ent altitude and azimuth of the clouds in the sky, that a small stretch of the horizon be included in the view, and that the direction in which the view is taken, and the direction from which the clouds are moving, as NE., SW., etc., be noted on the photographic plate before development; note also whether the view is from before or behind, from the right or the left of the direction from which the cloud is coming. The entry can be made with an ordinary lead pencil in the corner of the plate. In fact, the date, stop used, and exposure time should all be noted on the plate for future reference.

The foregoing has reference solely to the production of single cloud negatives, and may be considered as the first step in the method of ascertaining the height, direction and rate of motion, and internal changes of clouds by the photographic process. The full method, however, demands the use of two cameras at either end of a measured base, and other apparatus for reducing the observations.

METEOROLOGY AND PUBLIC HEALTH.

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The aim of this article will be to show briefly the connections between some of the meteorologic elements and public health, and to suggest some uses to which this knowledge may be put.

Although from time immemorial a belief in atmospheric influence upon health appears to have been held, yet real contributions to the knowledge of medical climatology date from a communication made to the Royal Society of London in 1797 by Dr. William Heberden, Jr., F. R. S., on the "Influence of Cold on the Health of the Inhabitants of London," wherein the author showed that a difference of 20° between the mean temperature in London in January, 1795, an excessively cold month, and January, 1796, an equally mild month, caused the deaths in the former to exceed those in the latter by 1,352.

In 1863 Dr. Scoresby-Jackson reported to the Royal Society of Edinburgh the results of a statistical investigation into the influence of weather upon the mortality of eight large cities of Scotland for the six years from 1857 to 1862. The most important result of this investigation was to show, for Scotland at least, that for every diminution of mean temperature below 50° F. there was a corresponding increase of mortality; but that for mean temperatures above 50° F. a diminution was favorable for vitality, at least if the temperature had been for any length of time above 50°. In other words, mean temperature and mortality from all causes had an inverse relationship below 50° F. and a direct relationship above 50° F.

One of the most important contributions to medical climatology was made to the Scottish Meteorological Society by Mr. Buchan and Dr. Mitchell in the communication of their researches into "The Influence of Weather on Mortality from Different Diseases and at Different Ages in London." The results of their labors are too extensive to be epitomized here, but their value may be estimated from the opinion of Dr. B. W. Richardson, that "from the researches of these distinguished men we can indeed forecast in this island [Great Britain] the course of many diseases with a precision that may, to a large degree, be called exact."

The researches of von Pettenkofer in Munich, and of Dr. Baker in Michigan, corroborated by those of other investigators, have established a connection between the depth of the water below the soil and the prevalence of typhoid fever. It appears that a fall of the subsoil water below its average seasonal level is very favorable for the appearance of typhoid fever. It is not to be supposed that the simple fluctuation of the water is a causative agency, but is suggestive of the conditions favoring the development of the typhoid germs.

The effects of high atmospheric temperature in causing an increased mortality from diarrheal diseases, and of a low atmospheric temperature in causing a low mortality from these diseases, is an established fact that no one can dispute, but all attempts to express the diarrheal mortality in a given place as a function of the temperature only have failed. "The reason," says Dr. Longstaff, in his Studies in Statistics, "is probably a simple one, viz: That summer diarrhea is a disease very greatly influenced by temperature, but not caused by it alone; it is rather a communicable zymotic disease that thrives best during hot weather," bearing a direct relation to temperature and an inverse one to rainfall. Longstaff found that, for London, diarrheal diseases became epidemic when the temperature of the water of the Thames reached 62° F.

More than thirty years ago Dr. Henry Bowditch, of Boston, from an exhaustive study of the distribution of consumption in Massachusetts and elsewhere, showed that a residence upon damp soil, whether naturally so, or caused by percolation or defective drainage, was most favorable for the development of phthisis.

The statistical work of Dr. Baker of the Michigan State Board of Health, has added valuable information to our knowledge of some of the conditions under which bronchitis and pneumonia become prevalent. Dr. Baker has suggested as a probable explanation of the greater tendency to these diseases in cold weather, the fact that cold air is necessarily dry air, considered with reference to the weight of aqueous vapor contained, which when respired is exhaled at a much higher temperature, and contains a much greater amount of aqueous vapor than when inhaled. This increase in amount of vapor in the expired air has been acquired by evaporation from the respiratory passages, and is, according to Dr. Baker, a chief factor in the causation of inflammatory affections of these passages so greatly prevalent during the winter months.

An example will illustrate Dr. Baker's argument. At 32° F. a cubic foot of air can hold only 2.1 grains of water in the form of vapor, while at 98° F. (the temperature of the expired air) it can hold 18.7 grains, or 16.6 grains more than at freezing temperature. This illustration shows exactly what takes place whenever we breathe air at 32° F.

The following general propositions have been deduced from statistical considerations, and have been advanced with more or less authoritativeness by many writers on medical climatology:

1. A preternaturally dry air, with a high temperature, predisposes to the development of fevers and intestinal disorders.

2. A very moist atmosphere, accompanied by a low temperature, is likely to induce bronchial and rheumatic affections.

3. In summer and autumn the tendency to sickness and death is chiefly connected with the digestive organs.

4. In summer and autumn a rise of mean temperature above the average increases the number of cases of, and the mortality from, diseases of the digestive organs.

5. A cool and rainy summer controls the prevalence and fatality of diarrheal diseases.

6. Diarrheal diseases become epidemic when the subsoil temperature at a depth of 4 feet below the surface reaches 56° F. for the season.

Within recent years our knowledge of the causation of disease has undergone a very profound change, and many of the theories of atmospheric origin and effect have been shown to be untenable as originally propounded. But the change has been rather in the direction of transferring the effects of atmospheric agencies from man himself to the bacteria that are now universally recognized as the causes of infectious diseases.

In the future we must study the effects of the different meteorologic elements upon these lowly organisms, as well as on man himself.