Polar Front Analysis.

FIVE years ago Dr. J. Bjerknes, of Bergen, Norway, visited the forecasting branch of the London Meteorological Office to demonstrate the methods of weather forecasting that had been developed by him and his colleagues. These methods had been arrived at in the first place because of a dearth of telegraphic reports from foreign countries during the War, which made it possible to progress only by securing more numerous local telegraphic reports giving an unusual wealth of information about conditions in Norway. Such a direction of development is contrary to that generally followed in synoptic meteorology in other countries, the natural course during the past few decades having been constantly to extend the network of stations to cover an increasingly large area, as it has been realised more and more that many weather phenomena can only be explained by tracing the past history of the wind currents involved during several days, which may involve the construction of 'trajectories' several thousand miles in length. Sir Napier Shaw has been prominent in these developments, and his "Life History of Surface Air Currents" is a notable landmark of progress on those lines. Nevertheless, as was shown by the French meteorologist Durand Gréville at a competition in weather forecasting held at Liège in 1905, it is equally true that many phenomena can be explained only by a very detailed study of local variations of wind and pressure in a portion of a single cyclonic depression, and this line of advance has not been followed nearly to the extent that it deserves.

Dr. Bjerknes has left as a memento of his visit to London a paper* which deals with three meteorological situations analysed by his 'polar-front' method, full use being made of the large number of autographic records of wind, pressure, temperature, etc., that are maintained in Great Britain. The spacial distribution of the masses of 'polar' and 'equatorial' air that according to the Norwegian school of meteorology are the fundamental elements of the cyclonic depressions of middle and high latitudes, and possibly even of tropical cyclones, is not the main subject matter of this paper, which is concerned rather with a demonstration of certain ways in which a 'front', that is, the line or band separating such different air masses, may be modified either by downward movement of air within the cold polar air mass or upward movement of air in a transitional band separating polar and equatorial air masses. Three cases covering the periods Mar. 30–April 1, 1925, Feb. 10–11, 1925, and Jan. 22–23, 1926, are analysed.

It is not possible in a short space to give more than an outline of the subject matter of the paper. As some of the ideas introduced are published here for the first time, the paper should be read by all who wish to follow the progress of this interesting school of meteorological thought. It is doubtful whether the pursuit of this method of analysis is likely to lead to an understanding of the causes of formation and maintenance of depressions, but it is none the less almost indispensable for explaining certain weather sequences, and as an aid to greater precision in making forecasts for periods up to about twenty-four hours ahead, and especially for periods of six or twelve hours ahead. The application to longer periods is normally impracticable, because the complexity of meteorological conditions makes it impossible to get much beyond a kind of extrapolation of tendencies revealed by a sequence of synoptic charts. The causes of acceleration or retardation of fronts, which last are so important in controlling the upward and downward motion of the air masses on either side of a front, are still obscure.

* Practical Examples of Polar-front Analysis over the British Isles in 1925–26, by Dr. J. Bjerknes. Meteorological Office Memoirs, No. 50. (London: H.M. Stationery Office, 1930.)

Body and Mind.

IN a paper read before Section J (Psychology) of the British Association at Bristol, Dr. H. Banister discussed the psychology of the tuberculous patient. He quoted various authorities who have attributed to tuberculosis a great variety of mental changes. The disease has been regarded by some to be stimulating to intellectual activity, even to the extent of producing the genius; others consider it to be the cause of neurasthenic syndromes, hysterical manifestations, certain types of psychosis, and homicidal tendencies. As his own view, Dr. Banister insisted that the mental mechanisms of tuberculous patients are the same as those of the healthy individual. Their apparently peculiar psychology is not dependent on tubercle infection; it is the ordinary reaction of the mind to the inhibitions, restrictions, and difficulties which inevitably accompany the disease, and is absent only in those who can readily adapt their outlook and their lives to the new and limiting circumstances. In some persons such adaptation, coupled with a tendency to day-dreaming which can be present during any chronic illness, may bring out the creative tendencies of the individual, expressed in literature and the arts. The state of undue exaltation and optimism often stated to be characteristic in phthisis, is very infrequent, and is simply a manifestation of the dissociation which might follow any severe mental stress.

Considering the effects of the mental attitude of the tuberculous, Dr. Banister stated dogmatically that the patient with a hopeful outlook has a far better chance of arresting the disease than the one who is constantly in a state of despair and anxiety. This points to an extremely important line of treatment. The patient must be encouraged to aim for a life of useful though limited activity, to beware of invaliding himself beyond the degree required, and to avoid anxiety and worry. This is not always easy for the rich; for those of limited means it is, in the home, almost impossible; but that it can be successful under suitable conditions is fully confirmed by the results obtained at Papworth Village Settlement.

A related topic was discussed in a paper before Section I (Physiology) of the Association by Mr. P. Watson-Williams, who referred to chronic toxæmia as a cause of mental disorder and alteration in character. He pointed out that chronic infections can give rise to mental changes and produce disorders of conduct resulting in the unfortunate victim being charged with misdemeanours or criminal actions. As a typical illustration, he cited the well-known character changes which often follow epidemic encephalitis in children. Of equal importance, but more readily overlooked, is toxic absorption from some focus of sepsis. The results of such toxæmia vary within wide limits, from a mild depression to a certifiable psychosis with suicidal tendencies.

While recognising that there must be convincing evidence before attributing misconduct to a toxic mental breakdown, Mr. Watson-Williams emphasised the necessity for expert medical examination to determine whether a delinquent should be dealt with in a hospital rather than before a magistrate.