disappeared, but the diffused white light still lingered, gradually becoming more and more limited in extent, though remaining equally pronounced, until 10.30; when it occupied the small segment of the sky comprised within about 5° on each side of the north point of the horizon, and from 6° to 7° above it.

Lamorna, Torquay, Oct. 24 W. PENGELLY

THE AMERICAN GOVERNMENT ECLIPSE EXPEDITION

AT the last session of the Congress of the United States of America, an appropriation of 6,000*l.* was made for the observation of the Total Eclipse of the Sun, under the direction of Professor Benjamin Peirce, the Superintendent of the U.S. Coast Survey. This generous act of legislation was suggested by one of the ablest statesmen of America, the Hon. John A. Bingham, of Ohio, and passed both houses unanimously.

An officer was immediately sent to examine the various places, and obtain all the local information which might be required to select the most favourable positions for observation. The expedition has been divided into two parties, each of which consists of about twelve persons. One party is under the immediate direction of Prof. Peirce, and will observe in Sicily; and the other is under the direction of Prof. Winlock, the director of the Observatory of Harvard University, and will observe in Spain. Almost all the astronomers of the expedition were upon the central path of the great eclipse which occurred in America in August 1869, so that they have already been under fire, and are prepared for the sudden outburst of the total obscuration.

The observations for precision will be entrusted in each party to an experienced officer of the survey, who will be upon the ground at least a fortnight before the eclipse. He will have the instruments all properly mounted and protected, the time well observed, and the arrangements made so that the principal observers of the physical phenomena may find everything in readiness when they arrive. Their presence will not, therefore, be required till within a few days of the eclipse. The officers upon whom this duty has devolved are Mr. Schott and Mr. Dean, assistants of the Coast Survey.

The spectroscopic observations have been chiefly arranged by Professor Winlock, assisted by Professors Young and Morton. New and peculiar methods have been prepared for preserving a record of the lines of the spectrum for subsequent measurement and discussion.

The photographic preparations are varied and original. The party of Prof. Peirce will have photographic apparatus prepared by Mr. Rutherford of New York, with lenses especially ground for the purpose under his direction by Fitz of New York, and young Fitz will himself superintend this portion of the observations. The party of Prof. Winlock will have its photographic apparatus prepared, under the directions of the Professor, by Clarke, of Cambridge, and will use lenses ground by Clarke. Alvan Clarke, Jun., will also assist in these observations. Prof. Winlock's new method of photographing the sun through a long tube will be used in a portion of this class of observations. In both parties arrangements are made for long and short exposures in different instruments during the period of totality.

The polariscopic observations will be made by Prof. Pickering in the party of Prof. Winlock.

General observations of the corona will be made by as many of the party as possible, and it is hoped that Steinheil's hand comet-seekers will be especially available for this class of observation. Hand spectroscopes will also be used by several of the party, and it is hoped that in the preparations for this portion of the service material assistance will be derived from Mr. Lockyer's suggestions.

It is worthy of notice that two of the ablest officers of Engineers of the United States' Army have been detailed by the War Department to accompany the Expedition. They are Major Abbott, whose name is familiar to hydraulic engineers through his connection with General Humphrey's Monograph upon the Mississippi river, and Captain Ernst. B. P.

DR. W. ALLEN MILLER

WE have already referred to the lamented death of Dr. W. A. Miller, and now give a short sketch of his life. Dr. Miller was born at Ipswich in 1817, and received part of his education in Merchant Taylors' School. He obtained, however, his first insight into chemistry in a school belonging to the Society of Friends, at Ackworth, in Yorkshire. At the age of fifteen he was apprenticed to his uncle, who was surgeon to the General Hospital at Birmingham, and at the age of twenty he entered King's College, where (we quote from an obituary notice in the *Chemical News*) his knowledge of chemistry attracted the attention of Professor Daniell, who, during the illness of the laboratory assistant, engaged his services. In 1840 he visited Germany, and passed some time in Liebig's laboratory at Giessen. In the same year he was appointed to the post of Demonstrator in the Laboratory of King's College. In 1841 he became Assistant Lecturer to Professor Daniell, and also took his degree of M.D. in the University of London. He also assisted Professor Daniell in various scientific inquiries, and conducted the experiments on the electrolysis of saline compounds, his name being associated with that of Daniell in the paper that appeared in the *Philosophical Transactions* for 1844. In the following year he became a Fellow of the Royal Society, and on the death of Professor Daniell succeeded to the vacant chair. At this period he became greatly interested in the subject of spectrum analysis, in which he worked with great activity as an observer of the various phenomena which were then attracting the attention of the scientific world. He was a member of the Council of the Royal Society from 1848 to 1850 and from 1855 to 1857, being elected treasurer in November 1861, thereby becoming vice-president of the society. About this time his highly-trained mind and great knowledge were utilised to the highest degree in a joint research with Mr. Huggins on the spectra of stars and nebulæ, and in this class of researches his loss will be as severely felt as it will be at King's College, the Council Board of the Royal Society, and other places where his calm and sound judgment was conspicuous.

Professor Miller received the degree of LL.D., Edinburgh; of D.C.L., Oxford; and of LL.D., Cambridge. He also received the gold medal of the Astronomical Society, in conjunction with Mr. Huggins. At the time of his death he was a member of the Royal Commission which is now considering the whole question of scientific instruction and the advancement of science. His contributions to scientific knowledge, beyond those we have mentioned, were not large, his time being much taken up, as is the case with too many of our best scientific men, with teaching. His "Elements of Chemistry" is a valuable work which has long been favourably known, and has gone through several editions.

AUGUSTUS MATTHIESSEN

THE sad death of Dr. Augustus Matthiessen, which we briefly referred to in a previous number, has bereft English chemical and physical science of one of the most arduous and successful workers who ever entered her ranks. Born January 1831, in London, he from early youth upwards, manifested a great liking for chemistry, but it was not until he came of age that he entered upon its study in earnest at the University of Giessen, where he subsequently took his doctor's degree, and afterwards at Heidelberg, where, for nearly four years, he worked

under the guidance of Bunsen and Kirchhoff. His first paper, "On the Preparation of the Metals of the Alkalies and Alkaline Earths by Electrolysis," appeared in the *Annalen der Chemie und Pharmacie* for March 1855, and was devoted to a description of the preparation and properties of the metals calcium and strontium, then isolated for the first time. Calcium he found to be a metal of the colour and glance of bell metal, exceedingly ductile and malleable; using water as the exciting fluid, he found it to be electropositive to magnesium, and electronegative to sodium and potassium, which at once explained why it could not be obtained from its chloride by the action of sodium or potassium at high temperatures. Next in order is a paper of his in Poggendorf's *Annalen* for 1857, communicated by Kirchhoff, in whose laboratory the results were worked out, entitled, "On the Electric Conductivity of Potassium, Sodium, Lithium, Magnesium, Calcium, and Strontium." Following this, appear in Poggendorf's *Annalen* for 1858 two communications from him "On the Electric Conductivity of Metals," and "On the Thermo-electric Series." On his return to London he worked some time at the Royal College of Chemistry under Hofmann, and published a paper "On the Action of Nitrous Acid on Aniline." Hunt had described phenol, free nitrogen and water as the products of this reaction, but he found that an intermediate reaction took place, by which ammonia was formed; extending his experiments to ethyl and diethylaniline, he obtained ethylamine and diethylamine. It was this reaction which first led him to the study of narcotine, which afterwards in his hands yielded such splendid results. After working diligently several years in a laboratory which he fitted up for himself in Torrington Square, he was appointed Professor of Chemistry to St. Mary's Hospital in 1862. It was about this period that his most important researches were carried out in conjunction with Dr. Vogt, Von Bose, Holzmann, &c., and published in a series of papers in the Philosophical Transactions of the Royal Society, to which he was admitted a Fellow in 1861. Some of the most important of these papers are those "On the Influence of Temperature on the Electric Conducting Power of Metals." It was this research which proved the important fact, that the conducting power of the pure metals decreased to the same extent between 0° and 100° C.; two remarkable exceptions, however, to this law, Iron and Thallium were the subject of a later paper; "On the Specific Gravity of Metals and Alloys;" "On the Chemical Nature of Alloys," in which he showed that nearly all the two-metal alloys may be considered as solidified solutions of the one metal in the other. Also a long series of determinations of the influence of temperature on the conducting power of alloys. He also made a most careful redetermination of the expansion of water and mercury, and found that Kopp's coefficients were slightly too low. He was a very active member of the committee appointed by the British Association "On the Standards of Electrical Resistance," and it was one of the alloys discovered by him which was finally adopted for the reproduction of the now well-known B A unit of electrical resistance. His later chemical work is embodied in a series of papers in the *Philosophical Transactions*—"On the Chemical Constitution of Narcotine"—published partly in conjunction with Prof. Foster, and partly with Dr. Wright. In these he shows that one, two, and three atoms of methyl can be successively removed from narcotine, and also describes a large number of interesting derivatives of the same. In 1869 he was appointed Professor of Chemistry in St. Bartholomew's Hospital, and in the same year received the Royal Society's Gold Medal for his published researches on the metals and the opium alkaloids. One of the most important results of his last investigation is the discovery of the relation between morphia and codeia, the latter simply containing one of methyl more than the former; although, however, he succeeded in obtaining apomorphia from codeia, he was never able to reconvert apomorphia into morphia, and thus form morphia direct from codeia. At the time of his death he was occupied with the experiments on the chemical nature of pure cast-iron, of the Committee appointed to inquire into which he was a member, and also with experiments with a view to determine whether the specific heat of platinum was constant at high temperatures, and if so, to employ it in the construction of a standard pyrometer. He was also prosecuting his researches on the opium bases, and had already arrived at interesting results, which we believe will shortly be published. All the beforementioned researches display an enormous amount of manipulative skill, and there is little doubt that his success was mainly due to the wonderful acuteness of his powers of observation, and also to his great perseverance; but it is indeed surprising that, labouring under the physical disadvantages he did, he should have been able to attain such ends.

At a time when England can least afford it, she has lost one who had not only done a vast amount of valuable work, but who, there was every prospect, would do as much more in the future.

BRITISH EDIBLE FUNGI

MUSHROOMS and their congeners seem never have been in good repute since Agrippina employed one of the tribe to poison her husband, and Nero with villanous pleasantry called it the "food of the gods." With proverbial tenacity the bad name thus incurred has clung to the whole family of agarics, and what within certain limits might be called a wholesome dread has become a deep-rooted and irrational prejudice, excluding from popular use a really valuable class of vegetable esculents. We cannot altogether go along with those enthusiastic mycophagists who recognise a substitute for meat in every edible fungus, and dilate on the ozmazome and other nutritious properties of the tribe; but we readily acknowledge that their merits as secondary sources of food-supply have hitherto been unduly neglected. The great difficulty always felt in advocating the claims of the class to more extensive use has arisen from the want of some definite rules, some formula at once simple in expression and universal in application, by which to distinguish the noxious from the innocent members. Pliny, in his Natural History, goes so far as to say that the first place amongst those things which are eaten with peril must be assigned to agarics, and he expresses his surprise at the pleasure which men take "in so doubtful and dangerous a meat." But his observations show that fungi of all sorts, including even such growths as the *Fistulina hepatica*, were known to his countrymen and eaten by them without scruple. Indeed, in one particular the wisdom of the ancient Romans seems to have been superior to that of their descendants, for, while Horace lays down the rule—

Pratensibus optima fungi
Natura est; aliis male creditur—

the modern Ædiles of the Roman market condemn to instant destruction every specimen of the meadow mushroom (*A. campestris*) which comes within their reach. Although, however, it is not always easy to distinguish the wholesome from the unwholesome fungus, and the organs of sight and smell require some training before they can be wholly trusted in the matter, yet the dangers have been greatly exaggerated, and, as a matter of fact, hogweed is more often mistaken for parsnip and aconite for horse-radish than are *Boletus sátanas* and *Amanita verna* for their innocent brethren. No better opportunity for engaging in the study of this branch of natural history could be found than that which the present season affords; and if the treatises of Mr. Berkeley, Dr. Badham, or Mr. Worthington Smith be not at hand, the following notes on