## Electrical Conditions in Stratified Clouds.

IN preparing a paper on "The Physics of High Altitudes" for the Dublin meeting of the British Association in 1908 (Climate and Health Committee), I spent some days on one of the central heights of Madeira observing atmospheric electrical conditions during the placid season of summer weather.

The wind was steadily N.N.E., and except for ascending masses of vapour the inflowing sea-breeze from solar generation had wasted before reaching my station 5700 feet from the sea. The mountain collar cloud formed with great regularity, and varying slightly with barometric pressure became a stationary mass, perhaps 500 feet thick, at an altitude between 2500 feet and 3000 feet.

The upper surface waste of constant evaporation was steadily recuperated by the arriving cloud vapour, visible or condensed, which spread out as a lower layer of the collar.

Now this collar cloud took, always in calm weather, a distinctly stratified form, and on one or two occasions when in exceptionally high barometric conditions the collar rested at an unusual height—6000 ft. or 7000 ft. —I was able to fly my kites into close proximity with the arriving vapour masses which were to maintain the collar in structure and position.

These arriving masses were always electrified, that is, clothed with an envelope of positive electricity varying in intensity as indicated by Thomson's portable electrometer, to which my kite was attached by a wire conductor twisted with the string; and the vapour masses, thus clothed, seemed on arrival at the cloud under-surface, itself positively electrified, to hesitate and to be kept apart, thus giving a clue to the stratified appearance which it is here my object to illustrate.

By and by distinct coalescence would occur, but the cloud never lost entirely the stratified arrangement of its component layers. My kites were made of thin glazed lining, for paper would collapse under aqueous vapour, and I was able, with an improvised oiled silk receptacle fitted with spirit and provided with a spreading unlighted wick, to provide the waste of substance accomplished by the burning match or water dropper.

MICHAEL GRABHAM.

Madeira, Oct. 6.

## The Band Spectrum of AsH.

THESE bands were obtained by photographing a carbon arc, the negative electrode of which had been drilled and filled with arsenic, run in an atmosphere of hydrogen at a potential of 110 volts. No bands were obtained with the arsenic in the positive electrode. The electrodes were composed of Acheson graphite. The spectrograph used was a Hilger three-metre quartz prism instrument.

Three bands were found. Two, the origins of which were at 32,380·2 cm.$^{-1}$ and 31,636·9 cm.$^{-1}$, had very wide spacing between the lines, and appeared to be typical hydride bands. The other band was unresolved and was probably due to $As_2$. The head of the band was at 31,802·6 cm.$^{-1}$.

The AsH bands were shaded to the red and consisted only of $P$ and $R$ branches. The lines of the band at 32,380·2 cm.$^{-1}$ were fitted by the formula

$$\nu = 32{,}380{\cdot}18 - 11{\cdot}186\, M - 4{\cdot}474\, M^2 + 0{\cdot}0485\, M^3 + 0{\cdot}01027\, M^4,$$

but since the origin lies in the head of the band we have not yet been able to assign definitely the true quantum numbers. There was no sign of doubling in any of the lines. The electronic transition is, therefore, probably of the type $^1\Sigma - {}^1\Sigma$.

The other hydride band is badly confused by the $As_2$ band, and no analysis has yet been attempted. Further work will be carried out in the near future.

GEORGE E. KIMBALL.
JOHN R. BATES.

Frick Chemical Laboratory,
Princeton University,
Princeton, N.J.,
Oct. 14.

## Branching of Lightning.

SCHONLAND and Allibone, in NATURE of Nov. 7, contribute what seems to be conclusive instrumental evidence that lightning discharges proceed from a negatively charged cloudbase. Confirmation (if any were required) may be obtained optically by the observation of very distant flashes, on the assumption that lightning consists primarily of direct electronic movement.

If the discharge is sufficiently far away, the subtended angular motion is so small that it is possible, in the duration of the flash, actually to see which way it is moving. I have noted several such discharges, particularly under the favourable conditions prevailing in sub-tropical China, and in every case the flash could be seen to start from the cloud and 'grow' downwards.

J. L. P. MACNAIR.

Military College of Science,
Royal Arsenal, Woolwich, S.E.18,
Nov. 17.

## Esperanto in Scientific Literature.

UNTIL quite recently the use of Esperanto for scientific purposes was usually regarded as a matter of jest. This is still the attitude of many who, while they readily appreciate how immensely valuable an easy but complete, precise, and euphonious international language would be, do not realise that Esperanto not only possesses these claims in theory, but has also been tried out in practice with most encouraging results. Several entire papers have been published in Esperanto from the Institute of Physical and Chemical Research at Tokyo, and other Japanese (and also European) institutions issue bulletins in this language. Esperanto may certainly be considered a satisfactory medium for composition on physical and chemical themes, as during the last three decades various commissions, societies, and individuals have carried out translations and compiled lists of technical terms which have been officially accepted. Consequently, a complete system of chemical nomenclature and a very complete physical and chemical vocabulary have now been available for several years.

An efficient medical language has been developed lately through an international society of medical men, and a monthly review which has flourished since 1923. In the more general field of biology, however, the language has been much less widely employed, though here again various individuals have performed notable spade-work in the compilation of technical vocabularies and in working out systems of nomenclature. A group has recently been formed to take stock of the existing material and to develop its use by the translation of biological papers. I shall be glad to send particulars to anyone interested in the subject.

R. M. MORRIS-OWEN.

Balliol College, Oxford.