the chain which separates France from Spain, an immense perspective of the atmosphere which covers the French valleys stretching from the foot of the Pyrenees.

In calm weather, towards sunset, the atmospheric vapor formed a true sea of fog, the upper limit of which was very perceptible, well defined, and perfectly horizontal, that is, spherical, having a height above the sea of about 1300 metres. (4270 feet.) This foggy stratum, which was about 900 metres (2955 feet) thick, was, so to speak, the reservoir of moist air, which, by movements originating in the mass itself, and without external influence, gave rise to the different kinds of clouds which the observer saw forming, at the expense of this sea of vapor.

And in the first place, a portion of this foggy atmosphere rose, and losing its transparency became visible, but always passing into the state of *stratus*, that is, clouds in horizontal layers, and of but slight thickness. This first formation is evidently in accordance with the laws of movement of a warmer layer which rises from the bosom of an immense fluid mass. These original *stratus*, by an internal agitation easily conceived, afterwards transformed themselves into *cumulus*, that is, into clouds with a horizontal base, rounded and mammelated on their upper surface. These cumulus formed a stratum of from 400 to 500 metres (1300 to 1642 feet) in thickness, the highest part of which reached an elevation of 1800 metres. (5910 feet.)

These cumuli, disturbed in different ways, become *nimbus*, at heights which never exceed 3200 metres. (10,507 feet.) These nimbus, rainy and stormy clouds, have an elevation which is very variable. The internal constitution of this kind of clouds must be very complicated, and at certain points partial storms burst out, in which the rest of the cloud does not participate.

A remarkable peculiarity, and one which may throw light upon the theory of *heat lightning*, to which M. Arago has paid attention, is that, according to M. Rozet, "when these storm clouds touch the earth, electric discharges frequently take place without any noise, and thus form true *heat lightning* at a small distance from the observer."

Comptes Rendus de l'Academie des Sciences de Paris, March 5, 1849.

Translated for the Journal of the Franklin Institute.

Fusion and Volatilization of Refractory Bodies. Note of Some Experiments made with the Triple Combination of the Voltaic Pile, the Sun, and the Blowpipe. By M. DESPRETZ.

M. Despretz, in these experiments, used a battery equivalent to 185 pairs of Bunsen's combination of ordinary dimensions; the height of the zinc about $5\frac{1}{4}$ inches.

An annular lens of about 3 feet diameter.

An oxy-hydrogen blowpipe. The following were the results:

Hard and compact magnesia, which, under the action of the pile alone, assumed a pasty state, was immediately volatilized in white smoke by the combination of the pile and lens.

A needle-shaped piece of anthracite, of about .04 in. in diameter and $1\frac{1}{4}$ in. in length, was bent by the action of the pile and lens. Another

piece, submitted to the simultaneous action of the pile, lens, and blow-pipe, appeared to fuse. Two persons present, besides the Professor, thought they saw the anthracite fall in drops.

In another similar experiment, he collected in a platinum capsule placed under the piece of anthracite, several small black globules visible to the naked eye.

Ibid, June 18, 1849.

In some subsequent experiments, reported at the session of the 16th of July, operating with a Bunsen battery of 496 pairs, arranged in four parallel series, and about equivalent to 124 pairs of four times the size, and in the vacuum of the air pump, M. Despretz succeeded in volatilizing charcoal from sugar, "with much the same appearance as when a fragment of iodine is thrown upon a body sufficiently hot." The charcoal was deposited on the sides of the containing vessel, in a dry, black, crystalline powder. Every precaution was taken to avoid the presence of organic matter in the charcoal. Alumina was first melted, and then volatilized.

Translated for the Journal of the Franklin Institute.

On the Cooling of Masses of Air which Rise in the Atmosphere. Extract from a letter from CAPTAIN ROZET to M. BABINET, dated June 11, 1849.

You asked me to make experiments upon the cold produced by the dilatation of a current of air which rises along a regular slope under the action of a steady wind. It is not as easy as it might be thought, to find all circumstances favorable for such experiments; nevertheless, I have met them thus twice already in the chain of Corbieres, in the southern part of the department of the Aude, where I am now executing geodetic operations, and I hasten to give you the results.

1st June; clear weather; on Mount Bauchard; noon, wind from the south; steady and pretty strong; the two thermometers placed in the direction of the meridian.

Elevation of the lower station, 686 metres, Lower Thermometer, $+23^{\circ}\text{C}$.

" " higher " 890 " Higher " $+19^{\circ}$

Difference of levels, 204 " Difference from below upwards, — 4°

Horizontal distance of stations, 1000 metres. Mean slope, 12° .

4th June, on Mt. Mielavre de Bouisse, 2 o'clock, P. M.; weather clear; wind north-east and pretty steady, about as strong as the south wind of 1st June; the two thermometers placed in the direction of the wind.

Elevation of lower station, 641 metres, Lower Thermometer, $+27^{\circ}\text{C}$.

" " upper " 865 " Upper " $+24^{\circ}$

Difference of levels, 224 " Difference from below upwards, — 3°

Horizontal distance of stations, 700 metres. Mean slope, 18° .

Latitude of the places of observation, 43° .

On the 31st May, in clear weather, and with a strong south wind,