lowed by diminished rains in India. The researches of Russel (Director of the Observatory of Sydney) seem to show that the droughts in Australia are accompanied or followed by droughts in other portions of the world. The series of charts compiled by Hildebrandsson, and published partly in his Researches on the Centers of Action of the Atmosphere, show that even when we adopt the arbitrary division of the year into twelve months, and chart the monthly departures of pressure, temperature, and rainfall from the normal values for those months, there are certain broad generalizations that become possible, and which would doubtless be still more pronounced if more appropriate periods were adopted. Thus, the departures from pressure are greater in winter than in summer and increase from the Equator toward the poles The barometric variations in the Azores and in the neighborhood of Iceland are nearly always opposed to each other, and the curves for Siberia and Alaska are generally inverse to each other. The curves for Tahiti at the center of the South Pacific area of high pressure, and those for Tierra del Fuego in the southern temperate zone are inverse. Among all these changes there appears, as yet, no law of successive transformations. By plotting the barometric departures on charts of the world, Hildebrandsson finds that the pressure is sometimes abnormally high over the arctic region but low over the equatorial region, or vice versa; at one time it is high over northern Europe but low over the arctic and North America; at another time it is low there and high here; during one month it is high over the arctic and low over the antarctic, and another month just the reverse.

The continuous set of daily maps of the Northern Hemisphere prepared by the United States Weather Bureau from 1875 to 1895, and actually published for nine years, have often given us abundant illustrations of the fact that the phenomena occurring in one part of the atmosphere are certain to affect other distant portions a few months later, and, in fact, may continue to be felt even for years. If we recall the observed movement of the vapor and dust ejected from Krakatoa in 1883 (its spread at great elevations near the Equator, moving westward around the world in a few days and its very slow spread northward, reaching latitude 40° north in nine months and 60° north in eighteen months), we shall the more easily understand that even greater events than this (such as those that produced the droughts of 1896 and 1899 in India), when once they occur, must propagate their influences also slowly, but not necessarily in precisely the same direction or manner. If there be a variation in solar radiation, it must affect the land and water hemispheres differently; our system of isotherms and isostats, that we have idealized into curves symmetrical about the orographic and meteorological axis of the globe, will be changed primarily as to intensity, and perhaps eventually as to location, and the general effect of solar variations on local climate will thus become distinguishable.

By thus considering the land and water hemispheres of our globe as the thermal and frictional disturbers of the phenomena that would otherwise pertain to a uniform surface, rapidly rotating and warmed symmetrically with reference to the north and south poles, and by introducing convectional resistances instead of viscosity, we seem able to take another step forward in meteorology and long-range forecasting.

It is only by the study of these general phenomena and their elucidation by the help of the laws of mechanics that we can expect to realize satisfactory long-range seasonal forecasts. We shall arrive at the desired result sooner and better by the study of the mechanics of the atmosphere than by the search for elusive empiric periodicities, and it is in the hopes of inducing some to turn their attention toward this study that I have submitted these views.

RECENT PAPERS BEARING ON METEOROLOGY.

W. F. R. PHILLIPS, in charge of Library, etc.

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:

American Journal of Science. New Haven. Vol. 12.
- **Barus, C.** Effect of Temperature and of Moisture on the Emanation of Phosphorus, and on a Distinction in the Behavior of Nuclei and of Ions. Pp. 327–347.

The Astrophysical Journal. Chicago. Vol. 14.
- **Pickering, E. C.** Spectrum of Lightning. Pp. 367–369.

Journal of the Western Society of Engineers. Chicago. Vol. 6.
- **Wright, Wilbur.** Some Aeronautical Experiments. Pp. 489–511.

Nature. London. Vol. 65.
- **Shaw, W. N.** Meteorological Work for Science Schools. P. 128.
- —— The "Armorl" Electro-Capillary Relay. Pp. 129–130.
- —— Fresh Light on the Antarctic. Pp. 153–155.
- —— The Inert Constituents of the Atmosphere. Pp. 161–164.
- **Smith, D. T.** Relative Velocity in Streams. P. 174.

Science. New York. Vol. 14.
- **Ward, R. DeC.** Hail Prevention by Cannonading. [Abstract of article by Friedrich Stengel.] P. 938.
- **Ward, R. DeC.** The Dust Storm of March, 1901, and Glacial Studies. [Abstract of article by Richter.] P. 938.
- **Ward, R. DeC.** The Climatic Control of Government in the Tropics. [Abstract of article by Alleyne Ireland.] P. 938.
- **Ward, R. DeC.** Underground Temperature at Oxford. [Review of article published by Radcliffe Observatory.] P. 938.
- **Ward, R. DeC.** Lehrbuch der Meteorologie. Von Dr. Julius Hann. Pp. 966–967.
- **Upton, Winslow.** Physiological Effect of Diminished Air Pressure. Pp. 1012–1013.
- **Rotch, A. Lawrence.** The Measurement of Wind at Sea. Vol. 15. Pp. 72–73.

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- **Cox, John.** Comets' Tails, the Corona and the Aurora Borealis. Pp. 265–279.

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- **Rayleigh, Lord.** Flight. Pp. 233–234.
- **Marconi, G.** Wireless Telegraphy. Pp. 247–257.
- **Dewar, J.** Solid Hydrogen. Pp. 473–480.

Scientific American. New York. Vol. 85.
- **Collins, Frederick.** The Slaby-Arco Portable Field Equipment for Wireless Telegraphy. Pp. 425–426.

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- **Rotch, A Lawrence.** The Use of Kites to obtain Meteorological Observations. Pp. 21718–21720.

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- —— Hann's Text-Book on Meteorology. Pp. 177–179.
- —— Rainfall and Storms in November. Pp. 179–181.
- —— The Moon and Rainfall. Pp. 183–184.
- —— Weather and the Horns of the Moon. Pp. 184–185.

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- **Borgen, C.** Report on the Magnetic Observations made during the Total Solar Eclipse May 17–18, 1901, at the Magnetic Observatory, Wilhelmshaven, Germany. Pp. 167–168.
- **Eschenhagen, Max.** Report on the Magnetic Observations made during the Total Solar Eclipse, May 17–18, 1901, at the Magnetic Observatory, Potsdam, Germany. Pp. 169–172.
- **Fraser, H. A. Denholm.** Report on the Magnetic Observations made at Dehra Dun, India, during the Total Solar Eclipse of May 17–18, 1901. Pp. 173–176.
- **Moidrey, J. de.** Report on the Magnetic Observations made at the Magnetic Observatory at Zi-Ka-Wei, China, during the Total Solar Eclipse of May 17–18, 1901. Pp. 177–178.
- **Farr, Coleridge.** Report on the Magnetic Observations made in Christchurch, New Zealand, during the Total Solar Eclipse, May 17–18, 1901. Pp. 179–180.
- **Hosmer, G. L.** Report on the Observations of Magnetic Declination made at Sawah Loento, Sumatra, during Total Eclipse of May 17–18, 1901, by the party of the Massachusetts Institute of Technology, Boston. Pp. 181–183.
- **Claxton, T. F.** Report on the Magnetic Observations made dur-

ing the Total Solar Eclipse, May 17-18, 1901, at the Royal Alfred Observatory, Mauritius Island. Pp. 184-185.
Moidrey, J. de. Magnetic Observations in Southeast China. Pp. 186.
Hazard, D. L. The Central Physical Observatory of Russia. Pp. 193-194.

Annuaire de la Société Météorologique de France. Paris. 49me Année.
Cœurdevache, P. Contribution à l'étude de la variation diurne de la vitesse du vent. Pp. 243-244.
Coeurdevache, P. Variations des éléments météorologiques au Pic du Midi. Pp. 244-246.
Demtchinsky, N. A propos de l'influence de la lune sur l'état barométrique de l'atmosphère. Pp. 246-249.
Cheux, —. Observations faites à l'Observatoire de la Baumette (près Angers), sur l'arrivée de plusieurs oiseaux. Pp. 250.
Maillet, Ed. Sur la prévision des crues à Pommeuse et à Coulommiers (Bassin du Grand-Morrin), à l'aide des hauteurs de pluie. Pp. 275-283.

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—— La foudre en boule. Pp. 479-480.
Thoulet, J. La transparence et la couleur de la mer. Pp. 481-492.
Raulin, V. Les variations séculaires du magnétisme terrestre. Pp. 492-495.
—— Répartition de la pluie avec l'altitude en Angleterre. P. 503.
—— Les méfaits de la foudre aux États-Unis pendant l'année 1899. P. 503.
—— Sur la conservation de la radiation solaire. Pp. 503-504.
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Pellat, Henri. Méthode permettant d'évaluer en valeur absolue les très basses températures. Pp. 921-924.
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Graffigny, Henry de. Une chaudière à vapeur d'ether. Pp. 235-237.
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—— La photographie en ballon. P. 252.

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Rabot, Charles. Les variations du niveau des lacs et des precipitations atmospheriques dans l'Asie centrale. Pp. 473-474.

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Plumandon, J. R. Troisième Congrès international de defense contre la grêle. Pp. 38-39.
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—— Die Witterung zu Tsingtau im Juni, Juli, und August 1901. Pp. 554-556.
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Klengel, Friedrich. Ueber das Wetterschiessgebiet bei Windisch-Feistritz im südlichen Steiermark. Pp. 270-276.
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—— Experimental-Untersuchungen über die Wärmestrahlung der Atmosphäre. Pp. 55-56.
—— Ueber die tiefste Temperatur, welche Insekten lebend überdauern können. Pp. 59-60.
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Kumpel, Juan. La sombra en los cafetales considerada especialmente bajo las condiciones locales de terreno y clima de Costa Rica. Pp. 285-305.

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Kostersitz, K. Zur Frage der Errichtung eines astrophysikalisch-meteorologischen Höhenobservatoriums im Semmeringgebiete. Pp. 487-497.
Ernst, J. W. Graphische Wetterbeschreibung. Pp. 497-504.
Draenert, F. M. Das Klima im Thale des Amazonas-Stromes. Pp. 504-515.
Mohn, H. Absolute Maximum-Temperaturen in Norwegen. Pp. 515-518.
Trabert, W. Die Extinktion des Lichtes in einem trüben Medium (Sehweite in Wolken). Pp. 518-524.
Rotch, L. und Hann, J. Ein neues Feld für die Erforschung der höheren Luftschichten mittelst Drachen. Pp. 524-526.
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Fenyi, J. Zur Theorie des Gewitterregistrators. P. 536-537.
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—— Meteorologisches Observatorium auf den Azoren. P. 538.
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Pocchettino, —. Ergebnisse einiger Messungen der Elektricitätszerstreuung in freier Luft. Pp. 540-542.
—— Ueber die Störungen des normalen atmosphärischen Potentialgefälles durch Bodenerhebungen. Pp. 542-543.
—— Resultate der meteorologischen Beobachtungen in Guatemala im Jahre 1899. Pp. 543.
—— Ausserordentlicher Regenfall auf Lussin piccolo. P. 543.

Pearson's Magazine. London. Vol. 12.
Anderson, Alder. Photographing Cloud-Land. Pp. 10-15.

NOTES BY THE EDITOR.

CLASSIFIED WEATHER TYPES.

On previous pages we have presented three papers on classified weather types. It must not be supposed that this is a new subject, for, aside from the unpublished work of the various forecast officials, Professor Bigelow has published a classification of weather types in United States Weather Bureau Bulletin No. 20, Storms, Storm Tracks, and Weather Forecasting, and a similar classification also appears in his discussion of "The typical local circulation over the United States," in chapter 8 of the Report of the Chief of the Weather Bureau, 1898-99, Vol. II. Russell's Meteorology[1] also con-

[1] Meteorology, Thomas Russell, New York and London, 1895.