

strated by the following extract from the Stevens Point Journal of January 25, 1902, descriptive of a geographical display at the Wisconsin State Normal School at that place:

There is in the geography room at the normal the most pleasing and instructive exhibition ever prepared by the school in that line. The work has been done by the students through Miss De Riemer's suggestions. Miss De Riemer also furnished considerable material such as is not easily procured. A large part of the exhibit consists of pictures showing scenery, industries, cloud types, and racial characteristics.

Suspended from the ceiling is the model of a kite such as is used by the United States weather service for scientific purposes. A large number of very excellent maps are on exhibition, showing a variety of physical features. That which is most in evidence is a scrap book showing what a wealth of information may be put together in such form. The number and variety of the flags flying indicate all sorts of weather that the Bureau is able to provide.

In regard to the meteorological features of the display, Miss Alice De Riemer writes as follows:

In the meteorological corner we had weather maps, charts, many beautiful cloud and fog views, forms of snow crystals, models of weather vanes, rain gage, and anemometer, made by the students, with descriptions and cuts which I had collected. Indeed, it was a miniature exposition, and such a revelation to many of these young people who have had such limited opportunities.

Another time I plan to have several of the students give short talks, during certain hours, describing certain features of the several exhibits. However, our first attempt has been a grand success. All the city teachers were in to-day, and I have just had a communication from a superintendent in one of the adjoining towns asking for the privilege of bringing some of his teachers over to see it.

Miss De Riemer is to be congratulated upon the success of her exposition. Its installation and the preparation of the models of instruments were no doubt useful exercises in manual training, and the exhibition itself an excellent object lesson in meteorology. Other teachers will do well to use it as a model.—H. H. K.

PERNTER'S METEOROLOGICAL OPTICS.

The Director of the Central Institute for Meteorology and Terrestrial Magnetism, Prof. Dr. J. M. Pernter, has begun the publication of a work on meteorological optics (for sale by the firm of W. Braumueller of Vienna and Leipsic), which we most heartily commend to the numerous correspondents who write inquiring as to the explanation of the various optical phenomena that are to be observed in the sky. The first chapter of this work gives an account of the apparent curvature of the dome of the sky; of the connection between our estimates of angular altitudes and the true altitudes of objects seen in midheaven, explaining why such estimates differ in the presence of sunshine and moonshine, and why objects of a circular outline, such as halos, appear distorted into egg-shaped ovals. Professor Pernter has lectured and written frequently for twenty years past on this topic and the explanations of halos, parhelia, red sunsets, and other phenomena that will be given in another part of his volume will undoubtedly make available to us all that is known on the subject and all that is to be found in the very widely scattered literature. The Editor will occasionally translate portions of this volume for the benefit of the readers of the Review, but those who are at all familiar with German should possess the original.—C. A.

SECOND MEXICAN CONGRESS OF METEOROLOGY.

The Second National Meteorological Congress convened by the Scientific Society Antonio Alzate, in the City of Mexico, December 17-20, 1901, has published a short report from which we perceive that there is established a permanent committee of the International Meteorological Congress which prescribes the general character of these congresses as to membership and communications. The annual dues are \$5, and the president of the committee is Señor Prof. Mariano

Leal, Director of the Secondary School, Leon, Guanajuato, Mexico. A preliminary program of this congress will be found in the MONTHLY WEATHER REVIEW, November, 1901, page 512. About fifty members were present. Following the reading of papers, as announced in the preliminary program, corresponding resolutions were formulated and adopted expressing the opinions and wishes of the society. Among these we find under the heading "The prediction of the weather;" three relating to telegraphic work, a fourth urging the increase of stations for temperature and rainfall, a fifth urging the prediction of local weather for short periods, sixth, the study of methods of prediction for long periods, and, finally, that the local weather predictions be announced to the public by means of the signals used in the United States.

Under the heading of "Resolutions relative to the study of storms," the congress appointed a committee to collect data relative to the storms in Mexico and report to the next congress.

Under the heading of "Resolutions relative to self-registering apparatus" the congress recommends: (1) that important observatories constituting the centers of sectional systems of stations be provided with self-registers; (2) that the equipment for each station include thermograph, barograph, hygrograph, pluviograph, and anemograph; (3) said observatories publish the hourly values deduced from these curves in the "Annals of Mexican meteorology;" (4) that the permanent committee distribute instructions as to the use of these instruments.

Under the heading of "Resolutions relative to the applications of climatology to agriculture" the congress recommended: (1) that observations be made on the relation between rainfall and the superficial or subterranean deposits depending thereon within the national territory; (2) the coordination of rainfall with hygrometry both superficial and subterranean; (3) the appointment of a special commission to correspond with the government on these matters; (4) that the regulation of currents and deposits in rivers and lakes is necessary for the improvement of the public health and the preservation of the forests; (5) in order that these beneficial results may be attained, the congress recognizes the necessity of expedition in public works and legislation; (6) that meteorological observatories, when appropriately located, study (a) phenology, (b) actinometry, (c) the appearance of injurious insects, animals, fungi, and vegetables, (d) the prediction of hailstorms; (7) that the efforts being made in Europe to prevent hail by the firing of cannon be studied.

With reference to the thermometer exposure the congress appointed a committee to make a comparative study of the exposures used in Russia, France, and England, and of the aspiration thermometer of Assmann.

With reference to the dissemination of meteorological knowledge the congress recommended to the minister of public instruction and other authorities (1) that elementary meteorology be introduced into the primary schools; (2) that each school have a collection of instruments, and that the scholars in the last year of the course periodically assist in maintaining the station record; (3) that the meteorological bulletins be distributed freely, or at a very moderate price; (4) that there be a meteorological committee for each locality; (5) that the directors of the observatories be requested to publish promptly monthly summaries of local phenomena, especially rainfall; (6) that there be monthly public conferences relative to meteorology at educational centers and in scientific societies; (7) that whenever interesting meteorological phenomenon occur the directors or professor of physics explain them scientifically in the public press and seek to destroy popular prejudices and absurd theories; (8) that there be formed a general association of all the meteorologists of the republic to be known as the national association and having the per-

manent committee as its center; (9) that in connection with this organization the committee appoint a local auxiliary council at the capital of each state or territory.

At the conclusion of the discussion of a memoir by Contreras, on the prediction of the seasons for long periods in advance, the congress adopted two resolutions requesting the Director of the Central Meteorological Observatory, Manuel E. Pastrana, to carry out a course of study based upon the ideas of Señor Contreras. Finally the congress recommends to the Mexican observatories their compliance with the resolutions of the international conference at Munich, the adoption of barometric readings reduced to normal gravity for all telegraphic work, and the statement in the published records as to how the values of the correction terms were obtained.—
C. A.

GRADUATE STUDY AT WASHINGTON.

The Fifteenth Annual Convention of the Association of American Agricultural Colleges and Experiment Stations was held at Washington, D. C., November 12-14, 1901. Simultaneously with this, the Association of State Universities and the Society of Official Horticultural Inspectors held their meetings in Washington, D. C. From the report published editorially in the last number of the Experiment Station Record, Vol. XII, pp. 517-519, we note that several topics of general interest were discussed. President A. W. Harris of the University of Maine, as president of the convention, among other good things said: "If the agricultural college did nothing more than to establish, maintain, and officer the experiment station, it would be justified many times over."

This tribute to the importance of experimentation in agriculture applies equally to meteorology. Many of our own observers have suggested ideas in explanation of observed phenomena, or relative to unknown laws, that are very good as suggestions or hypotheses, but have no value to meteorology until they have been tested, and their truth demonstrated by a proper course of experimentation. Of course such experiments, even if they consist in simply reading a thermometer or rain gage, require time, money, labor, and especially thought. It is much more difficult to establish a new principle than to merely make a series of observations. One must search out every source of error and every chance of mistaken logic; he must even refute other explanations before he is entitled to say that his own is the correct one. All this is the work of the experiment station, whether it be in the field of agriculture or meteorology.

Investigation along new lines of work is, we suppose, especially characteristic of schools of graduate study. Those who have gone through the ordinary scientific school, having attained the degree of bachelor of science, or perhaps even master of science, and thereby shown an extensive knowledge of what is recognized as correct in science, often wish to pursue a further graduate course, and aim for the degree of doctor of philosophy or doctor of science. These degrees are generally attainable in three or four years and should be a guarantee as to the candidate's ability in original research, an assurance that can only be based upon his having actually performed one or more pieces of thoroughly good work in research. For many years past the colleges at the Capital have enjoyed the proud satisfaction of being able to announce in their circulars that by the Act of Congress of April 12, 1892, students are entitled to the use of the libraries and other facilities offered by Government museums and laboratories. These privileges, however important and highly valued, are, however, as nothing compared with the opportunities that ought to be provided for students as such. College laboratories, observatories, and museums must be provided with apparatus and specimens adapted to student use, and the pedagogical business must be the first consideration. It is only when an advanced student

actually enters the Government employment and has his daily work assigned him in the museums, laboratories, libraries, observatories, and workshops in Washington that he can truly profit by his opportunities while at the same time pursuing his studies at some one of the universities too numerous to mention in that city.

So great has been the need of good men in the service of the Department of Agriculture, and so difficult is it to meet this need that many have regarded the establishment of a national university at Washington as a necessary future outcome of the present condition of affairs. We have before expressed our opinion that when graduates from scientific schools or land-grant colleges or agricultural colleges or employees of Government experiment stations throughout the land wish to come to Washington to pursue further studies, they can be entered as student assistants in the respective bureaus and do the work necessary to the degree of doctor of philosophy, under a supervisory committee that shall constitute all the organization that the Government need recognize as its university. From this point of view, we are interested in quoting from the above-mentioned editorial in the Experiment Station Record, as follows:

The committee on graduate study at Washington reported [to the convention] that no progress had been made in securing a bureau in Washington for the administration of graduate work since the last convention. The committee was directed to exhaust every effort to devise a plan whereby graduate study and research in the several departments of the Government may be efficiently organized and directed under Government control, and in the meantime to secure, if practicable, the same opportunities for study and research in other departments of the Government as are at present afforded graduate students in the Department of Agriculture. A resolution was also adopted by the association recording its appreciation of the action of the Government in making available the facilities for research and advanced work in the Department of Agriculture and expressing a desire that these facilities be still further extended and that a national university devoted exclusively to advanced and graduate research be established.

It is evident that such an arrangement would be of the highest advantage to Government work and to the nation. It will not in the least interfere with, but rather stimulate, the State and local colleges if only their holders of the doctor of philosophy degree be admitted to such school.

A paper on agricultural college libraries, by Miss Clark, librarian of the Department of Agriculture, emphasized the great importance of libraries as aids to the work of investigation and instruction. Arrangements are in progress for assisting agricultural colleges in classifying and cataloguing their libraries; only a small proportion are considered to be well organized and administered. The Library of the Department of Agriculture would be able to keep up an index of agricultural literature if an appropriation of at least \$2,500 could be secured for the purpose.

The special index to meteorological literature, of which four parts were published by the Signal Office, is not now being kept up by the Weather Bureau. But the great Lehrbuch, or Treatise on Meteorology, just published by Prof. Julius Hann, shows that he must have a very complete index of his own, and his treatise is, therefore, exceedingly useful as a guide to the literature of any branch of the subject.

It was announced that a graduate summer school of agriculture would hold its first session at Columbus, Ohio, during the summer of 1902. Dr. A. C. True, Director of the Office of Experiment Stations, will act as dean of the school, and if the first session proves a success, it will be continued hereafter under the management of a committee of control appointed by the Association of American Agricultural Colleges and Experiment Stations. It will be essentially a school to stimulate and educate those who desire to engage in research. It seems to be generally admitted that there should be some rational combination of the two different subjects, namely, teaching and investigation, in both the colleges and the stations.