

results true hæmoglobinæmia followed by hæmoglobinuria." Parasitic, osmotic, and chemical actions having been excluded as causes, it seems to the authors "most probable that black-water fever is due to some specific hæmolysin arising within the body" as the result of certain conditions, induced by repeated attacks or infections by malaria. The hæmolysin is believed not to be derived from the malarial parasites themselves, but to be thrown out by the cells of the body in response to stimulation, as a result of the constant phagocytosis of red cells. "If hæmolysins are formed against the blood there seems no agent so likely to effect this as the endothelium." The prophylaxis of black-water fever is "simply the prevention, as far as possible, of malarial infection, and the prompt and efficient treatment of this disease." In the palliative treatment of black-water fever the authors wish to show that "there are excellent reasons for believing that good results may be expected from serum-therapy."

The Government of India is greatly to be congratulated on the enlightened manner in which it aids forward the production, and undertakes the publication, of important and valuable investigations of this kind.

ANIMATED PHOTOGRAPHS IN NATURAL COLOURS.

THE production of photographs in colour by means that may fairly be described as photographic is now quite common. Though the simple method of getting pigmentary colours in the picture by the direct impact of the coloured lights proceeding from the object has not been, and may never be, realised, except, perhaps, to a certain extent by very prolonged exposures, the indirect three-colour process in its numerous modifications has thoroughly established itself as a quite practical method. It is natural, therefore, that endeavours to get kinematograph views shown on the sheet in natural colours should follow on the same lines that have made such great successes possible in single photographs.

Three-colour projection involves the taking of three negatives and the making from these of three suitably coloured positive transparencies which may then be superposed to form a single coloured transparency, or, using suitable colours, projected by three lanterns separately upon the screen and superposed there. The latter method would obviously commend itself in kinematography, because of the difficulty, if not the impossibility, of uniting three long strips into one, maintaining correct superposition from one end to the other. Besides, three lanterns would obviously give a good illumination on the screen more readily than one lantern. Many attempts, or at least suggestions, for it is difficult to know whether a verbal description really means anything more, have been made in this direction. Mr. G. Albert Smith, in a lecture recently given at the Royal Society of Arts, described the difficulties he met with in a really practical and persevering attempt, in conjunction with Mr. Charles Urban, to succeed on these lines. There was not only the difficulty of photographing with the necessarily short exposure through the red screen, which was eventually overcome, but the practical impossibility of getting correct, or even passably correct, registration of the three pictures on the screen. This is a very different problem in kinematography from the production of a single three-colour picture. Obviously the three series of photographs must be taken simultaneously, and although the three kinematograph cameras may be synchronised, as they are necessarily somewhat bulky, the three points of view must be separated, and this introduces differences in the pic-

tures analogous to the differences between the individuals of a stereoscopic pair. But this is not the only difficulty. It is comparatively easy to get three pictures on the screen from three lanterns or a triple lantern correctly superposed when the lanterns are quite still; but it is a very different matter in the case of kinematograph projection apparatus, for here the film runs through it in a series of rapid jerks, and the slightest movement of the apparatus produces a very much increased effect on the screen, because of the very considerable magnification necessary. Mr. Albert Smith describes the result of his best attempts as "unbearable confusion."

All the mechanical difficulties of registration, and the dissimilarity of the photographs taken from three points of view, are done away with by using one film only and allowing the three coloured images to alternate. This has, further, the very great advantage of simplification, for the apparatus for taking and projecting is single only instead of three-fold. Of course, the film must pass more quickly through the apparatus, as it requires three pictures to form the single complete impression instead of one. The difficulties of this are obvious in a general sense, and it also means a shortening of the exposure time in taking the pictures, a disadvantage especially with the red and green screens. Still, the method was successful, but Mr. Albert Smith found the colours to be "washy and ineffective." It is not obvious why this must needs be so; probably the defect might have been remedied, but Mr. Smith applied himself to further simplification, and aimed, in spite of theory, at reducing the colour records to two. In this he has been surprisingly successful, as his demonstrations show. It is not easy to follow his reasoning as to the most suitable colours, but as a matter of fact it seems that he uses a red inclining to orange and a green inclining to blue. The two colour screens are on a disc that rotates in front of the lens so that each alternate picture is taken and afterwards projected through the one colour. Thus the ordinary apparatus is available by the addition of the rotating disc that carries the colour screens, there is no difficulty with regard to registration, and the increase in speed of working, as compared with the ordinary kinematography, is doubled only instead of tripled. Doubtless there are imperfections in the colours, but the same may be said of all three-colour work. It has, however, been demonstrated that greys are fairly well reproduced, and that there are no striking errors even in such compound colours as purples. A comparison of the results so obtained with an autochrome slide made of the same view shows practically no difference to the ordinary observer. We may therefore say that Mr. Albert Smith's method is not only very good as a first step towards kinematography in colours, but that it is a really practical method.

PROF. H. G. SEELEY, F.R.S.

THE death of Prof. H. G. Seeley, which took place at his residence on the morning of January 8, makes a big gap in the ranks of the comparatively small body of British vertebrate palæontologists, among whom the deceased professor was entitled to rank as the *doyen*. Born in London in February, 1839, he seems to have acquired literary and scientific tastes at an early age, and in the 'sixties we find him established at Cambridge, where he was taken up by the late Prof. Adam Sedgwick, and employed to work at the fossil vertebrates then being rapidly accumulated in the Woodwardian Museum, and likewise to lecture on geology when the aged professor was incapacitated from doing so by infirmity or illness. It was at this time that the so-called coprolite diggings

were in full swing in the neighbourhood of Cambridge, and Seeley was to the fore in bringing to light what was to a great extent a new Mesozoic vertebrate fauna, albeit one of which the remains were for the most part in a sadly fragmentary condition.

This was, in fact, the first of Seeley's two great opportunities in this field of research, and he undoubtedly made the most of it, for it is to him that we owe the first discovery of birds in Cretaceous strata—birds which, as Prof. Marsh subsequently showed, retain evidence of reptilian affinity in the possession of a full series of teeth. Much information was likewise acquired at the same time in regard to the structure of pterodactyles, of which numerous remains were obtained in the coprolite workings. The results of these studies were published in a somewhat bald form in a preliminary "index" to the remains of Mesozoic birds and reptiles in the Cambridge Museum.

Although entered as a student at Sidney Sussex College, Seeley never took a degree, and soon after Sedgwick's death he left Cambridge for London, where in 1876 he was appointed to the chair of geography at King's College. In the same year he was chosen professor of geography and geology at Queen's College, London, while five years later he was appointed dean of the college. In 1890 he commenced lecturing on mineralogy and geology at the Royal Indian Engineering College at Coopers Hill, and a year later was appointed to fill the post previously held by Prof. Martin Duncan. Finally, in 1896, he became professor of geology and mineralogy at King's College. As if all this was not work enough for any man, he likewise conducted for many years the excursions of the London geological field class.

In 1862 Prof. Seeley was elected a Fellow of the Geological Society, and in 1879 he was admitted to the fellowship of the Royal Society, while in 1905 a fellowship at King's College was awarded him. He served on more than one occasion on the council of the Geological Society, from which body he also received a medal. The honorary memberships of foreign scientific bodies accorded in honour of his labours are too numerous to mention on this occasion.

The second great opportunity in his career came in 1889, when, under the auspices of the Royal Society, Seeley started for South Africa in order to collect and study the remains of the marvellous anomodont reptiles which render that country of such intense interest to the palæontologist. On his return, he spent a large amount of time and labour on working out his collections, many of the results of these studies being published by the Royal Society in its Transactions. As each section of the work was completed, such specimens as were his own property were presented to the natural history branch of the British Museum, where they form some of the most prized treasures of the fossil reptile gallery.

In this investigation Prof. Seeley definitely recognised the intimate relationships existing between the anomodont reptiles and the lower mammals, a matter on which previous writers had displayed some degree of hesitation and wavering. If he had done nothing else, his claims to a high place in the records of palæontology would have been fully established by the recognition of this one great fact. For the trend of all subsequent work has been to emphasise the intimacy of this relation between mammals and the anomodonts.

In several respects Prof. Seeley was unlike other men, so that his work can scarcely be judged by the ordinary standards, and the time for a final judgment has not yet arrived. That palæontological (to say nothing of geological) science has lost a student with an almost superhuman store of knowledge is, however, admitted by all.

R. L.

NOTES.

ON December 31, 1908, Mr. H. B. Woodward, F.R.S., retired from the Geological Survey of Great Britain, after more than forty years' service. His post as assistant to the director has been taken by Dr. A. Strahan, F.R.S., and the vacancy in the district geologists thus created has been filled by the promotion of Mr. George Barrow.

A POLL has been taken of the proprietors of the London Institution in connection with the proposal to amalgamate the institution with the Royal Society of Arts. The result shows that the majority of the proprietors are in favour of the scheme for the amalgamation of the two societies. A meeting of the board of management of the London Institution is therefore being held as we go to press to consider the next step to be taken.

PROF. J. ARTHUR THOMSON, of Aberdeen University, has been invited by the lecture committee of the South African Association for the Advancement of Science to give the "South African Lectures" for 1909. The lectures are to be delivered in August and September in Johannesburg, Pretoria, Bloemfontein, Kimberley, Cape Town, Grahams town, and Durban, and at the request of the committee they will have special reference to the Darwin centenary. The previous lecturers were Prof. Raleigh, Magdalen College, Oxford, and Mr. Herbert Fisher, New College, Oxford.

THE Paris correspondent of the *Times* reports that on January 6 the driver of the Côte d'Azur express was attacked by an eagle while the train was proceeding from Chalon sur Saône to Fontaines station. The bird, which measured 2 metres across the wings, flew into the cab of the engine, and was only overcome after a severe struggle.

WE regret to notice in *Science* the announcement of the death on December 19, 1908, at the age of fifty-eight years, of Prof. Thomas Gray, professor of dynamics and engineering at the Rose Polytechnic Institute, and distinguished for his work in these subjects.

WE regret to see the announcement of the death, on December 25, 1908, of Major Percy B. Molesworth, R.E., in the forty-second year of his age. He died at Trincomali, Ceylon, where he had been stationed for some years. Major Molesworth was one of the most careful and assiduous of planetary observers, especially of Jupiter and Mars. He published in the Monthly Notices of the Royal Astronomical Society a long series of observations of Jupiter made in 1903-4, and recorded what appears to be a unique instance of perceptible change on the planet's surface in the course of a few minutes. He made a series of observations, amounting to many thousands, of transits of spots on the planet, the results of which were published in the Memoirs of the British Astronomical Association, of which he was one of the most devoted members of the observing sections. He made a fine series of observations and drawings of Mars, extracts from which were published in the Monthly Notices, the full report being placed for reference in the library of the Royal Astronomical Society, of which society he had been a fellow since 1898. He was a member of the British Astronomical Association from its foundation.

A MEDICAL congress, due to the initiative of Sir George Clarke, the Governor, is to be held in Bombay, and will begin on February 22. On the opening day Sir George Clarke will deliver the presidential address, and the sectional meetings will last during the next four days. There will be an exhibition of medical, surgical, and sanitary