

RIVER FLOODS AND THEIR PREDICTIONS.

Telegraphic reports of the condition of the rivers began to be received by the Signal Service January 1, 1872. This work was so natural and desirable and so easy an expansion of the work originally authorized that there could be no doubt of its propriety. At first it seemed sufficient to publish the reports of stages of water as received at the office, but soon some general indications of probable rising and falling water began to be added to the weather probabilities. The gauge readings, above which a stage of water was considered to be dangerous, as well as the times required for flood waves to descend along the channels of the rivers, as first adopted approximately by me, were revised in a report by Gen. Greely in 1874. The principal and most satisfactory work of the Service relative to the study of the hydrology of the Ohio, Missouri, and Mississippi rivers has been done by Prof. Thomas Russell, whose reports were published in 1890 and 1891, and subsequently. His methods and long range predictions have stood the scrutiny and evoked the highest praises of American and European hydraulic engineers.

FARMERS' BULLETINS.

In 1873 Gen. Myer made an arrangement with the Post Office by which the midnight synopses and probabilities were telegraphed to many Signal Service printing stations and issued by the first morning mail to all neighboring post offices, where they were displayed as "Farmers' Bulletins." This insured the reception of the predictions by the public independent of the purchase of a morning newspaper. These general bulletins ceased in 1881, and the local flag signals now take their place.

The regular publication of the Service that was taken up next following the daily bulletins, maps, and predictions was the "Weekly Weather Chronicle," which was a short summary of those features of the weather during the week that might be supposed to be of special interest to the agricultural classes. The occurrence of droughts, rain, and frosts were more especially mentioned, the whole occupying about one octavo page. The first Chronicle was published in September, 1872. They were distributed promptly to all boards of trade, chambers of commerce, and weekly newspapers, but were finally discontinued in 1881. These Chronicles were first compiled for the use of Gen. Myer by Sergt. Calver, to whom, I believe, they owed their origin.

That there was a real demand for this weekly publication is evident from the fact that it was revived under the title of the "Weather Crop Bulletin," which was started in May, 1887, and owes its existence to Maj. H. H. C. Dunwoody. This still continues to be a most popular publication; it appears weekly during the growing season and

monthly during the rest of the year, being based upon data collected by the State Weather Service Division. By giving the total sums of temperature and precipitation and the respective departures from the normal this bulletin contributes essential data for the computation of the so-called phænological constants, and may eventually enable us to predict the stage of growth of any crop. Beginning with 1891 this bulletin has been accompanied by temperature and rainfall charts.

THE MONTHLY WEATHER REVIEW.

The need of preserving in some permanent form a brief history of the successive storms and other prominent features of the weather led me early to propose some form of weather review. The same idea was simultaneously suggested by another, who, however, left it for me to execute, and my first review was published at the close of January, 1873; corresponding reviews for the latter half of 1872 were subsequently written out by Mr. Calver for publication in the annual report of the fiscal year 1872-'73. From that time forward until 1883, inclusive, the monthly reviews were annually reprinted as appendices to the Annual Report of the Chief Signal Officer. In 1874 it began to be a serious question what use to make of the great accumulation of records that the office was then receiving from the new voluntary observers. As the result of a strong presentation of the importance of the subject, Gen. Myer ordered me to reorganize the Review on a broader basis, making full use of all available data. This publication still continues to be one of the most important of the Service. For many years there was quite a regular system of rotation in office duties, in accordance with which the officer in charge of "probabilities" or "indications," after a month's tour of duty at that work, took editorial charge of the Review, so that generally the chapters on the storms, or high and low areas, were written in the light of the minute personal study that he had just given to the weather of the month. When this officer did not write these chapters the compilation of the Review fell upon the senior clerk of the Review Division, and among those who did a large share of this work I recall the names of Pearson, Walton, Calver, Berry, and Garriott. The Review consists of text, tabular matter, and charts, and has in many respects been considered as a model for the other weather bureaus of the world; at present the similar reviews for Germany and for India are formidable rivals. It did not at first give in tabular form all the climatic data that is ordinarily required in climatological research, but it is believed that it does so now. For a number of years such climatological data was given in the annual reports in a series of annual tables for each station. After 1884 the climatological tables for the Annual Report were largely extended, so as to respond to the demands of the European International Congresses,

and the "Monthly Weather Review" was treated as a separate publication.

During the years 1878-'83, the Review included a summary of the international work of the office, but subsequently that summary was published separately.

At Gen. Myer's request I sometimes added a chapter of notes and abstracts from current meteorological literature, but this feature of the Review has been only imperfectly developed, and, in fact, quite often omitted as trenching too closely on the province of an ordinary meteorological or scientific magazine.

ACTIVITY IN MARINE METEOROLOGY.

The vision that the tri-daily maps afforded us of the movement of storm centers and cold waves from the Pacific States eastward across the Rockies, southeastward into the Mississippi Valley, and thence northeast to New England and Newfoundland, daily forced upon me the conviction that many storms affect too large an area to be properly studied on the Weather Map of the United States. As I, therefore, desired observations from the ocean Gen. Myer took a first step toward the realization of this need in June, 1871, by sending to captains and owners of vessels circulars and forms requesting tri-daily, simultaneous, meteorological observations at sea, especially along our coasts. In this way numerous reports were received from the mercantile marine, the correspondence with whom generally took place through the agents of the respective steamship and transportation companies. The collection of observations from vessels lagged somewhat until the resignation of Prof. T. B. Maury in November, 1875, and his subsequent removal to Philadelphia led to his being appointed as marine agent; through his exertions in this place, and subsequently as marine editor of the "New York Herald," the number of our ocean reports was much increased. In 1876 the Secretary of the Navy issued orders, by virtue of which simultaneous observations were received from all vessels of the U. S. Navy. Finally, in 1882, Sergt. Penrod was, at my recommendation, appointed by Gen. Hazen to be marine agent at New York City, and a still greater interest was thereby given to the collection of data from the merchant marine. In 1887 all ocean marine work was relinquished to the Hydrographic Office of the U. S. Navy, and since the cessation of our International Bulletin the ocean data collected by that office has been loaned us for use in compiling the chapter on "North Atlantic Storms," published in our "Monthly Weather Review." Undoubtedly the daily charts and the storm tracks of the North Atlantic, compiled by the Weather Bureau, have given us more light on the subject of ocean storms than all the work of statistical charting done by various nations in continuation of Maury's early work.