

THE STUDY OF CLOUD.¹

THIS monograph has been long and anxiously expected by all who take an intelligent interest in the advance of meteorology, and recognise the long and



FIG. 1.—Cumulo-nimbus.

profound study that the Rev. Clement Ley has made of this subject. It is with great regret that we notice that the preface is signed by a member of his family, and that the zealous and energetic watcher of the clouds has not been able to see his own work through the press.

We have in this book to do emphatically with Mr. Ley's own observations, his own theories of cloud structure, and his own nomenclature. Although the author acknowledges in the preface the valuable assistance that he has received from the works of other writers, it is curious to notice how seldom in the text these authors are referred to by name. One cannot help feeling that it would have added much to the interest and the instructive character of the book, if Mr. Ley had systematically drawn attention to the work of those who have laboured with scarcely less industry than he has in this department, if he had exhibited the points of difference from, and support given by, other observers, such as Abercromby, Hildebrandsson, Weilbach, and a host of other authorities, who seem sometimes almost ostentatiously ignored. It will be seen that Mr. Ley does not offer anything approaching a history of the subject, either on the theoretical or observational side. Opening with a preliminary chapter on the atmosphere and the movements of vapour-laden air, we have the general principles of cloud formation explained. Although we have been accustomed to

think that moisture condensed into cloud can only be driven or rolled about in a limited number of ways, and hence but few really distinct varieties of cloud can be formed, our author subdivides the process of cloud formation under several heads. The process which he terms "interfret" seems very nearly allied to the Luftwogen of Helmholtz, though there is no mention of this authority in the text. Mr. Ley states that when approximately horizontal currents of air differing in velocity and direction move over one another, an intermingling of the particles will result, accompanied by whirls, ripples, and waves, varying in size and shape according to the velocity and direction of the current. This effect he attributes to friction, and this seems to be the chief difference between him and the German physicist, who sees a more complex problem in the mixing of two fluids of different specific gravities. If the colder current is uppermost, the resulting action is called "interfret"; if the warm moist current is above, then "reversed interfret." To clouds formed by the descent of moist particles through warmer and denser air, the term "inclination" is applied, and the final nomenclature adopted rests on subdivisions of these classes of formations.

An adequate nomenclature of clouds has long been, and we think it may be said, is still, a desideratum. Luke Howard's terms still survive, and after nearly a century's use cannot, and will not, be entirely superseded. Stratus, cumulus, and cirrus have too strong a hold on

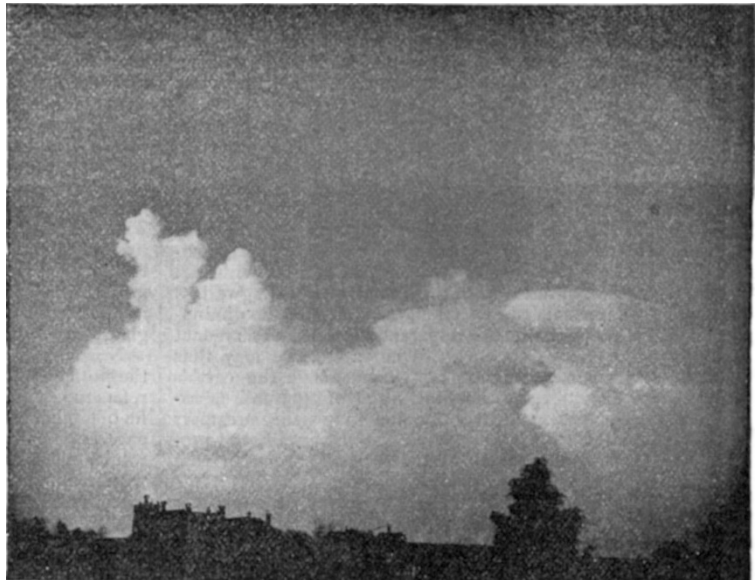


FIG. 2.—Cumulo-nimbus (same cloud as in Fig. 1).

the vocabulary to be dislodged, and however much they may be subdivided, they must remain the basis of classification. Mr. Ley therefore retains these terms, but an eye educated by some fifty years of constant study, has

¹ "Cloudland: a Study on the Structure and Characters of Clouds." By Rev. W. Clement Ley. (London: Stanford, 1894.)

seen and learnt to recognise many varieties of shape and form, arising possibly from real differences of structure, which require distinctive appellations, and make the description somewhat cumbrous. To quote the entire list of subdivisions would occupy no small space. Leaving out of the question fog, which is itself divided into three classes, we have the clouds of interrefret, inversion, and inclination, each subdivided into five different varieties. To this list, large as it is, must be added several additional subdivisions, all presenting marks of dissimilarity, and it is suggested, typical of special states of weather in different portions of the globe. Each of these classes is described at considerable length, and many of them are admirably illustrated, both by coloured plates and photographs. We have recently reproduced (NATURE, vol. xlix. p. 342) some admirable specimens of cloud photography, due to S. Manucci of the Vatican Observatory, illustrative of the distinctive characteristics of cloud formation. Mr. Arthur Clayden has secured some very admirable specimens, worthy to be classed with those of the Italian artist. We give in Figs. 1 and 2 the reproduction of the same cloud (*cumulo-nimbus*) after an interval of ten minutes, in which the shifting character of clouds is well illustrated. The truthfulness to nature is shown very conspicuously in an evening picture of the same variety of cloud (Fig. 3).

But the important question is, will illustrations, however carefully executed, give to persons of ordinary intelligence that insight into cloud structure which enormous experience has given to Mr. Ley, and enable them to discriminate with facility and certainty between the various classes? The author raises the objection, not as existing in his own mind, but as having been suggested to him by others whose opinion he values, that the classification here presented is too complex. We would respectfully associate ourselves with those who have suggested this doubt. Mr. Ley's contention is, that greater simplicity of description might induce a larger number of observers to contribute something, but that the *value* of the whole mass of such observations would be of small amount, through however long a space of time they were continued.

The main value consists in the evidence it affords of the different forces at work in the air, and its consequent trustworthiness as a weather guide, and on this point there will be many different opinions. The same description of cloud does not prognosticate the same weather in all countries, or at all times in the same country. The method and cause of development are as important as the character of the cloud itself. *Cumulus* may sometimes be the promise of a fine day, or prove the precursor of a shower. A man who "forecasts" by the clouds alone, is in the same position as a man who relies on the indications of a wheel barometer. He simply considers one variable in a very complex result. But Mr. Ley looks forward to a time when every man shall be his own "weather prophet," and when every individual and institution may be provided with weather telegrams and the means of correct and intelligent interpretation. In the multitude of counsellors so created there may be wisdom; there will certainly be confusion.

Waiting for this consummation, it seems most desirable that the same kind of cloud should be called by the same name by all observers; and simply having regard to

the main divisions, it will be admitted on all hands that this amount of progress has not yet been effected. We have then to consider whether this book, valuable as it is, will promote this end, and we are afraid that it will prove an edged-tool to beginners. To the advanced student it can easily be understood that this work is most welcome, but there still seems necessary a simpler system to serve as an introduction for the tyro. Mr. Ley may very well say that he addresses himself only to skilled observers, and to some this will be a sufficient defence, but this skill is not easily acquired, and we look for a graduated system, along which a student may advance confidently and scientifically. Abercromby and Hildebrandsson recognise and would recommend a classification of ten divisions, a system of which we believe the author disapproves. Captain Wilson Barker would, if we understand his arrangement correctly, still further simplify this system, and therefore it does not seem impossible to lead the student along an easy incline in which he would gradually accumulate experience, rather than plunge him at once into the subtleties and pitfalls which Mr. Ley prepares for the beginner.



FIG. 3.—*Cumulo-nimbus* (evening).

It is easy to understand how difficult a problem was submitted to the International Meteorological Committee when they were asked to adopt and sanction a uniform nomenclature of clouds, and how prudent they were in declining the invitation (NATURE, vol. xxxviii. p. 491).¹ Simply having regard to the fact, that meteorologists are generally agreed that the same cloud forms and cloud structure are to be met with all over the world, it would seem that an International Congress was admirably adapted for the settlement of such a scheme. But it was felt, and the feeling will be still more general after the perusal of Mr. Ley's book, that our knowledge of the physical and structural process of cloud formation is in a progressive state, and therefore final classification impossible. Mr. Ley would probably be the last to consider that his book possesses the element of finality. He has not only learnt and taught much, but he has also learnt, better than most of us, how much more there is to learn.

W. E. P.

¹ This subject is still engaging the attention of an International Congress (See p. 185.)