the earth, sixty-four rotations per minute—temperature, 15°.

In the Sun.—Time 11h. 50m. Temperature 18°, altitude 700 metres, sun shining through a layer of clouds fifty-four rotations per minute. Time 1h. 10m. Altitude 2,300 metres, temperature 13°. Sun shining; it is impossible to measure the number of revolutions, which are as great, if not greater, than with an ordinary white-black radiometer exposed to a radiant sun at the surface of the earth.

M. Gaiffe is constructing another differential radiometer to rotate under similar circumstances. One of the faces is to be white, and the other white with a black spot in the centre. The evaporator was working with ordinary vinic ether, but with methylic the condensation will be a great deal more powerful. The water in suspension will be precipitated under the form of ice; the refrigeration of condenser being then 20° C. below zero, all the dust floating in the air in the vicinity of condenser will be deposited with the ice. The ice is to be collected and ultimately analysed micrographically as well as chemically.

The difficulty is to prepare a vessel for holding the methylic ether, as the pressure is enormous even at ordinary temperature. But I was told at Auteuil frigorific works it can be obtained and filled ready for use very easily at a comparatively small expense.

W. DE FONVIELLE

THE RECENT TORNADO

IT is evident from a correspondence in the *Times* of Friday, Saturday, and Monday last that a tornado of almost unexampled intensity and destructiveness swept over the Isle of Wight and Hampshire on the morning of Thursday, September 28. The storm, which appears to have come from a southerly direction, struck West Cowes about seven in the morning, thence crossed the Solent in a north-easterly direction, and, striking the opposite coast, near the entrance of Southampton Water, passed up Hampshire between Titchfield and Portsmouth at least as far as Meonstoke, which is about sixteen miles to the north-east of Cowes.

Its appearance on approaching is described as that of an immense black cloud sweeping along the ground and giving out a low moaning sound which it was awful to hear. A gentleman in a small yacht, which fortunately was out of the course of the tornado, suddenly heard

sounds very much resembling the noise caused by the escape of steam when at its highest pressure, and at the same time the whole sky became clouded with articles of all forms and sizes which were carried through the air to a height of about 300 feet and parallel with the shore. The Globe hotel was blown down, and several houses lost their roofs, fronts, or chimneys; a pier belonging to Dr. Kernock was wholly demolished, and many of the watermen's boats were sunk, being filled with bricks which had been blown through the air. It is stated that some bricks fell on board Lord Wilton's steam yacht, the *Palatine*, which was moored half a mile from the shore. At Cowes alone the damage done, the work of only one short minute or two is estimated at from 10,000*l.* to 12,000*l.* The destructive character of the tornado was maintained in its course through Hampshire, where turnips and other crops were literally dragged out of the ground, fine oak trees uprooted, farms and homesteads damaged, a barn being bodily lifted up, and instantly converted into a heap of ruins, and life lost. It made a clean sweep through a thick copse, clearing a path for itself 100 feet in width, along which the trees and underwood were all uprooted, as if men had grubbed up everything. In some cases it is said that the corners of ricks and cottages were cut off as if with a knife, and that iron pig-troughs were carried a distance of 300 to 400 yards, and gates lifted from their hinges and thrown into the adjacent fields.

Since the mode and suddenness of its approach, its brief continuance, and its terrible destructiveness, all show that in investigating this storm, it is a true tornado we are dealing with, we hope that, whilst the occurrences are fresh in the minds of those who witnessed them, some one will take the trouble to make a careful collection of the facts. As yet, little of the meteorology of this tempest is before us; what is required for its investigation is to know along different points of its track the time it began and ended, the changes in the direction of the wind, temperature, and state of the sky, and the aqueous precipitation accompanying it; the damage done, the objects whirled aloft, and the direction and course taken by them in their flight through the air. A careful investigation of the facts of this tornado would form a valuable contribution to meteorology at the present time, inasmuch as it would probably enable us to say whether tornadoes and other whirlwinds are to be regarded as typical, as is sometimes alleged of the cyclone of tropical regions and of the ordinary storms which sweep over these islands.

The services of a sufficient staff of observers are more urgently required to record non-instrumental observations of wind, rain, hail, cloud, &c., from which the broad features of wind-storms, hail-storms, and thunder-storms could be adequately described, and some knowledge arrived at as to the way in which the rainfall is propagated from parish to parish. If such organisations were set on foot over different portions of the British Isles, we should soon be in a position to attack several of the more important practical problems of meteorology, and to issue weather-warnings in the interests of agriculture and horticulture as began to be issued in France some months ago.

Storms seem to have been wandering widely recently. Ten days before the tornado above referred to, a storm of unusual violence visited the American coast, and the *Paris Temps* received on Saturday evening a telegram from the Puy-de-Dôme Observatory stating that a terrific hurricane had been blowing since the morning. It was impossible for the observers to walk outside the house without being blown down. The velocity of wind could not be registered by anemometer. The sky was clear, but clouds were covering the surface of the earth and clinging to the different mountains. On the following night and day the weather was boisterous and rainy at Paris.