

out with tweezers. The lower part of the tube is drawn out for connection with the mercury pump. The powders used for experiment were carefully painted on the opposite sides of pith or mica disks, only water or alcohol being used.

Disks coated on alternate sides with chromic oxide and precipitated selenium move in one direction to the naked flame of a candle, and in the other direction when a water screen is interposed. With saffranin and hydrated zinc oxide the instrument does not move at all when exposed to the naked flame, but revolves when a water screen is interposed. With thallic oxide and Magnus's green platinum salt, the instrument moves strongly when no screen is interposed, but is stopped with a water screen. These results are all in conformity with the figures.

A pith radiometer coated with precipitated selenium and chromic oxide was exposed to the radiation from a colourless gas flame from a Bunsen burner, coloured intensely green by thallium. To the eye, by this light, the chromic oxide looked nearly white, and the selenium black. The rotation due to the repulsion of the chromic oxide was, however, apparently as strong as when the non-luminous flame was used. This experiment proves that certain substances have an opposite absorptive action on rays of dark heat to what they have on light, and that an optically white body may be thermally black, and *vice versa*. In this case, for instance, chromic oxide was optically green, and thermally black, while scarlet selenium was thermally white and optically black. W. CROOKES

(To be continued)

METEOROLOGICAL ORGANISATIONS

IN the *Journal* of the Royal Statistical Bureau of Prussia for 1878, there is published a report on the meteorological organisations of the chief countries of Europe, Part I., by Dr. Gustav Hellmann, who is rapidly coming to the front as a first-class meteorologist. In addition to considerable mental capacity and much enthusiasm for the science, Dr. Hellmann has, at the instance, and with the assistance of the Prussian Minister of Public Instruction, especially qualified himself for the work by undertaking tours more or less prolonged, in the countries the meteorological systems of which he reports on. These in the Part before us are the various systems in France, Great Britain, Belgium, and Holland. With the aid of a renewed grant he sets out on a second tour, this time through northern Europe, especially Russia, for the purpose of presenting similar reports on the meteorology of these countries. This action on the part of the Prussian Government has been taken, in view of a contemplated reorganisation of its meteorological system, so that when the time comes, the system may be established, not at haphazard, but on a sure basis, founded on the fullest knowledge of the requirements of the science, and on the best means to be adopted for its healthy development.

The Weather Telegraph systems of France, Great Britain, Belgium, and Holland, are fully detailed, very special attention being given to the weather warnings of France, carried out for the benefit of agriculture and horticulture. This system of weather warnings, which is so peculiarly adapted to the wants of Germany, was, as our readers are aware, the last gift to meteorology of the great Leverrier, to whom, in its practical bearings, meteorology stands so deeply indebted.

As regards France, meteorology would appear to have a most hopeful future before it, as evidenced by the mental activity brought to bear on the science, the fertility of resource in devising new methods and subjects of observation, the breadth of view shown in making the study of weather and climate subserve great public interests, and withal by the pecuniary assistance liberally and heartily

given by Government and other bodies intrusted with the public funds, to the observatories, societies, and associations in various parts of France that are doing its meteorological work. Among the more special work France is doing may be noticed the application of the electric thermometer to the observation of the temperature of the air at great heights and of the soil at great depths; the establishment of several stations in Paris for the investigation of the chemistry and micrography of the atmosphere in their relations to the health of the city; and the establishment of high-level stations, which has been done largely through assistance given from the public purse.

We note with the liveliest satisfaction the great increase of meteorological stations over these four countries, the introduction of instruments for continuous observations in regions where they were much required, and a more adequate observation of the rainfall, particularly in the British Isles, where about 2,100 rain-gauges are at work, and in the river-basins of France, where the rainfall is noted at 1,111 stations.

Forcible attention is directed to the fact that in some cases the reduction of the observations and publication of the results are not carried out, or carried out very imperfectly, so that no little difficulty is experienced when conducting climatological inquiries, in obtaining the data from considerable portions of Western Europe. This defect ought to be rectified without delay.

Reference is made to international stations, or stations at which observations are made for purposes of international meteorology. But on looking at the diverse hours of observation adopted by the different European systems, it is evident that the attempt recently made to found an international meteorology must be regarded as a failure, since the prime and most elementary condition of uniformity as regards hours of observation has been neglected, the just views on this vital point propounded by Humboldt and the meteorologists of his time being at present, if appreciated, entirely set aside.

MYCOLOGY¹

IT is perhaps not generally known how very numerous are the specimens comprised under the branch Mycology. The mycological herbarium which is in the course of transmission to Kew consists of at least 10,000 species, of which 7,500, comprising the Hymenomycetes and Ascomycetes, have already been forwarded. But not only are many species very beautiful in form and colour, but the subject is one of great interest both in a physiological and economical point of view, apart from mere distinction of species and nomenclature, and, therefore, while especial journals are devoted to entomology, malacology, algology, and other branches of natural history, it is quite right that we should have one devoted to fungi. M. Roumeguère ought, however, to have mentioned that England already possesses one in *Grevillea* quite equal to the French journal, which has appeared with great regularity ever since 1872, and is monthly instead of trimestrial, of the existence of which he could scarcely be ignorant, as it is referred to more than once in the number before us.

The Journal before us commences with a paper on the much-vexed question of the real nature of lichens, in which the author is altogether opposed to Schwendener's theory of their parasitic growth on *Algæ*. There are two points which ought to be noticed: that the growth of *Gonidia* from *Hyphæ* was observed by Mr. Berkeley, as recorded in the "Introduction to Cryptogamic Botany,"² while the stem of the curious

¹ "Revue Mycologique: Recueil trimestriel consacré à l'étude des Champignons." Par M. C. Roumeguère. (Paris: J. B. Baillière et Fils.)

² "Int. Crypt. Bot.," p. 373, Fig. 78d.

³ "Int. Crypt. Bot.," p. 341, Fig. 76.