the sun give results comparable with each other, wall-screens give results which are not comparable, *inter se*, it being perhaps impossible to find two wall-screens in positions tolerably comparable. But it is in investigating the daily range and sudden changes of temperature, the humidity of the air, and others of the prime factors of climate that wall-screens as instruments of observation totally break down.

A PAPER of researches on the rainfall of Austria-Hungary has been recently presented to the Vienna Academy by Dr. Hann. His object is, while showing the main features of distribution of rain in the country, to establish a rational method of deduction of results from measurements of rainfall during short intervals of time. In the greater part of Austria-Hungary, he shows that June is the most rainy month; it is so in the whole of Bohemia and Hungary, with Siebenbürgen, in the eastern part of Galicia, and in Bukowina. In Moravia and Silesia nearly the same rain falls in June and August, with an intermediate decrease in July. West Galicia and the Tatra-region show a preponderance of July rain. Southwards from the Upper Dranthal a maximum in October becomes predominant. From about 45° lat. southwards more rain falls in the three winter than in the three summer months. The further south the more pronounced is the distinction of a dry from a wet period. The dryest months in the whole of Austria-Hungary down to 45° (where July is the driest month) are January and February; and especially notable is the little rainfall of February at the southern base of the central chain of the Alps.

PHYSICAL NOTES

MEASUREMENTS of the heat conductivity of iron hitherto have given rather discordant results. This must be due, according to Herr G. Kirchhoff and Herr Hansemann, to the fact that in most of them the quantities of heat given out or received from without by the body examined have not been sufficiently taken into account. These physicists have recently described to the Berlin Academy experiments by a method in which a cubical iron mass, after being left to itself a long time, had a strong water-spray directed against one of its side surfaces, the water being some degrees hotter (or colder) than the place of observation. At several points back from the heated surface vertical passages were made, each to receive one junction of a thermopile of thin German silver and copper wire, the other junction being at constant temperature. An observer, with the aid of a chronograph, marked the point of time at which certain divisions of the scale of the (mirror) galvanometer passed the vertical wire of the telescope, at the same time dictating their number to an assistant. Referring to the memoir for further details, we note the conclusion arrived at, viz., that the heat-conductivity of iron divided by the product of its specific heat and its density, at the temperature $\theta = 16{\cdot}94 - 0{\cdot}034\ (\theta - 15)$, when the temperature is measured in centigrade degrees, and the units of time and length are seconds and millimetres. With this result, that of H. Weber agrees best; he obtained the number 16·97 for 39° C. The results of F. Neumann, Ångström, and Forbes, on the other hand, are more divergent. (The substance used in the experiments here described was Dortmund puddled steel, containing 0·129 per cent. carbon and 0·080 silicium.)

HERR E. WIEDEMANN has recently made further experiments on the phosphorescent or fluorescent light produced by electric discharges (*Wied. Ann.*, No. 1). Nearly all platino-cyanide double salts show fluorescence under the discharge; but, so long as they were undecomposed, no double fluorescence was observed, When platino-barium cyanide had been traversed by a single discharge, the strong green fluorescent light showed no dichroism, but, after a series of discharges, dichroism appeared. It also occurred when the crystals of that or other platino-cyanide double salts were left a long time *in vacuo* (without electric discharge), whereby they lost water; and the more rapid appearance of dichroism under the electric discharges is attributed to heating of the crystals. Herr Wiedemann opposes Mr. Crookes's view, offering the following proof of its incorrectness:—If the positive current of a Holtz machine be sent through a very thick-walled discharge-tube, and the discharges be made to follow one another in such a rhythm that they are deflected from their course in the tube by the finger, only a weak phosphorescent light appears on the inner side of the tube, but a very bright green light appears on the *outer* side. The non-observation of this before is probably due to the thinness of the tubes commonly used. In narrow, and especially capillary tubes, too, only the inner wall becomes luminous.

WE take the following from the *New York Nation*:—"It is impossible for the unaided ear to determine with certainty the direction of a distant sound, especially when the atmosphere is foggy; hence the great utility to navigators of the instrument which its inventor, Prof. Alfred M. Mayer, of the Stevens Institute, has felicitously named the 'topophone,' or sound-placer. It consists of 'a vertical rod passing through the roof of the deck-cabin,' and bearing on the upper end 'a horizontal bar carrying two adjustable resonators,' below which a pointer is set at right angles with the bar. Rubber tubes from the resonators pass through the roof of the cabin and unite in a single pipe connected with a pair of ear-tubes. The vertical rod is turned by means of a handle in any direction. The first step is to tune the resonators accurately to the pitch of the sound under observation, and fix them 'at a distance from each other somewhat less than the length of the wave of that sound;' the next, by turning the handle, to bring them simultaneously on the wave-surface, when, as 'they both receive, at the same instant, the same phase of vibration on the planes of their mouths,' it will result that if the connecting tubes be of the same length, the sound-pulses, acting together, will be reinforced to the ear, but if the tubes differ in length by one-half the wave-length of the sound, the pulses will oppose and neutralise each other, and thus tend to produce silence. At this moment the horizontal bar is a chord in the spherical wave-surface of which say the fog-horn is the centre; and the pointer represents a radius, 'or, in other words, coincides in alignment with a line drawn from the place where the sound is produced through the place of observation.' By sailing the ship a measured distance 'at an observed angle from the radius line thus found, a second radius line may in like manner be found,' and 'the distance between the two points of observation is the base-line of a triangle, of which the two convergent radii are the sides.' From these data the distance of the fog-horn is readily computed."

GEOGRAPHICAL NOTES

THE *Vega* reached Naples at 1.30 P.M. on Saturday, the 14th. Prof. Nordenskjöld and his staff received a warm reception from representatives of the Italian and Swedish Governments. Prof. Nordenskjöld has been made Grand Officer, and Lieut. Palander Commander of the Order of the Crown of Italy. On Monday the explorers were entertained at a grand banquet. The French Institute will hold its annual meeting on March 1, under the presidency of M. Daubrée, who will deliver an inaugural address, the subject being Prof. Nordenskjöld's expedition. It is expected that the professor will land in France on that day. He will stop at Marseilles and Lyons, where he will be received by the local geographical societies and authorities. The Paris Geographical Society will send a delegation to Marseilles. Prof. Nordenskjöld will receive the gold medal of the Society at Paris, in the large hall of the Sorbonne. The several learned societies of Paris will send delegations to witness this ceremony, which will be followed by a grand banquet on the succeeding day. It is expected that Prof. Nordenskjöld will reach London in about a month's time, but his present intention is not to give a public address. He does not feel himself sufficiently master of English for this purpose, and, moreover, as might be surmised, he has an aversion to "starring." The botanists and zoologists of the expedition will go overland, visiting all the museums with Arctic collections, and will rejoin the *Vega* at Copenhagen.

AT the last promotion of the Legion of Honour M. Levasseur, vice-president of the Paris Geographical Society, was appointed to the grade of officer for his geographical and statistical works. M. Levasseur is the editor of the statistical department of the *Annuaire* of the Bureau des Longitudes, which has been so much enlarged recently.

THE French Chambers, at the instigation of M. de Freycinet, have voted a sum of 600,000 fr. for the cost of sending exploring missions into the remoter parts of Algiers and Senegal, and penetrating into the Sahara of the Western Soudan. Their immediate object is to trace the lines of future railways, but the indirect influence on the extension of our geographical knowledge is most important. Three scientific expeditions are being organised in Algiers; one is to operate in the Algerian Sahara, and will not pass El Golea; a second, comprising a corps of