the North Atlantic Ocean is noted, this step being made possible by the use of reports now received from the West Indies, the Bahamas, Bermuda, France, Great Britain, Germany, etc. Whenever possible, forecasts are to be made of wind force and direction for the first three days of the voyage of all outgoing steamships. A brief history of each hurricane that occurred during the year is given, with copies of statements from persons not connected with the Weather Bureau regarding the efficiency of the storm-warning service. An important improvement in connection with the display of storm-warnings for the benefit of mariners has been made by the adoption of a specially constructed steel tower, with a flagpole at its summit. From this pole the signal flags are flown by day, and on it lanterns are displayed at night. 'Eminently satisfactory' progress is reported to have been made with experiments in wireless telegraphy. The importance of the Weather Bureau's Lake Marine service may be understood from the statement that 'each of the 20,000 or more vessels that pass Detroit receives the latest information available with regard to the force and direction of the wind, and the location and probable movement of storms.'

WEST INDIAN HURRICANES.

UNDER the title 'West Indian Hurricanes' the Weather Bureau has issued a report, prepared by Professor E. B. Garriott, which will find many interested readers. Since the United States has come to take an active political interest in West Indian affairs, West Indian hurricanes have assumed an additional importance in the eyes of the American people. This monograph gives a general account of these storms, their laws of circulation, cloud movements, tracks, formation, prognostics and characteristic phenomena. Poëy's table of hurricanes from 1493 to 1855 is given, supplemented by a table based on Weather Bureau records, giving the hurricanes from 1878 to 1900. Then follow brief descriptions, arranged by months, of recent hurricanes, including the famous 'Galveston Storm' of last September, and lastly local descriptions of historic hurricanes. Charts showing the hurricane tracks for each month for the years 1878 to 1900 accompany the report, which is to be recommended as being a readable, non-technical discussion of the subject with which it deals.

MONTHLY WEATHER REVIEW.

THE *Monthly Weather Review* for September (issued November 16th) contains the following articles: 'West Indian Hurricane of September 1–12, 1900,' by Professor E. B. Garriott; 'Special Report on the Galveston Hurricane of September 8, 1900,' by Dr. I. M. Cline, Local Forecast Official at Galveston; 'The Storm Waves of South Carolina and Texas,' by General E. P. Alexander; 'On the Color and Polarization of Blue Sky Light,' by N. E. Dorsey; 'Review of Professor Very's Memoir on Atmospheric Radiation,' by N. E. Dorsey; 'The Frequency of Hail in the United States' and 'The Crop as depending on Meteorological Conditions,' by Professor Cleveland Abbe.

R. DEC. WARD.

BOTANICAL NOTES.

BOTANICAL OPPORTUNITIES IN WASHINGTON.

IT may be doubted whether the botanists of this country fully realize the magnitude of the botanical work now being done in Washington. In the Department of Agriculture there are several 'divisions' devoted wholly to botanical investigations, and several others whose work contributes more or less to the enlargement of our scientific knowledge of plants. Thus the 'divisions' of Botany, Vegetable Physiology and Pathology, and Agrostology are so many divisions of the science of botany, while the 'divisions' of Forestry, Soils, Biological Survey, Experimental Gardens and Grounds, and Pomology, and the 'section' of Seed and Plant Introduction, are more or less contributory to botanical science. All these have much in them which is of interest to the botanist; in fact, some of the most interesting contributions to the scientific aspects of botanical inquiry have come from the second list, where the applications of science are generally emphasized. To these must be added the National Herbarium under control of the Smithsonian Institution, where are stored nearly a million botanical specimens.

With the liberal policy followed by the Secretary of Agriculture and the Regents of the Smithsonian Institution, there are here many opportunities for profitable work along different lines. In spite of the crowded quarters in which all the men in these 'divisions' are compelled to work, they are willing to make room for botanists who wish to study with them. With a little encouragement it is probable that a system of 'tables' will be arranged for the benefit of investigators who wish to take advantage of the collections, libraries, laboratories, and more than all—of the men to be found here. When we remember that there are from thirty-five to forty trained botanists in the government service, we can realize somewhat better what it may mean to most teachers of botany (generally isolated from their kind) when the opportunity is open to spend a couple of months in botanical study in Washington. So also with the lonely experiment-station botanist, puzzling over the problems that come to him, a few months of personal contact with these experienced workers in Washington would be of the greatest service. Without reflecting upon the work of the marine and other aquatic laboratories, it is safe to say that for most botanical teachers and experiment-station botanists a few weeks of study in the 'divisions' in Washington would be of more value.

In this connection it is well to emphasize the fact that the scientific 'divisions' in the De partment of Agriculture should have more and better rooms for the trained men who are at work in them, as well as for the preservation of the collections, libraries and laboratories. Congress should not hesitate to grant the moderate sum asked by the Secretary of Agriculture for increased laboratory facilities. Eventually there should be a fire-proof building for the department, so planned that it may furnish adequate laboratory facilities for all the 'divisions,' and complete protection to the priceless collections of specimens and books, at the same time providing for the enlarged uses referred to above.

CENTRAL MASSACHUSETTS FORESTS.

IN an interesting paper in *Rhodora* (Vol I., No. 8), Professor G. E. Stone discusses the forest conditions of central Massachusetts. In the course of his discussion he says: "The characteristic forest trees in this locality are the pine, chestnut, oak and birch. The pine and chestnut are especially adapted to this region, as is shown by their great abundance, both of these being more common in central Massachusetts than in any other portion of the State. The pine is especially abundant here, because of the fact that it can adapt itself to a great variety of conditions." A little later in his paper we find that "the principal forest trees at present are the pine, chestnut, oak, birch, maple, alder, poplar, willow, ironwood, hickory, hemlock, ash, cedar, spruce, beech. Their predominance follows quite closely after the order named. This order is not, however, the same as that which occurred in the primitive forests. The hemlock, beech and canoe birch have decreased, and other species have taken their places. The pine was always, and is to-day a valuable and prominent tree in this region, and undoubtedly is holding its own. The amount of young pines now in central Massachusetts is considerable. There is in fact no tree which takes so readily to the old and neglected pastures as does the pine, and they are gradually becoming filled with this species. This is a most fortunate occurrence, as these old pastures are practically worthless for other purposes, and it is by this means that the pine holds its own so readily, and compensates for that loss which occurs in consequence of rotation with hardwood where forests of this tree have been cleared." Professor Stone concludes from a study of the historical records of the forests that "on the whole, the climatic conditions have probably not changed very much, though undoubtedly local effects have been brought about by the removal of the forests, and also from industrial activities."

CHRYSANTHEMUM RUST.

DR. J. C. ARTHUR, of the Indiana Experiment Station, has given the results (in Bulletin 85) of his experiments on the rust which affects the chrysanthemum. This is a true rust (*Uredineae*), and to it the name of *Puccinia chrysanthemi* has been given (1900) by Roze, a French botanist. It has been known in this country and Europe

for a few years only, but apparently it has been known for a long time in Japan. In order to settle the question whether the rusts affecting other Compositae might give rise to that on the chrysanthemum, Dr. Arthur made many cultures of the rusts on this and other related plants. He found that he could not infect other Compositae with the uredospores of chrysanthemum rust, nor could he infect chrysanthemum with the uredospores of the rusts of other Compositae. No teleutospores have yet been observed in this country or Europe, and this fact is likely to make the disease more easily controllable. Hand-picking the diseased leaves, and spraying with Bordeaux Mixture or sulphide of potassium are recommended.

CHARLES E. BESSEY.

THE UNIVERSITY OF NEBRASKA.

THE NATIONAL OBSERVATORY QUESTION.

THE introduction by Senator Morgan last week of a bill to organize the National Observatory of the United States, of which we have not yet seen a copy, and a letter from Professor Bigelow which we published last week, suggest a condensed statement of the points at issue. The grounds taken by SCIENCE are these:

1. The United States, like every other leading government of the world, should have a national astronomical observatory.

2. The special object of this observatory should be to make those observations and calculations on the courses of the stars which are useful in the world's progress, and require to be pursued with greater system and persistence than is possible in any but a national establishment.

3. This purpose requires that the observatory should have a well understood and well defined policy and plan of work, mapped out by the best scientific authorities at command of the nation and obligatory on the scientific staff.

4. No work but the best should be done; of second-class work an abundance may be had everywhere. This requires that the instruments should be of the best.

5. To attain these purposes it is necessary that the head of the observatory be an experienced astronomer. This because of the high technical skill and experience required in planning the work, in seeing that the innumerable details necessary to its excellence are attended to, and in so expending the funds of the observatory as to get the best results, and also to inspire the confidence of the scientific public in the high quality of the work.

Every effort on the part of our astronomers to get an observatory of this kind established has been defeated through the impression that we already have one which answers the purpose. In the opinion of every astronomer who has publicly expressed views on the subject this is not the case. So far as we are able to collect published views, while there may be much disagreement on side issues, there is absolute unanimity that the existing observatory fails to perform the required functions in a satisfactory way. Yet, we are quite ready to regard the question as an open one until everything that can be said in favor of the work and results of the existing observatory is brought out. If there is a single astronomer in the land who, after a careful examination of the published volumes of the observatory, draws the conclusion that the objects in question have been satisfactorily gained, or, after having read the annual reports of the past five years, concludes that they describe the class and character of work which should be expected from the most expensively supported astronomical observatory in the world, the columns of SCIENCE are cordially thrown open to him to make known his views, and the facts on which those views are based.

It is a well-known fact that our existing observatory is unique in the main feature of its