

## METEOROLOGICAL OBSERVATIONS IN THE PYRENEES

M. DURUOF, the French aéronaut, has just completed a series of three ascents executed from Pau, for the purpose of studying the state of the atmosphere during the recent cold season. Thrice M. Duruof started with a north wind at the surface of the earth, and thrice he was able to find an upper current blowing from the south. The last time he started at 1.30 P.M., travelled upward until 2.30 P.M., moving southwards, when having reached a higher level he was carried northwards. He landed safely at 4 P.M. in the department of Gers.

He found in his last trip that the wind was veering regularly with increasing altitude, and was steady at certain levels, so that it was possible to go in any direction by keeping the proper altitude for a sufficient length of time. All his changes of direction were traced on an Ordnance Survey map. His readings and observations will be sent to the Academy of Sciences for further discussion.

It was observed during the recent cold period that the barometer was low with a northern wind, which is unusual. The three ascents of Duruof may be regarded as affording an explanation of the fact, if we suppose the southern current to have been general at an altitude of 4,000 to 9,000 feet above the earth.

The superior current on the 4th of March was carrying immense quantities of snow at a temperature of  $0^{\circ}$  C. The snow rapidly melted in its descent, as the air was mild below. It is probable that this snow was caused by the influence of the Pyrenean range, which is very cold. I observed at Paris an effect which can be ascribed to similar causes, from hilly parts of our geological basin situated in the south. On that very day the sky was covered in the south and blue in the north, where immense plains extend to any distance.

At all events the southern aerial stream which carried the balloon northwards was very thick. M. Duruof was unable to find its upper surface, although he reached the level of 11,000 feet.

Other ascents will be made by the same enterprising aéronaut, whose special attention has been so long devoted to the utilisation of various currents according to altitude.

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SCIENCE AT THE NEW PARIS OPERA\*  
II.

ALL branches of Physics are represented in the New Opera; Heat, Light, Optics, Electricity, Acoustics play their different parts. So far as acoustic instruments are concerned, we may refer to an organ constructed by M. Cavallé-Coll, and formed of eighteen registers, distributed over two key-boards, and a complete foot-board. This organ is worked by four pedals, vibrating the air contained in 1,032 pipes, of which some are more than five metres in height, and above 30 metre in diameter. But it is the electric light which has most interest for us.

After giving a brief account of the invention and history of the voltaic pile, M. Tissandier proceeds to describe the battery connected with the New Opera, which has been organised by M. Duboscq.

The electric light may be thrown upon the magnificent stage by means of a Bunsen battery of 360 elements, which is established in a room on the ground floor, the length of which is not less than seven metres. M. Duboscq has here arranged six tables of 2.75 metres long by .75 metre broad, which each support a Bunsen battery of sixty elements (Fig. 5). This battery is placed upon the table which is made of very thick unpolished glass that cannot be injured by the acids. The elements are arranged in four rows of fifteen each. The table is provided under-

\* Continued from p. 351.

neath with a board which supports a large rectangular basin, in which the plates are placed after they have been used. The jars of the battery, filled with nitric acid, are, after being used, placed in a tub containing the acid and closed with a wooden lid.

In order to work a battery of such power under favourable conditions, M. Duboscq has had to make special arrangements for the preparation of the sulphuric acid liquid as well as for the zinc amalgams necessary to put the system of batteries in action.

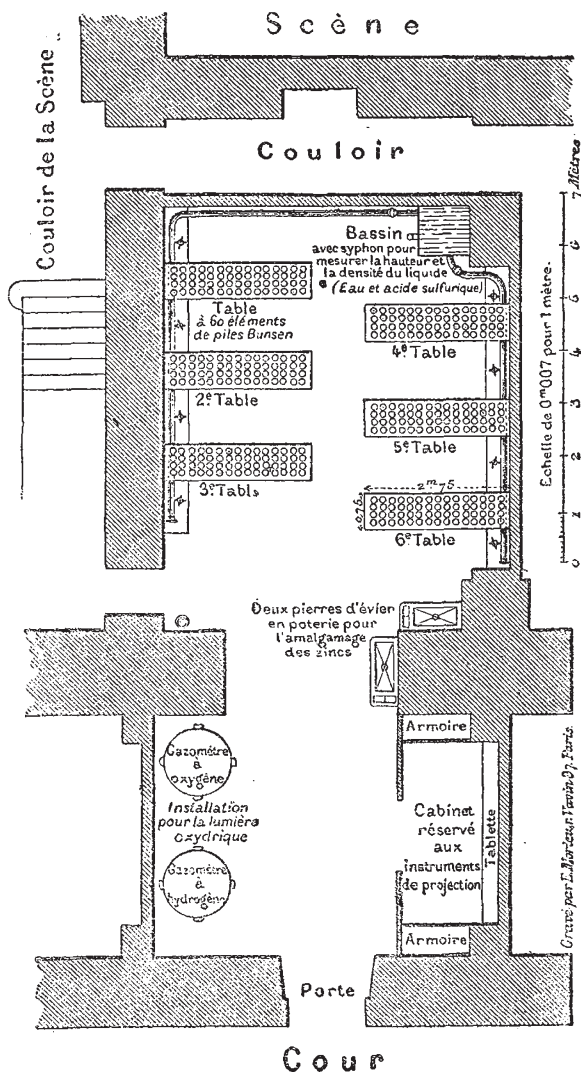


FIG. 5.—Plan of the Electric Room at the New Opera.

At the right corner of the electric room is a large reservoir, of the capacity of about one cubic metre, where water mixed with one-tenth of sulphuric acid can be stored. A spigot permits this liquid to run into a vertical siphon formed of a large tube, into which an areometer is plunged to ascertain its quality, and make sure that the preparation has been made in the proper proportions. The reservoir is furnished at its lower part with an earthenware pipe which is conducted along the walls of the room, opposite the six battery tables. Beside each table an earthenware spigot enables the operators to run the liquid into earthenware jugs, from which they fill the battery jars with the liquid.

By an excellent precaution M. Duboscq has obviated