succession of squalls of this kind is a common experience with westerly wind at Scilly, and the onset of squalls is generally associated with the veering of the wind to the north-west. Changes in wind velocity, either in the form of gusts or squalls, are generally associated with some change in direction of the wind, but the relation between the changes in gusts have not yet been studied.

A characteristic of squalls is the suddenness with which the increase of wind velocity occurs. At sea the ruffling of the surface can be seen travelling over the water, and the wind producing it and travel­ling with it strikes a sudden blow when it reaches a ship. If squalls are of sufficient violence to do damage to trees or buildings their progress can be traced in a like manner over the land.

These phenomena are exhibited in their most striking form in “ line squalls.” The characteristic feature of a line squall is that a number of places arranged, roughly speaking, in a straight or slightly curved line across the country experience a similar sequence of events at the same time, and the line of action sweeps across the country as a front advancing nearly uniformly throughout its length. This march of a linear front gives the impression of a wave or bore with an advancing front hundreds of miles long, sweeping over the country with a velocity that can be identified from the time of occurrence of the various changes at different places. the associated events are very well marked by those recorded for the fine of squall of the 2nd of August 1906 (fig. 3). They comprise a sudden increase of wind with a veer of direction of 45° to 90°, a sudden rise of pressure known in France as the *crochet d'orage,* and in Germany as the *Gewitter Nase,* a pronounced and permanent fall of temperature, and a shower of rain, hail or snow. While these various phenomena are indicated all along the advancing line their intensity may be very different at different points along it. The squall often exhibits greater violence in the middle portion, and it becomes more intense as the whole line advances. In the most fully developed portions the weather phenomena take the form of thunderstorms with violent wind and rain. The course of events in a typical line squall has been most care­fully worked out by R. G. K. Lempfert in a paper on the “ Line Squall” of the Sth of February 1906 *(Quart. Journ. Roy. Met. Soc.* vol. xxxii.). Fig. 4 (reproduced from the papers) shows the successive positions of the line of the front from which its rate of travel can be estimated. The line of advance of a line squall is generally from some point between south and north on the western side, the change of wind being from a warm southerly or westerly wind to a colder westerly or northerly one. So far as is known to the writer there is no case of a line squall exhibiting a backing wind. The date and direction of advance appear to be, generally speaking, those of the final wind, but in cases where the thunderstorms are developed there is a local violence of the wind bearing no relation to the isobaric distribution of the final wind.

Endeavours have been made to explain the phenomena of line squalls as due to vortex motion of particular character. The violent wind blowing out in front of the storm is part of the circulation of a vortex with horizontal axis. It supplies the air for the rainfall of the stations in front. Its place is taken by descending air at the back, which becomes in its turn the surface supply for stations farther in. But such an explanation seems in many ways incomplete. Although perhaps if the wind velocities in a vertical plane were plotted there might be some evidence of circulation in the mathematical sense by integrating round a closed curve, yet the idea of circulation in a vertical plane as suggesting the primary constitution of the phenomena is very inadequate. The change of air which takes place during the passage of the line squall is altogether different from that which we would get by passing the surface air through a complete vertical cycle and condensing a large quantity of water vapour on the way. If vertical circulation were complete the air would return to the surface warmed and dried. A few revolutions would produce a very considerable elevation of temperature. The air which remains after the passage of a line squall is, how­ever, distinctly colder, of an entirely different kind from that which it replaces and, in those cases which have been investigated, can be traced back to a different point of the compass. More­over, the smallness of vertical dimensions in the atmosphere as compared with the horizontal dimensions makes it difficult to allow that there is really room for an effective vortex with a horizontal axis. To carry air up 5 m. and bring it back again would practically deprive it of all its moisture and raise its temperature 72° F. Yet 5 m. would be a very small allowance for the horizontal spread of the phenomena of the squall.

The sudden replacement of warm air by cold with a change of wind seems much more likely to be associated with the flooding of the country by an advancing sweep of cold air. The pressure changes are continuous in the old layer and in the new layer, but discontinuous with varying degrees of discontinuity along the line of junction, where instability of the upper air may be set up. Fig. 5 shows the discontinuity of pressure in the example discussed by Mr Lempfert. It is clear that as the discontinuity of pressure becomes accentuated there arise