M. Coulier made experiments with the products of combustion from flames in which the combustion was as perfect as possible. He found these gases much more active than the air of the room. This he attributed to particles of unconsumed carbon. He also found the air after rain and storms to be less active, and the air in summer less active than in winter. After extending the experiments to alcohol and benzine, the paper concludes with some remarks on the peculiar action of ozone.

Up to this point the two investigations run perfectly parallel, and the strange likeness between the two sets of experiments is not the least interesting point connected with them. After going over this first paper by M. Coulier, I found he had communicated a second paper, which will also be found in the same volume of the *Journal de Pharmacie et de Chimie*, at page 254. This second paper is almost entirely occupied with a description of some experiments in which inactive air was heated and rendered active.

In the first experiment described in M. Coulier's second paper a platinum wire was heated in the purified air of the flask, after which the air was active. In the second experiment pure air in which hydrogen was burned became active. In the third experiment pure air which was passed through a glass tube surrounded with tinsel ("clinquant"), and moderately heated, was made active. Fourth experiment, oxygen, nitrogen, and hydrogen became active after they had been heated in a tube. After describing some effects in ventilation when *highly* heated air is used, he says, "In the preceding note (the first paper) I believed I could attribute the activity of the air to the presence of solid bodies, and it seemed to me that the only solid body that could escape from a carbon flame could be nothing but carbon itself. It was the remarkable experiment, so easily made, of filtering air through cotton-wool, that led me to form this hypothesis, which the experiments above related invalidate (à faire cette hypothèse, que les expériences relatées plus haut infirment)." He concludes by saying, "The explanation of these phenomena remains still to be found."

Experiments exactly corresponding to some of those described in M. Coulier's second paper will be found in mine. Wishing to test the effect of combustion on air, I first made experiments to test the effect of heat on the apparatus to be used in collecting the hot gases. For this purpose I passed filtered air through a heated glass tube, after which I found it was remarkably active. It was found however that this activity is not due, as M. Coulier seemed to suppose, to the heating of the air, but to impurities driven off the surface of the tube by the heat. This was proved by showing that the air remained inactive when the hot tube through which it was passed was thoroughly cleansed.

In making experiments on the effect of burning gas I arranged a platinum wire, connected with a battery, to enable me to light the gas in the pure air of the receiver. On testing the action of the heated wire alone, it was found that simply heating the wire gave rise to cloudiness. It was however found that by highly heating the wire its activity was destroyed, all impurities being driven off.

These experiments explain M. Coulier's first and third experiments. The fourth experiment is also to be explained by the nuclei driven off the tube by the heat. These nuclei may be driven off in the solid state, or as gases which condense without nuclei when *highly* supersaturated on being cooled to the temperature of the flask. The nuclei are in some cases formed by chemical union of the gases driven off by the heat, and in other ways unnecessary to enter upon here. As to the second experiment, more information is required as to arrangement of apparatus, &c., before any opinion can be formed as to the origin of the nuclei.

It now appears to me that this second paper explains why the first results of M. Coulier, though repeated and confirmed by M. Mascart, have not received that general acceptance we should have expected. In his second paper he describes a number of results which he did not succeed in fitting into his hypothesis. They even seemed to him to shake his first conclusions, and the uncertain sound given by his second paper seems to have blighted any fruit his first paper was likely to have produced. There can however be no doubt that M. Coulier was the first to show the important part played by dust in the cloudy condensation of the vapour in air, and his first paper clearly explains its action. It seems highly probable that if it had not been followed by his second paper, or if he had succeeded in getting the key to the explanation of his experiments, and his conclusions had confirmed instead of weakening the teaching of his first paper, his result would long ere now have been applied to explain the different causes and the different forms of cloudy condensation in our atmosphere, as well as other physical phenomena.

Darroch, Falkirk, February 15 JOHN AITKEN

Geological Climates

I DESIRE to express my thanks to Dr. John Rae for the valuable contribution of "facts" which he has added to this interesting question, of which I hope to make use in due time.

I wish also to answer the question asked by Prof. Woeikoff in his letter of February 17. My authority for January, July, and mean temperatures in the northern hemisphere and in the southern is the most recent and accurate available, viz., United States Coast Survey, "Meteorological Researches for the use of the Coast Pilot," Part 1, by William Ferrel (Washington, 1877). Mr. Ferrel gives the January and July temperatures for every ten degrees of longitude and latitude, up to 80° N. and 60° S. as follows, so far as regards the annual means :—

Lat. N.		Annual.		Lat. S.		Annual.
°		°		°		°
0	...	80·1 F.	...	0	...	80·1 F.
10	...	81·0 ,,	...	10	...	78·7 ,,
20	...	77·6 ,,	...	20	...	74·7 ,,
30	...	67·6 ,,	...	30	...	66·7 ,,
40	...	56·5 ,,	...	40	...	57·9 ,,
50	...	43·4 ,,	...	50	...	47·8 ,,
60	...	29·3 ,,	...	60	...	35·3 ,,
70	...	14·4 ,,	...	70	...	—
80	...	4·5 ,,	...	80	...	—

This table fully justifies what I said of the southern hemisphere as compared with the northern, and is, of course, explained by the existence of three great gulf streams in the south, which raise the mean temperature, producing insular climates with a small range from July to January.

Mr. Ferrel adds, at the close of his discussion (p. 22) :—

"From Dove's Charts of Isothermal Lines, which do not extend beyond the middle latitudes in the southern hemisphere, it has been inferred that the southern hemisphere is colder than the northern, and this has been the accepted view ever since his charts were first published, in the year 1852; but from the results obtained above it is seen that the mean temperature of the southern hemisphere is the greater of the two."

I was well aware that the east coast of Asia is colder, latitude for latitude, than the east coast of North America, but this has nothing to do with reducing the temperatures of the east coast of America, by means of alterations in the ocean currents of the North Atlantic, which I deny to be possible.

SAMUEL HAUGHTON

Trinity College, Dublin, February 19

Climate of Vancouver Island

As questions connected with the climate of Vancouver Island and the influence on it of ocean currents have lately been the subject of several communications in the pages of NATURE, it may be worth while to draw attention to the fact that Esquimalt, at the southern extremity of the island, together with several places on the mainland of British Columbia, have now been for a number of years occupied as regular stations of the Canadian Meteorological Service, and that trustworthy meteorological results are to be found in the annual reports to Government.

When writing a report on British Columbia for the Canadian Pacific Railway Survey in 1877, I applied to Prof. Kingston, then in charge of the Meteorological Department, for some information on climate, and received from him an abstract, which was published at the time ("Can. Pacific Ry. Report, 1877," p. 246), by which it appears that the mean summer temperature of Esquimalt is 57°·82 F., mean winter temperature 34°·45, mean annual temperature 47°·97. This does not include however the additional results of the last few years.

Much information on the climate of the northern part of the north-west coast may also be found in the *Alaska Coast Pilot*, 1869, and the *U.S. Pacific Coast Pilot*, Appendix 1, 1879. In the latter, series of monthly and mean annual isothermal lines are given for the air and sea surface, which—though the observations at command are by no means complete—are doubtless nearly correct. A partial abstract of these, with some discussion