of the 24th, the ship ran suddenly in a streak of light coming from the water which alternated blue and green, the colors being so brilliant that the vessel was lighted up as if she were covered with arc lights with colored globes.

A half mile streak of dark water, and a blackness that settled like a pall over the ship followed, and a second streak of the same brilliant-hued waters was encountered. The second streak was about as wide as the first one, and when the ship ran out of it the same black waters and a night of exceptional blackness were also encountered. * * *

"I have sailed the high seas for twenty years," declared Captain Carlson, "and have seen interesting phenomena, both meteorological and otherwise, in the waters of every known ocean, but I never saw anything that approached this blue and green light from the water phenomena. The night was dark, but clear, and we ran into the streaks without any seeming warning. I was in the pilot house when we struck it, and I ran on deck, thinking that something was on fire.

"The crew tumbled out to witness it also, and it was magnificent. It was so light that it was remarked by the chief engineer that it could be read by, and to make sure I grabbed a paper, and the finest print that I could find was easily discernible. We ran out of the streak into a streak of black water, and the darkness of the night seemed to increase as we did so. From the streak of blackness we ran into the second streak of lighted waters. Each of the streaks and the intermediate streak of black water was about half a mile wide. The wind at the time was a light northwest. The sea was smooth and we were bearing southeast by east half east, 35 miles from Mobile light."

NEW SYSTEM OF STORM SIGNALS FOR NORWAY.

Communicated by F. S. S. JOHNSON, American Consul, Bergen, Norway. Dated November 19, 1908.

I have the honor to report the placing of new storm signals in and around Bergen. Signal masts have been placed on the part of Frederiksberg under control of the fire brigade who are to attend to the signals. These will be:

DAY SIGNALS.

One cone with the point up, denotes storm from the northwest.

One cone with the point down, denotes storm from the southwest.

Two cones above each other with the points up, denotes storm from the northeast.

Two cones above each other with the points down, denotes storm from the southeast.

One ball denotes a storm without direction of wind.

NIGHT SIGNALS.

The night signals consist of white lanterns as follows:

One triangle with the point up, denotes storm from the northwest.

One triangle with the point down, denotes storm from the southwest.

One triangle with the point up and lantern over same, denotes storm from the southeast.

One triangle with the point down and a lantern under same, denotes storm from the southeast.

Eight lanterns in the form of the Roman cardinal numeral "I," denote storm without the direction of the wind.

There can also be used for a night signal a red light alone which will be stationed at Molon where formerly storm signals were seen.

The above system has been prepared by the Society for the Promotion of Norwegian Fisheries in cooperation with Prof. Dr. H. Mohn and the director of the meteorological station at Bergen, Mr. Foyn, and has been accepted at most places along the coast where storm signals are displayed. The system serves as a substitute for the previous heterogeneous signals which were used at the various stations.

RECENT PROGRESS IN CALIFORNIA.

In a recent interview with a representative of the San Francisco Chronicle Prof. Alexander G. McAdie said:

The Weather Bureau intends to put in a large number of snow gages in the mountains at elevations of over 4,000 feet.

This is one of the first steps resulting from the meeting of the governors of different States in Washington about six months ago, and the resulting discussion on the conservation of natural resources. Naturally water is one of the most important subjects, and one of the first things to be done in all the States west of the Rocky Mountains was to determine the depth of snow and the amount of water the snow would yield.

The Weather Bureau intends to go into that matter extensively, and California will probably lead all the States, partly because we make such direct use of the water for irrigating and for power purposes.

I went south to the Cuyamaca Mountains, back of San Diego, and then worked north to the Sierra Madre Range. One of the most interesting experiences was at Mount Wilson, where I spent a couple of nights. Dr. George E. Hale, director of the Yerkes Observatory, and head of the Solar Physics Observatory, was most kind to me, and showed me the results of the investigations going on, and the discoveries already made at that point by the staff of astronomers and astrophysicists. Some wonderful discoveries have been made, in one sense almost as great as Galileo's original discovery of the sun-spots themselves.

They are able at Mount Wilson to photograph not only the spots and the hydrogen masses sucked into the spots, but the calcium and hydrogen flocculi. The photographs made by Professor Hale with the spectroheliograph and the big Snow telescope show what is going on at the different levels of the sun's atmosphere. In fact, I told Professor Hale that he was discovering so much about the solar atmosphere that meteorologists envied him and wished we knew as much about the earth's atmosphere

These remarkable photographs, unequaled in any part of the world, and not likely to be duplicated for years, show very plainly solar vortices. It is impossible to do justice to the work in a few words, but I felt that I had seen the sun for the first time, although I had been studying it for years. To put it in popular language, it is as if these men at Mount Wilson were able at their pleasure to analyze and look thru all the layers of metallic clouds in the sun. There have been some marvelous discoveries also with regard to the magnetic effects produced by sunspots. In brief, the fruits of nearly twenty years' work at other observatories in the East are now coming forth.

California, I may say without the slightest brag and with all modesty, now leads the world in astrophysical work. With the Lick Observatory contributing its full share, as it has done since Doctor Campbell became director, and this young but powerful solar-physics observatory at Mount Wilson, backed by the Carnegie Fund, the Smithsonian, and Professor Hale's own large means, California is simply setting the pace for all other observatories.

SUGGESTED REFORM IN METEOROLOGICAL METHODS.

By Prof. A. G. MCADIE. Dated, San Francisco, Cal., September 29, 1908.
[Published by permis ion of the Chief of Bureau.]

In order to help the Weather Bureau maintain its present prestige, I venture to submit a plan for a gradual adoption of the metric system in our records and work. Many National Weather Services now use this system and it will be admitted without argument that the universal use of one system will by uniformity, facilitate exchange, economize time and labor, increase efficiency, and briefly, bring into harmonious whole, the now somewhat disjointed efforts of meteorologists.

I have suggested elsewhere that an easy way of beginning the use of the metric system was in the connection with the measurement of precipitation. The problem of measuring the snowfall and its equivalent water is now submitted to the Bureau by the Inter-Bureau Agreement, and it is all important in connection with the water resources of our country and the conservation and preservation of water yields, that scientific measurements of snowfall and rain should be available. Heretofore measurements have not been made in a manner or on a basis suitable for the new requirements. In a letter recently submitted, I urged that some method may be adopted whereby the water-content of snow would be given in decimal parts. The particular scheme suggested seemed to be an easy and entirely feasible one.

* * * * * * *

For a time at least it will be necessary (as an educational and precautionary measure) to use some system giving values side by side. There is, however, no difficulty in doing this. Instruments with double scales are already on the market and

[1] This paper is published in order to invite discussion. Its appearance here does not imply the approval of the Chief or other officials of the Weather Bureau.—*C. A.*

in general use in college laboratories. There is no inherent difficulty in adding an additional scale. In the matter of publishing, the two sets of values are easily arranged so as not to interfere. The method used by Herbertson and Buchan in the standard Atlas of Meteorology of Bartholomew, illustrates how satisfactorily this can be accomplished. Moreover we do in effect already partially use the decimal system, as witness our methods of recording relative humidity and sunshine in percentages. We have also unwittingly used a ten to one ratio in the conversion of snow to water.

There are other reasons than those connected with water resources, calling for the adoption of a decimal system. Aerial navigation has how reached that stage in its development when tests of various types of aeroplanes will be needed. The instruments used will be chiefly of European manufacture and the records will be in metric units. If I am not mistaken, the records of the aeroplane used under the shadow of the Capitol at Fort Myer, were given to the press of the country in kilometers. The instruments used in aerial flight will doubtless give air movement in meters per second, pressure in millimeters, temperature in degrees centigrade, vapor pressure in millimeters, vapor weights in grams, and all dimensional and structural data in the metric system. The Weather Bureau simply can not afford to stand still and be a laggard in the international struggle for achievement in aerial navigation. Its place is to lead and pioneer in its own proper field—the atmosphere. Certainly it should be in a position to guide rightly the efforts of aeromobilists. The whole subject of aerostation is so intimately connected with the daily work of the Weather Bureau that a thoroly scientific system of measures is essential. The metric system is already in use, is accepted by the scientific men of all nations, is legalized in our own country and is in many ways superior to the cumbersome, uncertain, and generally unsatisfactory system now in use.

Another reason besides those of water resources and air navigation, why a simplified system of measurement and notation should be adopted, lies in the opportunity which such action affords, to contribute to the educational progress of the country. No other single Government bureau could so readily accomplish a reorganization of our weights and measures. The people of the United States will follow the lead of the Weather Bureau and accept the new system. This means much from an educational standpoint and it will stand to the credit of the Bureau that it accomplished that which all prominent educators desire; namely, the abolition of antiquated, involved, and unscientific tables. We very properly to-day laugh at the English monetary system, by which one needs pen and paper to convert pounds, half-crowns, shillings, and pence into single units; and we are thankful that our system is a decimal one. But we are equally ridiculous in publishing each morning our present temperatures. We say, for example, 79° [Fahrenheit]. We mean 79°—32° or 47 degrees [of the Fahrenheit scale] above [the] freezing [point of water]. We say 15 degrees below zero, or —15° [Fahrenheit]. We are trying to say that the temperature is 15 degrees [plus] 32 degrees below freezing. How much easier to say what we mean in both cases, 47° above and 47° below [freezing].

Our method of expressing pressure change is also involved; and a simpler method, (and indeed a marked improvement even on the metric system), will be referred to later. So also with wind velocities. Even an expert must take pen or pencil to convert 6 miles an hour into feet per second.

As a tentative measure, it is suggested that:

A. *Temperature.*—Beginning January 1, 1909, maps of the Central Office, and those at Boston, New York, Chicago, and San Francisco, publish the equivalent in centigrade at one end of isotherms.

B. *Wind.*—As soon as possible, velocities be given in meters per second. A gale to be considered 10 meters per second or more.

C. *Snowfall and rain.*—As soon as practicable, snow to be measured in millimeters; and where it can not be melted, the ten to one ratio to be used as at present. Rainfall to be measured in millimeters and the number of days counted only when the amount is 0.1 millimeter or more.

D. *Pressure.*—A distinctly new proposition is advanced. While it would be advantageous to use the metric system, permitting the construction of wide-area charts by connecting with European and Asiatic charts, it is thought that if pressure changes were charted in percentages of a standard atmosphere, the notation would be more legible, the departures more pronounced and the general presentation more satisfactory to both meteorologists and the public. To illustrate this, a pressure of 29.92 inches, as now recorded, means little if anything to the average citizen. Why not 2.4 feet, or why not just as well 19 inches as 29.2. The equivalent height of a column of mercury as balanced against the depth of a homogeneous atmosphere, is beyond his comprehension, and it is a rather difficult matter to illustrate the relation so that the average man may understand. If we do as is done by other weather services express the value of a standard atmosphere by writing 760 millimeters [or 29.92 inches of mercury at lat. 45°] we will have made a step forward; but still uncertainty may remain as to what 760 millimeters represents. I propose, and so far as I know the proposition is new, that we write values in precentages of *a normal atmospheric pressure.* Instead of 29.92 inches or 760 millimeters we should have the value 1000, meaning thereby the pressure of the atmosphere at sea-level reduced to standard temperature and gravity. Then on any given weather map—

In place of 30.30 inches, we should have 1012.
In place of 30.20 inches, we should have 1009.
In place of 30.10 inches, we should have 1006.
In place of 30.00 inches, we should have 1002.
In place of 29.90 inches, we should have 999.
In place of 29.80 inches, we should have 996.
In place of 29.70 inches, we should have 993.
In place of 29.60 inches, we should have 990.
In place of 29.50 inches, we should have 986.
In place of 29.40 inches, we should have 983.

The great advantage of this is that pressure gradients can be read at a glance and the average man can readily understand the significance of pressure variation. For example, the business man reads 1009, and knows without computation that the pressure is nine points in a thousand above [the adopted standard or] a normal pressure. At the present time with the pressure expressed as 30.20 inches even Weather Bureau men must take pencil and paper to figure out the proportional change in pressure compared with a normal condition. On auxiliary maps in the forecast room there would be much simpler, more flexible, and I believe more significant lines of change. The British Meteorological Office, the Indina Service, and the Hongkong Observatory; also the Australian Service would probably follow the lead of the U. S. Weather Bureau, in this matter, as it involves no radical change of instruments or equipment and is as much superior to the metric system, as that is to the one now in use.

E. *Humidities.*—Relative humidity is now expressed in percentages and no change is needed.

Vapor tensions should be in millimeters and weights of aqueous vapor per cubic meter of space for various saturations given in grams. This change might be adopted immediately; or as soon as a new edition of psychrometric tables could be prepared. But these tables should cover a greater range than those now in use. * * *

In closing this appeal, may I be pardoned for going beyond the usual bounds of official correspondence by saying that in my belief, no achievement of the Chief of the Bureau will rank higher in years to come than the reform urged in this paper. The introduction of a scientific system of records and notation will be far-reaching in its good effects. I am not unmindful of many and important advances which have been made in the past few years, but I believe that in certain aspects this is the most important matter that has yet come before the Chief for action.

RECENT ADDITIONS TO THE WEATHER BUREAU LIBRARY.

C. FITZHUGH TALMAN, Librarian.

The following have been selected from among the titles of books recently received, as representing those most likely to be useful to Weather Bureau officials in their meteorological work and studies. Most of them can be lent for a limited time to officials and employees who make application for them. Anonymous publications are indicated by a ——.

Azores. Service météorologique.
Résumé d'observations 1907. Lisbonne. 1908. 15 p. f°.

Bebber, W[ilhelm] J[akob] van.
Anleitung zur Aufstellung von Wettervorhersagen... 2d ed. Braunschweig. 1908. vi, 38 p. 8°.

Bemporad, A.
Nuova riduzione delle osservazioni pireliometriche eseguite da K. Angström all'isola di Teneriffa. (Dagli Atti dell'Accademia gioenia di scienze naturali in Catania. Serie 5. v. 1. 12 p.)
Ueber die Veränderung der Luftdurchsichtigkeit mit der Höhe und an der Erdoberfläche. (Archiv für Optik. Leipzig. 1 Bd. p. 305-316.)

Besançon. Observatoire national astronomique, chronométrique et météorologique.
Bulletin météorologique. 19-21, 1903-5. Besançon. 1905. v. p. 4°.

Bouches-du-Rhone. Commission de météorologie.
Bulletin annuel 1907. 26 année. Marseille. 1908. 112 p. 4°.

Brounov, P. I.
...Einfluss der meteorologischen Bedingungen auf die Vegetation und die Ernte des Hafers im Tschernoziomgebiet. 1. Theil. St. Petersburg. 1908. 270 p. 4°. [Russian text.]

Brunhes, Bernard.
L'Observatoire du Puy-de-Dôme depuis 1876. Clermont-Ferrand. 1908. 16 p. 8°.

Bulgaria. Institut météorologique.
Annuaire 1900. Sofia. 1908. 63 p. f°.
Annuaire 1907. Sofia. 1908. 127 p. f°.

David, Pierre.
Les travaux de magnétisme terrestre à l' Observatoire du Puy-de-Dôme. Clermont-Ferrand. 1908. 10 p. 8°.

Dörr, ——.
Die Beobachtungsergebnisse der meteorologischen Stationen niederer Ordnung im Herzogtum Braunschweig während des Zeitraumes 1878-1905. (S.-A. Beiträge zur Statistik d. Herz. Braunschweig. Heft 20. 1907. 38 p.)

Finland. Meteorologische Zentralanstalt.
Meteorologisches Jahrbuch. Band 1, 1901. Helsingfors. 1908. v. p. f°.

Fortschritte der Physik.
1906. 1-3 Abteilung. Braunschweig. 1907. 3 v. 8°.
1907. 1-2 Abetilung. Braunschweig. 1908. 2 v. 8°.

France. Bureau central météorologique.
Annales. 1904. 1. Mémoires. Paris. 1908. xii, 377 p. f°.

Gesellschaft deutscher Naturforscher und Ärzte.
Verhandlungen ... 79. Versammlung zu Dresden. 15.-21. September 1907. Naturwissenschaftliche Abteilungen. Leipzig. 1908. xiv, 284 p. 4°.

Gockel, Albert.
Die Luftelektrizität. Leipzig. 1908. 206 p. 8°.

Great Britain. Meteorological office.
Meteorological observations at stations of the second order. Edinburgh. 1908. xiv, 163 p. f°.

Hamberg, H[ugo] E[manuel].
Moyennes et extrêmes de la température de l'air en Suède 1856-1907. Upsala. 1908. 81 p. 20 pl. f°.

India. Meteorological department.
Report on administration 1907-1908. Simla. 1908. 24 p. f°.

Kensington. Solar physics observatory.
...Monthly mean value of barometric pressure for 73 selected stations over the earth's surface. London. 1908. 97 p. 30 pl. f°.

Mac-Auliffe, L.
Notions nouvelles en climatothérapie. Paris 1908. 177 p. 12°.

Messina Osservatorio.
Annuario. 1907. Messina. 1908. 8°.

Moore, John W.
Is our climate changing? Dublin. 1908. 26 p. 8°. (Reptr. Dublin journal of medical science, Oct., 1908.)

[Naturforschender Verein in Brünn.]
Ergebnisse der phaenologischen Beobachtungen aus Mähren und Schlesien im Jahre 1905. Brünn, 1907. 16 p. 8°.

Phillip, George, and son (*pub.*).
Philip's meteorological calendar. London. n. d. 52 sheets.

Plumandon, J. R.
...Le climat du Département du Puy-de-Dôme. Clermont-Ferrand 1908. 23 p. 8°. (Association française pour l' avancement des sciences. Congrès de 1908 à Clermont-Ferrand.)

Prague. K. k. Sternwarte.
Magnetische und meteorologische Beobachtungen 1900-1907. Prag. 1901-1908. f°.

Pyrénées-orientales. Commission météorologique.
Bulletin météorologique 1907. Perpignan. [1908.] 51 p. 4°.

Ratzel, Friedrich.
Die Erde und das Leben. Leipzig. 1901-1902. 2 v. 4°.

Sweden. Statens meteorologiska Centralanstalt.
Meteorologiska iakttagelser. 1907. Upsala. [1908.] x, 159 p. f°.

Transvaal. Meteorological department.
Annual report. 1907. Pretoria. 1908. 126 p. f°.

Vaucluse. Commission météorologique.
Compte rendu. 1907. Avignon. [1908.] 34 p. f°.

RECENT PAPERS BEARING ON METEOROLOGY AND SEISMOLOGY.

C. FITZHUGH TALMAN, Librarian.

The subjoined titles have been selected from the contents of the periodicals and serials recently received in the Library of the Weather Bureau. The titles selected are of papers or other communications bearing on meteorology or cognate branches of science. This is not a complete index of the meteorological contents of all the journals from which it has been compiled; it shows only the articles that appear to the compiler likely to be of particular interest in connection with the work of the Weather Bureau. Unsigned articles are indicated by a ——

American geographical society. Bulletin. New York. v. 40. October, 1908.
Huntington, Ellsworth. The climate of ancient Palestine. pt. 2. (October) p. 577; (November) p. 641-652.

American society civil engineers. Proceedings. New York. v. 34. November, 1908.
Pickett, William D. The floods of the Mississippi delta; their causes, and suggestions as to their control. p. 1232-1251.
Collingwood, F., Roberts, Thomas P. *and others.* Forests and reservoirs in their relation to stream flow, with particular reference to navigable rivers. p. 1290-1311.

Engineering news. New York. v. 60. November 19, 1908.
—— The report of the Pennsylvania water supply commission; forests, stream flow, and flood control. p. 555-556.
Chittenden, H. M. Forests, stream flows, and storage reservoirs. p. 564.
Wilson, Elwood. The relation of forests to stream flow in Quebec. p. 564.

Experiment station record. Washington, D. C. v. 19. July, 1908.
Gager, C. S. The evaporation power of the air at the New York botanical garden. [Abstract. Describes apparatus.] p. 1010-1011.

Indian forester. Allahabad. v. 34. October, 1908.
—— The effect of forests on rainfall. p. 571-573. [Argues that the rainfall of the world is chiefly dependent on the existence of forests. Assumes that 600 times as much evaporation occurs from a forest as from a free water surface of the same area.]
—— Cause and effect of the gradual disappearance of forests on the earth's surface. [Abstract of paper by Ducamp.] p. 600-704.

India meteorological department. Memoirs. v. 20, pt. 4.
Jones, R. Ll. A discussion of types of weather in Madras. p. 53-71.

Meteorological society of Japan. Journal. Tokio. 27th year. 1908.
Yamada, J. Observations of the givre. [Relation of hoarfrost to fog.] (August.) p. 21-23.
Tsuitsui, M. Relation between the range of air temperature and the distribution of land and water. (October.) p. 27-28.

Nature. London. v. 79. November 12, 1908.
Boycott, A. E., *and others.* Caisson disease. p. 41-42.

Royal meteorological society. Quarterly journal. London. v. 34. 1908
Rawson, H. E. The anticyclonic belt of the southern hemisphere. (July.) p. 165-188.