

writer and other observers on the night of April 19, several brilliant meteors having been observed. If the computed time of the maximum for that night be correct, viz. 10h. 30m., it would not, of course, have been possible for observers situated near the longitude of Greenwich to witness the display in its entirety.

The Lyrid activity on the night of April 21, judging from Mr. Alphonso King's letter, appears to have been somewhat exceptional, and scarcely inferior to that observed on April 22. It may be interesting to note that the well-known continental observer, Prof. A. A. Nijland, states that the night of April 19, as well as that of April 20, was almost constantly and entirely overcast, and that not a single Lyrid was observed at Utrecht in 1903, though the night of April 21 was both clear and moonless. This negative result might have been anticipated from the forecast which appeared in NATURE last April.

JOHN R. HENRY.

Dublin, September 21.

Glow-worm and Thunderstorm ; also Milk.

In the *Daily News* of July 14 is printed an observation by a Mr. Haswell, of Handsworth, which bears the marks of genuineness, that during a thunderstorm a glow-worm extinguished its light for a second or a second and a half before each flash, relighting at an equal interval after the flash. May I ask if this has been noticed by anyone else?

It may also be worth while for someone to examine whether radium can assist milk to turn sour, or can otherwise influence organic processes of that kind.

OLIVER LODGE.

ILL-HEALTH OF THE RAND MINERS.¹

THE two official reports described in the footnote are not pleasant reading; it seems that the War Office is not the only culprit with regard to South African affairs, for the waste of life among the Transvaal miners from disease and accidents may fairly be described as appalling. But here, as in the case of the War Commission, the Briton is not afraid to wash his dirty linen in public, and for this he must be commended. The remedy for an ill will be discovered most speedily, if the symptoms are proclaimed widely and discussed freely.

The first document tells us that the death-rate among the natives employed at the mines on the Rand is 42 per 1000, which is extremely high. To see exactly what this figure means, we should compare it with the mortality rate of males of like age and occupation in this country; and no one can say that too favourable a case is taken if we choose, as a standard, the Cornish miner, who notoriously is a great sufferer from the ills which pertain to work below ground. Unfortunately, the official report does not state the mean age of the Rand miners, but it may be fairly assumed that the majority are young, and probably no great error would be made if their ages were taken as ranging from 25 to 35. In the years 1890-92 the mean annual death-rate of Cornish tin miners of 25 to 35 years of age was 8.06 per 1000, and for the men of 35 to 45 it rose to 14.32 per 1000. In brief, the death-rate of the natives employed at mines on the Rand is five times as much as that of the Cornish miners for the life-period 25 to 35, and nearly three times that of the men in the life-period 35 to 45.

The endeavour to cast some of the blame upon the natives themselves by saying that they fail to take ordinary common-sense precautions is ungenerous on the part of the author of the report. In matters of

¹ "Rand Mines (Native Mortality). Return of the Statistics of Mortality, Sickness and Desertion among the Natives employed in the Rand Mines during the Period October, 1902-March, 1903." Pp. 6 folio. (London, 1903.)

² "Report of the Miners' Phthisis Commission, 1902-1903, with Minutes of Proceedings and Minutes of Evidence." Pp. 147 folio and 7 appendices. (Pretoria, 1903.)

hygiene, the natives must be regarded as children and treated as such. The blame for the ill-health of the native must in the main lie at the door of the British employer. It is satisfactory, however, to learn that the present heavy death-rate on the Rand is regarded as exceptional.

The second document is a Blue-book containing the report of a Commission appointed by Lord Milner to inquire into the disease commonly known as miner's phthisis. Judging by the facts and figures brought forward, the inquiry has taken place none too soon. The Commissioners report "that the disease prevails to a very great extent, and that a high mortality is due to it." Carefully prepared medical evidence shows very plainly that the malady is silicosis pure and simple, a dust disease. The miner inhales sharp, angular particles of quartz, and these cause such irritation that the lung tissue undergoes a change and gradually becomes incapable of carrying on its respiratory functions. At the end of a few years, often only six or seven, so large a proportion of the lungs is rendered useless that the man dies. The age at death of many of the victims is only about 35 years. In the majority of cases there is no tubercular phthisis added to the silicosis. As might be expected, the men working rock drills are the greatest sufferers, and especially in places where the holes are bored upwards without any water.

The remedies suggested by the Commissioners are sprays and jets of water to prevent and keep down the dust, and some of the witnesses advocate the use of respirators, which are already being employed to a certain extent. The Commissioners are of opinion that experience is needed before deciding how water can be best applied.

Though dust is the worst evil affecting the miner on the Rand, it is not the only one. Analyses show undesirable proportions of carbonic oxide in what is called "normal mine air under ordinary working conditions." This noxious gas is generated mainly by the dynamite and other explosives, but also in some cases by heat acting upon the lubricant during the compression of the air used for working the drills. Mine-managers are often unaware of this latter source of danger. Mr. E. Hill, in a paper read before the American Institute of Mining Engineers, puts the matter very plainly by saying, "Workmen at the front, instead of receiving pure, cool air from the exhaust of the drills or other machines, breathe a foul, stupefying, and sometimes fatal, mixture."

The Transvaal Commissioners deserve much credit for the painstaking inquiry which they have made, and the lessons taught by it should be taken to heart by English mine-owners, for both Dr. Ogle and Dr. Tatham in their well-known reports have pointed out that the Cornish tin miner is a great sufferer from his dust-producing occupation.

PHOTOGRAPHY AT THE NEW GALLERY.

THE forty-eighth annual exhibition of the Royal Photographic Society is, in general arrangements, much like its predecessors, and shows very little evidence of this being the jubilee year of the Society. In the scientific and technical division the only difference that we notice is the reappearance of several exhibits that have been seen before, and the presence of a few isolated frames of examples from the Society's own collection. We understood that the Society's fine historical collection was to have been on view in its entirety, and feel much regret that advantage has not been taken of this opportunity for its display.

The fact that many of the exhibits are old and already well known gives especial value to the present

collection, and that value would have been much enhanced if the scientific section had been subdivided into definite sections, and the order in the catalogue had corresponded to the order on the walls, as we have previously advocated. But the student will be well repaid for the trouble that is imposed upon him of sorting out the exhibits for himself.

Telephotography, or, as we prefer to call it, large-image photography—for the only function of a telephotographic lens is to enlarge the image before it falls upon the sensitive surface, and whether the original image is small by reason of the distance of the object or because of its size makes no difference—is better represented probably than ever before. The well known "Mont Blanc," by M. Fred. Boissonnas, is on view again, also an early telephotograph by the late Prof. W. K. Burton, of interest because of its age. But the most striking and new applications of this kind of work are shown by M. Fred. Boissonnas of enlargements of telephotographs. He gives several examples in sets of three:—(1) a photograph with an ordinary lens; (2) with a telephotographic lens; (3) an enlargement of the latter, the proportional sizes being approximately as 1 : 5 : 24. Thus a measurement of one inch on the first becomes two feet on the last, and the detail, vigour and general quality of the enlargements are surprising, and demonstrate the fine quality of the image given by the telephotographic lens.

The gradual changes that take place during rapid movement or slow development are well represented by three new series. Sixteen radiographs showing the various stages in the incubation of a pigeon's egg, by Mr. M. W. Martin, enable one to trace the process very clearly, the first appearance of blood vessels and of the beak being quite marked, and the final packing of the two parts of the shell together ready for removal from the nest by the old bird fitly completes the series. Mr. Martin also exhibits a beautifully made series of forty radiographs illustrating the evolution of the common frog, appropriately finishing with an old frog which has broken its leg. The life-history of a splash is well shown by Mr. A. C. Banfield in a series of thirty-six photographs.

Colour work is not so much in evidence as it was at the last two or three exhibitions. We have no opportunity of judging whether any appreciable advance has been effected, because in no case is the original object shown with the photograph. For this reason many of these exhibits have no value, for we do not need at the present day any proof that photographs in colour can be produced.

Photomicrography is well represented. The student will probably be specially interested in Mr. Spitta's "small garden spider," $\times 20$, taken with a 50mm. planar, as a fine example of low-power work; the fourteen photographs of test objects, ranging up to a magnification of about 4300, also by Mr. Spitta, and Mr. Albert Norman's series of photographs of different bacilli.

We have not space to do more than mention the fact that the exhibition includes astronomical and spectroscopic photographs, as fine a series of photographs from balloons as, probably, has ever been brought together, photographs of many kinds of animals, birds, reptiles, insects, fishes, flowers, and plants; photographs in mines and quarries and dark factories, illustrations of waves and ripples and lightning, and many splendid reproductions by many different processes. The science of photography itself is represented by photomicrographs of film sections by Mr. Edgar Senior, including multiple films, and a Lippmann's colour photograph showing a very large number of layers of deposit due to the stationary waves, and Mr. Watkins's demonstrations of the validity of his time method of development.

NO. 1770, VOL. 68]

NOTES.

THE fund established by Mrs. Elizabeth Thompson, of Stamford, Connecticut, "for the advancement and prosecution of scientific research in its broadest sense," now amounts to 26,000 dollars. As accumulated income will be available in January next, the trustees desire to receive applications for appropriations in aid of scientific work. Preference will be given to those investigations which cannot otherwise be provided for, which have for their object the advancement of human knowledge or the benefit of mankind in general, rather than to researches directed to the solution of questions of merely local importance. Further particulars can be obtained from the secretary of the Board of Trustees, Dr. C. S. Minot, Harvard Medical School, Boston, Mass., U.S.A. It is intended to make new grants in January, 1904. Decided preference will be given to applications for small amounts, and grants exceeding 300 dollars will be made only in very exceptional circumstances. The following list of grants for 1902 has not previously been recorded:—125 dollars to Dr. F. T. Lewis, Cambridge, Mass., for investigation of the development of the vena cava inferior; 150 dollars to Prof. Henry E. Crampton, New York, for experiments on variation and selection in Lepidoptera; 100 dollars to Prof. Frank W. Bancroft, Berkeley, Cal., for experiments on the inheritance of acquired characters; 250 dollars to Prof. John Weinzirl, Albuquerque, N.M., for investigation of the relations of climate to the cure of tuberculosis; 300 dollars to Prof. H. S. Grindley, Urbana, Ill., for the investigation of the proteids of flesh; 300 dollars to Dr. Herbert H. Field, Zürich, Switzerland, to aid the work of the Concilium Bibliographicum (an additional grant of 300 dollars was made June, 1903); 250 dollars to Dr. T. A. Jaggar, Cambridge, Mass., for experiments in dynamical geology; 50 dollars to Prof. E. O. Jordan, Chicago, Ill., for the study of the bionomics of Anopheles; 300 dollars to Dr. E. Anding, Munich, Bavaria, to assist the publication of his work, "Ueber die Bewegung der Sonne durch den Weltraum"; 300 dollars to Prof. W. P. Bradley, Middletown, Conn., for investigations on matter in the critical state; 300 dollars to Prof. Hugo Kronecker, Bern, Switzerland, for assistance in preparing his physiological researches for publication; 300 dollars to Prof. W. Valentiner, Heidelberg, Germany, for observations on variable stars.

PROF. VON BEHRING is reported to have brought before the Medical Congress at Cassel some new conceptions regarding tuberculosis. The fundamental idea of his theory is that tuberculosis in animals and in man represents different varieties of the same disease, and that it is transferable by the agency of tuberculous milk; in these respects he is in direct opposition to Prof. Koch. He distinguishes between adults and infants, maintaining that the former may as a rule safely partake of unsterilised milk, while infants are particularly liable to infection from that source, and he holds that infection may take place many years before the disease becomes manifest. Prof. Behring is now engaged in experiments upon new-born animals with the view of testing the possibility of rendering them immune against tuberculosis by supplying them with a suitable solution of tuberculous virus in the food. He is further inclined to believe that the milk of cows which have been rendered immune contains prophylactic elements which it will be practicable to employ in the treatment of the disease in human beings.

THE death is announced of M. A. Certes, formerly president of the French Zoological Society. M. Certes carried out numerous delicate researches on bacteria, and presented several memoirs to the Paris Academy of Sciences.