

edly an advantage, for the lower adjustment requires always great nicety in the observer, and is, in some kinds of light, really difficult; but the advantage is, in our opinion, more than counterbalanced by the complexity of the reductions necessary for the instruments, which obviously require an additional correction for the change of level in the cistern.

The thermometers, maximum and minimum, dry and wet bulb, are described in the same exhaustive manner, and the best methods are discussed for obtaining trustworthy observations on the temperature of air, springs, rivers, and soils; the tension of the vapour of the atmosphere, and hence the relative humidity of the latter. Dr. Jelineck erroneously states on page 41 (foot-note No. 4), that the mean temperatures in England and Scotland are solely derived from the readings of the maximum and minimum thermometers. It is quite possible that in former years such observations, for want of better ones, were made the basis for deducing the mean temperature of some localities; but, as far as we are aware, these are exceptional cases, and the daily and annual mean temperatures are everywhere in this country derived from daily observations at fixed hours.

The remainder of the work comprises chapters on rain-gauges, the direction and force of wind, anemometers, the amount and form of clouds, the direction of upper currents, thunderstorms, optical phenomena of the atmosphere, ozone observations, and finally, the best methods for deducing from the observations the most probable annual mean results. Although the author shows himself, on the whole, well acquainted with what has been done in this branch of physical science beyond Germany, some of the chapters alluded to appear defective. A great deal of scientific knowledge and mechanical ingenuity have been brought to bear in this country on many of the subjects just mentioned, and our observatories, both public and private, are now supplied with instruments for different purposes, with which those described by Dr. Jelineck will bear no comparison; indeed, his instructions with reference to them, show that very little advance has been made in this respect from an almost primitive state: and if we consider what use is being made in this country of photography for obtaining continuous records of the principal atmospheric phenomena, and how well founded our hopes are thus, at last, to obtain an insight into the great laws which must regulate these phenomena,—we cannot but regret that the wide experience and profound knowledge of continental meteorologists should remain unsupported by the invaluable assistance of our modern appliances in their scientific investigations. The attentive reader will nevertheless find treasures even in those parts which fall short of our expectations, for every page is replete with most valuable hints, instructions, and suggestions, derived from long and extended experience.

The second part consists of very numerous and highly-valuable auxiliary tables, some of which, especially those referring to hypsometrical observations, we do not recollect to have met before in such a compact form.

No allusion whatever is made to solar radiation and atmospheric electricity, two meteorological elements the importance of which is rising more and more in the estimation of all thoughtful meteorologists.

We learn with satisfaction that the metrical system will shortly be introduced in Austria and Hungary, and that in future the Centigrade scale will be made use of in the meteorological observations.

B. L.

OUR BOOK-SHELF

The Home Life of Sir David Brewster. By his Daughter, Mrs. Gordon.

WE like this book. It is notoriously difficult for a near relation to write a truthful biography, but Mrs. Gordon has done her work with great ability, taste and judgment. To most readers, the family details at the beginning will be of little interest, but as the life advances the interest grows. The book is essentially what its title imports, it pictures Sir David as a man rather than as a philosopher; yet his daughter tells us much of when and how his literary and scientific work was accomplished, and gives us lively anecdotes both of himself and of many of his contemporaries. In one chapter she analyzes his mental characteristics, and while acknowledging his imperfections, she shows that much which appeared inconsistent in his actions arose from an unusually dual nature, the continuation of a peculiarly impulsive temperament, with a scientific habit of thought. In another, she traces his religious history, and we see his advance from a somewhat cold and rigid orthodoxy to a living and happy faith, when without materially changing his own opinions he was ready to sympathise with good men who differed from him. Those who are well acquainted with the multitudinous optical researches of Brewster, will enjoy a glimpse of him at work among apparatus, often extemporised from corks and bits of metal, and glass, meanwhile indulging in a low purring whistle of satisfaction, and those who remember him only as a Nestor in science with furrowed features and snowy hair, describing his discoveries, or declaring his convictions in clear vehement language, will like to know him also as the head of a family, and the principal of a university, a politician, and a writer of reviews, gaining high distinctions, and promoting valuable institutions. But we can only just indicate these things, and must refer to his daughter's book for details about the dawn full of promise, the brilliant noonday, and the beautiful sunset of his life.

J. H. GLADSTONE

On the Rotation of the Embryoes of the Frog within the Egg. By Dr. S. L. Schenk. Pflüger's Archiv. 1870, iii. Jahrg., Heft 2 and 3.

IT is well known that the embryo of the frog exhibits remarkable movements of rotation, the direction being in opposition to that of the movements of the hands of a watch, supposing the observer to be looking vertically down upon the instrument, and that the head of the animal is directed away from him. These movements continue without interruption, and may be watched for hours together. They vary considerably in rapidity, but a series of observations made by Dr. Schenk showed that the rotation was effected in from five minutes and thirteen seconds to twelve minutes and two seconds. It has not been accurately ascertained when these movements commence, since in the earliest stages of development the surface of the egg is in close contact with the capsule, and it is only after some water has been imbibed that the two are separated, but Dr. Schenk shows that they result from the presence of ciliated cells on the surface; first, because these can be demonstrated with the microscope; secondly, because they can be accelerated by the application of moderate heat, which is well known to render the movements of cilia more rapid, and thirdly, because they can be arrested almost instantaneously by the action of weak acids, which are known to operate in the same way on ciliary movements.