

from radiation. A centrifugal aspirator, run by clockwork (25 turns per second) draws an air current of from two to three meters per second past the thermometers inside the protecting tubes. This removes the radiation heat that has not been reflected by the protecting tubes, so that even in the strongest sunshine (at great heights, on mountains, in balloons, as well as in the Tropics) the true air temperature is measured. One of the thermometer bulbs is wrapped in muslin and from time to time moistened with water. The vapor tension is calculated from Sprung's formula $f = f' - \frac{1}{2} (t - t') b / 755$. For use in the Tropics, two extra springs and thermometers and a moistening apparatus are furnished.

Bolometric apparatus for the measurement of the total radiation.—In order to measure the radiation from a glowing body, which it sends out to its environment in the form of ether waves, a very sensitive instrument is required, which transforms the energy of the oncoming waves into heat, and by means of its rise in temperature allows this energy to be measured.

The bolometer, according to Lummer-Kurlbaum, consists of platinum foil 0.001 millimeter in thickness, covered with spongy platinum, in order that all wave lengths may be absorbed equally. The four arms of the bolometer are combined into a Wheatstone bridge. These are all as much alike as possible, in order that the balance of the bridge shall not be affected in any appreciable degree by the variations of the room temperature or the variations in strength of the measuring current. In consequence of this and on account of the small thermal inertia and extraordinary thinness of the strips, a radiation that produces a heating in the bolometer of only 0.00001° C. can be measured with an accuracy of a few per cent. In addition to the bolometer, the stand holds a blending apparatus and a shutter, provided with water cooling.

THE PHILIPPINE WEATHER BUREAU.

This exhibit occupies a building of its own. The map section is especially interesting and elaborate. An outdoor relief map of the Philippines occupies a space 110 feet long by 70 feet wide just back of the building. There are also eight smaller accessory relief maps of the islands, showing: (1) The average rainfall in the Archipelago and prevailing winds on the seas during February, the driest month of the year; (2) during August, the wettest month of the year; (3 and 4) the political and religious divisions; (5) the relative earthquake frequency; (6) mines and mineral springs; (7) forestry and agriculture; (8) ethnography. Other maps show Manila Bay; the Volcano and Lake Taal; Manila and surrounding towns; the distribution of rainfall in the Archipelago; typhoon tracks, etc.

A number of the Manila Observatory publications are displayed.

On each side of the building is a high tower. A Robinson anemometer is at the top of one and the transmitting portion of Richard's anemocinograph is at the top of the other.

A microseismograph, built at the Manila Observatory, is shown in operation. This instrument is a copy of the grand microseismograph of Vicentini, with the vertical component modified by Rev. Father Algué. Twenty additional instruments are displayed, including Rev. Father Algué's refraction nephoscope, barocyclonemeter, and typhoon barometer. Rainfall, lightning, sunshine, earthquakes, temperature, atmospheric pressure, and the direction, velocity, and force of the wind are recorded by self-registering apparatus.

Both Father Fenyi's and Father Odenbach's ceraunographs, or lightning recorders, are also exhibited.

THE DIGNITY OF THE SERVICE.

Address by Mr. JAMES H. SCARR, Observer, at the Weather Bureau Banquet, Peoria, Ill., September 22, 1904.

When I speak of "Dignity" I do not refer to that so-called dignity whose chief stock in trade consists of a silk hat and kid gloves. These and more are but the adjuncts of dignity, and in proper time and place possess a value not to be underestimated. But I would speak of that dignity which comes from a sense of responsibility for the performance of a duty—not only agreeable and satisfying, but imperative and valuable—the dignity that comes from a faith in the absolute integrity of purpose behind the work sought to be performed, and the exercise of every energy to bring that work to perfection.

Let me speak of the man as the visible sign of the Service,

the stereoscope, if you please, through which the public views and forms its estimate of the Service.

The true dignity of the Service may be as high above the man charged with its duties as the heaven is high above the earth, but the public estimate of that duty will, for a long time to come, be measured by the public's opinion of the men who represent it.

The weather has so long been the synonym of uncertainty and fickle changeableness, that signs and portents (possibly of some value in the locality of their origin) have obtained a firm hold upon the public mind, so that it is not too much to assert that the service that seeks to reduce the weather changes to rule and foretell their occurrence by the application of known physical-laws, must, for a time at least, borrow its dignity from the men who represent it.

The man is wholly unworthy the work in which he is engaged, who fails to dignify that work with his very best effort. Not only must he so dignify his profession, but he must be deeply impressed with the fundamental truth that his best is good enough only so long as it is equal to the demand made upon him.

I know of no position in any community that demands more than that occupied by the representative of the United States Weather Bureau. It is only by the constant, faithful, and accurate response to these demands that the true dignity of the Service can be, and will be, established and maintained.

He must be a good citizen, sober, industrious, and moral; keeping carefully aloof from sectional or factional alliances or prejudices; resisting kindly but firmly every effort of local pride or rivalry to build up its particular climatological reputation by the suppression or garbling of conditions prevailing there or elsewhere. He must bear in mind that his principal duty to the community is the collection and dissemination of climatological and current weather data, in their special relation to the business of that particular community, and that the dissemination of such data must be timely, reliable, and impartial.

Neither must his dignity be always of the ministerial sort that invariably frowns upon the "Weather Joker." Let him have his joke so long as it contains no poison; it may afford an opportunity to point a lesson, strengthen a friendship, and advance the interests of the Service.

He must put the Service before self. In every public service the man becomes but the instrument of operation, and if found unsuited to the field in which he is employed, he must give way to another. It matters not, so far as procedure and results are concerned, whether the lack of adaptability be the fault of the instrument or of the field. It is much easier to change instruments than to reform fields.

He must be loyal. Put this down as fundamental. Nothing can exert such a disintegrating, demoralizing influence upon the Service as disloyalty. Assistants must be loyal to the officials in charge of the stations on which they serve. Observers and local forecasters must be loyal to the district forecaster. But above all be loyal to our honored Chief, than whom no man has done more to set up and maintain a high standard of dignity, and than whom no man could have done more to increase the efficiency and practical utility of the Service, while conserving, in so far as its hard exigencies permit, the personal interests of every man in it.

Remember, too, that the Service stands before the unformed public, identified and measured by its failures. In the mind of that public the weather forecaster is not exempt from that stern but inexorably written law, "He that offendeth in one point is guilty of all." Let one serve his friend with devotion and singleness of purpose through the years of a long life, but never so unwittingly fail him in one instance, and the service of a lifetime is found wanting when weighed in his balance against the one failure.

Facing this fact, it is not hard to see two converging lines along which the Service must proceed to establish itself in the confidence of the public. The one is to make better forecasts. The other is to make clear to the public just what the Service attempts to do and does do in the matter of making forecasts. If forecasts for definite areas and times could be reduced to mathematical exactness, the Bureau could proceed with its work without seeking to take the public into its confidence. But this period is not now and may never be reached; and the work along this line may be termed interior. The exterior work is along the other line, and the two must be pushed simultaneously till they meet at the surface.

Personal work in the form of popular lectures and courses in educational institutions will accomplish much in this direction. But greater, wider, quicker, and surer is the influence of the public press. This is the medium which offers freely to bring the Service daily into confidential relations with every fireside; and I speak advisedly and with deliberation when I say that the men in charge of stations should be held strictly accountable not only for the articles bearing upon meteorological conditions and occurrences appearing in the papers in their vicinity, but for those which should but do not appear. To plead or prove inefficiency in this particular is to fail to meet an imperative demand of the Service, and to demonstrate an unfitness for that particular field.

These may seem to you, my comrades, to be hard lines, but from your respectful and sympathetic attention I feel confirmed in the opinion that you have not sought or remained in this service either because it is easy or largely remunerative, but because of a love for the Service and a devotion to duty, brightened and strengthened by that bond of brotherhood everywhere manifested; a bond developed by years of association, and a devotion that gives the strongest assurance that the dignity of this Service will be maintained by meeting every requirement and discharging every duty.

RECENT PAPERS BEARING ON METEOROLOGY.

Mr. H. H. KIMBALL, Librarian and Climatologist.

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 —.

Knowledge. London. New Series. Vol. 1.

— A scheme for the comparison of climates. P. 243.

Scientific American Supplement. New York. Vol. 53.

Hopkins, N. Monroe. The construction of an indicating or recording tin plate aneroid barometer. Pp. 24040-24042.

Deslandres, H. General organization of solar research. Continuous registering of the variable elements of the sun. P. 24070.

Lendenfeld, R. von. Climate and glaciers. Pp. 24070-24072.

— The mechanics of the atmosphere. Pp. 24072-24074.

American Journal of Science. New Haven. 4th Series. Vol. 13.

Hutchins, C. C. and Pearson, J. C. Air radiation. Pp. 277-286.

Symons's Meteorological Magazine. London. Vol. 39.

— Meteorology at the British Association. Pp. 141-142.

Eliot, John. Meteorology at the British Association. Address to the sub-section cosmical physics. [Climate of India. Pp. 142-147.]

Shaw, W. N.; Dines, W. H.; Archibald, D.; Boys, C. V.; Buchan, A.; Glazebrook, R. T.; Mill, H. R. Investigation of the upper atmosphere by means of kites in co-operation with a committee of the Royal Meteorological Society. Pp. 147-148.

Bacon, John M. On upper currents and their relation to the hearing of far sound. Pp. 149-150.

— The Dines recording barometer. Pp. 150-151.

Bonacina, L. C. W. The wettest spot in the United Kingdom. Pp. 152-153.

Pringle, C. S. Ball lightning. P. 153.

Russell, Spencer C. Ball lightning. P. 153.

MacGregor, W. Formation of a water spout. Pp. 153-154.

Nature. London. Vol. 70.

— Relation of rainfall to run off. [Review of paper of George W. Bafter.] Pp. 299-300.

— Sun-spot periodicity and terrestrial phenomena. [Abstract of work of O'Reilly.] P. 512.

Poynting, J. H. Radiation in the solar system. Pp. 512-515.

Lockyer, William J. S. Astronomy and cosmical physics at the British Association. Pp. 536-538.

Scottish Geographical Magazine. Edinburgh. Vol. 20.

Waite, Percival C. The annual rise and fall of the Nile. Pp. 543-544.

— Scotia Bay meteorological and magnetical station. P. 552.

Bulletin of the American Geographical Society. New York. Vol. 36.

Ward, R. DeC. Sunshine and influenza. [Note.] P. 539.

Ward, R. DeC. Climatic influence on vineyards. [Note on article of Richard Strachan.] P. 540.

Ward, R. DeC. South African rainfall. [Review of article of J. R. Sutton.] P. 543.

W[ard], R. DeC. Transvaal meteorological service. [Note on article of R. T. A. Innes.] Pp. 543-544.

— The coldest region of the earth. [Note.] Pp. 546-547.

W[ard], R. DeC. Antarctic meteorology. [Review of work R. C. Mossman.] P. 547.

American Inventor. New York. Vol. 20.

Nippoldt, A. On the investigation of simultaneous occurrences in the solar activity and terrestrial magnetism. Pp. 202-206.

Geographical Journal. London. Vol. 24.

Watson, E. R. On the ionization of air in vessels immersed in deep water. Pp. 437-441.

MacLagan-Wedderburn, E. Seiches observed in Loch Ness. Pp. 441-442.

H., A. J. The annual rainfall of the British Isles. [Review of paper of H. R. Mill.] Pp. 466-468.

Electrical World and Engineer. New York. Vol. 44.

— The magnetism of the earth. [Note on paper of L. A. Bauer.] P. 638.

Geographical Teacher. London. Vol. 2.

Ward, R. DeC. The climatology of the United States: an outline. Pp. 212-218.

Terrestrial Magnetism and Atmospheric Electricity. Baltimore. Vol. 9.

Umow, N. Die Construction des geometrischen Bildes des gaus'schen Potentials, als Methode zur Erforschung der Gesetze des Erdmagnetismus. Pp. 105-112.

Bauer, L. A. The physical decomposition of the earth's permanent magnetic field. No. IV. Pp. 113-133.

Bemmelen, W. van. Magnetic survey of the Dutch East Indies. Pp. 135-136.

Moidrey, J. de. Note sur l'amplitude de l'oscillation diurne de la déclinaison magnétique et son inégalité annuelle. Pp. 137-139.

Cold Storage and Ice Trade Journal. New York. Vol. 28.

Wegemann, Karl. The use of hygrometrical instruments. Pp. 30-33.

Transactions of the Connecticut Academy of Arts and Sciences. New Haven. Vol. 11.

Verrill, Addison, E. The Bermuda Islands, their scenery, climate, productions, physiography, natural history, and geology; with sketches of their early history and the changes due to man. Pp. 17-956.

Science Abstracts. London. Vol. 7.

B[urbury], S. H. Principles of aerodynamics and their application to some special problems. [Abstract of article of M. Smoluchowski-Smolan.] Pp. 639-640.

B[orns], H. Possible variation in the solar radiation and its probable effect on terrestrial temperature. [Abstract of article of S. P. Langley.] P. 640.

B[orns], H. Dimensions of deep-sea waves and their relation to meteorological and geographical conditions. [Abstract of article of V. Cornish.] Pp. 640-641.

B[orns], H. General circulation of the atmosphere in middle and higher latitudes. [Abstract of article of W. N. Shaw.] P. 641.

Annuaire de la Société Météorologique de France. Paris. 52me année.

Goutereau, Ch. Sur l'affaiblissement du rayonnement solaire en 1902-1903. Pp. 189-195.

— Les époques d'apparition des premières glaces au Japon. [Review of work of Okada.] Pp. 203-204.

— La télégraphie sans fil et la prévision du temps. [Note.] P. 204.

La Nature. Paris. 52me année.

— La foudre en boule. P. 258.

Rudaux, Lucien. Observation du rayon vert. P. 294.

Libert, L. Le soleil vert. P. 294.

Jullien, Omer. Extraordinaire sécheresse dans la région française du Mont-Blanc. Pp. 298-299.