

### A Green Sun.

I WAS looking, a few days ago, at three o'clock in the afternoon, towards the sun, which was shining in a clear sky. Exhaust-steam from an engine employed in the new Thames Tunnel works, and situated just below my window, was passing intermittently over his face. Many puffs had already crossed it, some partially, others completely obscuring the luminous disk, when presently, three puffs, following each other quickly, successively covered the sun, which then shone brightly through the steam with a vivid light-green colour. The effect was strikingly noticeable, and the green colour intense. I watched for twenty minutes, but in vain, for another "green sun," and at 3.30 clouds came up.

I have since tried to reproduce the same effect by observing the arc lights in Cannon Street Station through steam rushing upwards from the safety-valve of a locomotive. Seen through the thickest part of such a column of vapour, the electric light exhibits a deep red colour, and I *think* there is a green transmission near the edge of the column; but the latter was unsteady, while the point is evidently critical, and it is impossible to say positively that it was so.

D. PIDGEON.

Holmwood, Putney Hill, February 11.

### RABIES AMONG DEER.

THAT all domesticated or semi-domesticated mammals succumb to inoculation with the virus of rabies has long been asserted, and examples of its occurrence have been duly recorded. The possibility, however, of the disease affecting half-wild animals seems to have been lost sight of, and it was therefore with much surprise on the part of the public that the announcement was received last year of the deer in Richmond Park being attacked by the malady.

Apart from the general interest attaching to the welfare of the public using the parks in which these animals are kept, and beyond the special interest felt by the veterinary profession in the clearing up of the diagnosis of this strange and novel condition, the outbreak was of importance as affording a fresh opportunity of investigating the character of the malady under, as it were, new circumstances, and hence we find in the reports of this epizooty recently furnished to the Privy Council by Mr. Cope and Prof. Horsley, many points which fill up certain blanks in our scientific information on the subject.

The prevention of rabies in all animals we have shown before to be the simplest task imaginable for the health authorities of this country to undertake, and nothing illustrates this more clearly than the history of the recent epidemic, which attracted so much notice on account of its excessive mortality, and which terminated by causing the local mischief which forms the ground of this article.

It will be remembered that in 1884 rabies began to increase in the London and home counties districts. No notice being taken of its spread, it soon produced a severe effect, when in 1885 the numerous deaths (twenty-seven) among human beings caused a popular panic, and led the authorities to institute measures for its repression. The authorities in the London district having provided for the merciful extirpation of stray dogs, the familiar vehicle of the disease, secured the non-transmission of the virus by enforcing the use of muzzles. The result of their work during 1886 has been seen during 1887, in the practically total immunity of the population of this great city from this the most justly dreaded of all diseases. Let us not forget to add in passing that as was pointed out at the time of the expiration of the local regulations by those acquainted with the malady, that the measures being but local could only produce a temporary relief from the evil, since the metropolis was continually being infected from districts beyond the reach of the regulations, and that though it could be kept free for a time, yet reintroduction of the virus would certainly occur, and the work would have to be done all over again. This is actually now happening,

though not yet officially declared. The disease has re-appeared (as it has usually done) in the southern suburbs, and is gradually making its way into the metropolis.

But to return. The epidemic of 1885 terminated in the London district with the infection of the roe deer in Richmond Park, resulting in the extermination of several hundreds of these valuable and pretty animals. From Mr. Cope's interesting report it appears that the first to be seized was a doe which had a suckling fawn, and as we learn from the very valuable evidence of Mr. Sawyer, the head-keeper of the Park, it seems that under these circumstances a doe will attack a dog attempting to worry the herd, as a rabid dog passing through the Park would do. Fortunately in the Richmond case no instance occurred of the transmission of the disease from the deer to man through the dog as in an outbreak recorded in 1856 at Stainborough. Had this happened, the deaths of the deer would not have been attributed to various causes, poisoning, &c., as they now were until the remarkable aggressiveness of the affected animals led to a thorough investigation by the veterinary advisers of the Government. Rabid deer were sent for observation to the Veterinary College, and the symptoms noted. The exact determination yet remained to be made, and, thanks to the recent researches of M. Pasteur, this was now possible. Portions of the central nervous system from these animals were sent to the Brown Institution, and there inoculated by Prof. Horsley into rabbits by the subdural method. These animals died after exhibiting the characteristic symptoms of rabies, and after death the usual *post-mortem* appearances were duly discovered. More infected deer were sent also to the Brown Institution, and the extraordinary changes effected by the disease more closely studied. This kind of deer, naturally gentle and timid, was transformed into a fierce and savage animal, rivalling the rabid horse almost in its attempts to do mischief. The early symptoms, as in all animals, appear to have been indicative of mental hallucination, for the animals would stop feeding, hold up their heads, sniff the air, and then, without the slightest reason, burst into a gallop. When placed in confinement the least noise attracted their attention, and later—*i.e.* on the second and third day—caused them to charge in the direction of the sound. The mental perversion which leads a rabid dog one moment to lick with almost frantic energy a healthy dog placed with it, and then the next moment to violently bite it, finds its parallel in the deer similarly affected, for these animals in a like manner licked their companions, and then ferociously attacked them, seizing them with their jaws (usually about the shoulders) and tearing off hair and pieces of skin. The points thus inoculated with the virus after cicatrization became, as is almost invariably the case, the seat of intense irritation when the disease actively showed itself; hence one of the most prominent signs presented by the animals was that of their rubbing themselves with such force as to make these parts raw. In connection with the differences which are now known to be characteristic of the same disease in different classes of animals, it is interesting to note that in all large animals, whatever be the previous temperament, the course of the malady is closely identical; thus in the horse, the ox, the sheep, the pig, the deer, &c., the illness is rapid, there is great aggressiveness, and yet early paralysis. It is of common knowledge that in the dog these two latter features are sometimes widely separated. The paralysis may set in so soon as to obliterate aggressiveness, and thus a distinct form (dumb) of rabies be produced, though of course the aggressive form of the disease always ends in paralysis if not suddenly arrested by syncope. In the deer the combination of the two symptoms seems to have been very equal. For even when the animal had fallen down from paresis (of the hind-limbs more especially) it would nevertheless spring up and attempt to seize and worry with its teeth every person or object



coming within its reach. The complete metamorphosis of the usual temper of the animal is of course only to be explained by profound mental disturbance, exactly as seen in the human being. We have alluded to the mode of transmission of the disease—viz. through the saliva. This mode was put to direct experiment by an infected animal being placed with a healthy one which had been isolated for some time, and the incubation period was determined in this instance to be nineteen days, the comparative shortness of the period being no doubt due to the very numerous points of inoculation. An interesting and confirmatory circumstance of the reality of this method of transmission was afforded by the fact that so long as the bucks retained their horns they were able to literally stave off infection, but as soon as these natural means of defence fell off at the usual periods, both sexes suffered alike.

The mode of death seems in all cases to have been ultimately cardiac failure, which supervened frequently before the customary coma, the final stage of paralysis, was developed. Relatively, syncope occurred much more frequently than it does in the human subject, and *a fortiori* than it does in the dog, a circumstance explicable by the necessarily extremely fatiguing nature of the fits of excitement to which deer are evidently specially liable in the early development of the disease. According to Prof. Horsley's pathological report, both macroscopic and microscopic appearances of the affected tissues revealed the usual lesions which are symptomatic of rabies. This last fact is a healthy sign of scientific progress, for any layman who has sought to obtain from books or verbal statements made by those justly recognized as being qualified to speak with authority on this subject must have been disappointed with the uncertainty of knowledge which has prevailed respecting the morbid anatomy of rabies up to the present time. The obscurity which existed on this point was aggravated no doubt by the absurd popular superstitions connected with the disease, and by the failure to recognize that it was simply a very severe kind of one of the acute specific maladies. From the latter cause especially has confusion arisen, since it will be found that previous records of the *post-mortem* appearances fallaciously comprehend the examination of animals dying at all possible stages of the malady. But now we know these points accurately; and as in this particular case the subject has been so thoroughly worked up, there will be scarcely any excuse for the disease escaping immediate recognition and adequate treatment.

Here we cannot help pointing out what a very grave injury is inflicted on the public by the vexatious operation of the so-called Vivisection Act, which prevents the veterinary inspector from at once resorting to M. Pasteur's admirably simple and conclusive method of testing the real condition of any animal killed under the suspicion of rabies. Under the present *régime* valuable time is lost, and risk incurred of the inoculative material becoming useless from decomposition, &c., by reason of his being compelled to forward it to some such institution as the Brown for examination. The very valuable observation recently published by M. Pasteur's assistant Dr. Roux, that the immersion of the tissue in a mixture of glycerine and water prevents septic change, but does not mitigate the influence of the virus, to a slight extent obviates part of the difficulties and inconvenience just noted, but the anomaly still remains that, while the immense value of the experimental test has received the full recognition of the recent Committee of the House of Lords, the law does not permit it to be used except in one, or at the outside two places in Great Britain, which have with the usual difficulties and obstruction succeeded in obtaining the necessary permission. No one perhaps supposes that the benefits which science offers to the public will ever be received with anything like adequate acknowledgment of the difficulties, and it may be dangers, which

have attended this or that particular discovery. But we think that it cannot be recognized by the mass of the people who actually or theoretically direct the Legislature by their votes, that, while they eagerly reap the benefits of the harvest of science, at the same time they permit that harvest to be choked by the tares of legislative obstruction, and thus very greatly diminish the profits which would otherwise be theirs.

Just as we are much behind other nations in the foundation of technical instruction, so we are being fast outstripped in the provision for means for the scientific investigation of matters which, like the one we are now considering, greatly concern the public welfare. We believe it to be a fact that at the present moment neither of the two great Government Departments which are concerned in the scientific arrest of national disease, viz. the Privy Council and the Local Government Board, have any laboratory whatever at their disposal, and consequently are obliged to seek the necessary accommodation in private institutions; or, to put it in plain language, the Government is not ashamed to get its public work done by the favour of private means. The Berlin Laboratory and the Pasteur Institute should serve as the kind of example which a statesman whose desire for the improvement of the country and the people is not a question of votes but of genuine interest might study with advantage.

Those gentlemen, unfortunately few in number, who represent science at the present moment in Parliament, would have a large field of good work open to them if they attempted to reform this state of affairs by adjusting the advantages and assistance offered by science to the real needs of the nation. At present the actual opinion of the scientific world on any subject of special interest is usually only extracted with difficulty by evidence before a Select Committee. It would be very easy for the scientific members of the House to concentrate their force by previous meeting and organization, and so to give weight to that side in a debate which was truly working for the best solution of any national problem involving health and disease. In former years, the opinion of unscientific persons has been sought on the subject of rabies as being of equal weight with the assured observations of scientific experts. This lamentable state of things has led to the present condition of our legislation against this disease, under which the malady is but temporarily, if readily, stamped out in one district alone; this same district becoming infected again from neighbouring parts of the country as soon as the regulations are withdrawn. There is no doubt from the minutes of the Lords Committee on Rabies, that the Report of that Committee was drafted in this unfortunate manner owing to the influence of Lords Mount-Temple and Onslow, who, in their speeches and writings, have afforded numerous evidences of their complete want of scientific knowledge of the nature of the disease, and who, consequently, have failed to grasp the most obvious way in which it can be extirpated—namely, the universal application of preventive legislation. Mistakes of this kind, it seems to us, would be utterly prevented by combined action of the scientific members of either House, and if, as is sometimes our unfortunate duty, we have to chronicle ill-advised measures of suppositiously scientific officialism, let us hope they will not have passed out into law without a strenuous protest from the *united* voice of "our representatives."

#### THE COMING OF AGE OF THE "JOURNAL OF ANATOMY AND PHYSIOLOGY."

DURING the past summer there was established (as our readers have been informed), under the title of the "Anatomical Society of Great Britain and Ireland," a new brotherhood of anatomists; and the adoption by