

does not say who manufactured the plates which he used; but they measure four by five inches. With a steady, diffused glow on an arch he has had very fair success, with an exposure of between forty seconds and five minutes. With a greatly agitated, curtain-like display, and an exposure of only one minute, he lost all detail. But a very sharp picture was secured, with an exposure of six seconds, of one end of an arch, which was composed of radiant streamers; the structure is distinctly shown. The pictures were obtained between Jan. 4 and Feb. 1, this year. On the night of Feb. 13-14, a heavy snow-storm prevented observations of the famous aurora of that date; but, as has already been mentioned, a remarkable magnetic disturbance was recorded by the needles.

The scientific world will wish Dr. Brendel good luck in his future endeavors, and will watch eagerly to see whether he finds it practicable to determine the parallax of auroras by this method.

JAMES P. HALL.

Brooklyn, N. Y., Oct. 8.

BOOK-REVIEWS.

The Horse: A Study in Natural History. By WILLIAM H. FLOWER, Director of the British Natural History Museum. New York, D. Appleton & Company.

THE "Modern Science Series," edited by the distinguished scientist, Sir John Lubbock, is not primarily designed for the specialist, nor, on the other hand, for the class of readers that reads merely to be entertained. It attempts rather to supply accurately, yet in language divested of needless technicalities, such information as is needed by everyone who desires to keep fairly abreast of the progress of modern knowledge.

The name of the author of the present volume is in itself a guarantee of the accuracy and interest of its contents, and in the reading we are not disappointed; for within 204 short pages the

horse and its relations to nature are presented in a sketch which is at once attractive and thorough.

In the first chapter the ancestral relations of the horse are especially considered; the second chapter discusses chiefly the horse's living allies; while the third and fourth chapters are devoted to structural features. But what adds unusual interest to the book is that the bearing of the facts upon the origin of the horse is in every chapter constantly kept in view. "The anatomy and history of the horse are . . . often taken as affording a test case of the value of the theory of evolution, or, at all events, of the doctrine that animal forms have been transmuted or modified one from another with the advance of time, whether, as extreme evolutionists hold, by a spontaneous or inherent evolving or unrolling process, or, as many others are disposed to think, by some mysterious and supernatural guidance along certain definite lines of change."

The conclusion is forced home to the reader that the horse is a very highly specialized type derived from a generalized ancestor by slow and gradual change, or evolution. The one-toed animal was once five-toed, and its heel was less raised above the ground than now; its teeth were once fitted for a much wider range of diet; its neck was short and a collar-bone, now absent, was once present; its tail was long; its brain — and especially the cerebrum — was small; instead of the open plain, it frequented the shady or often marshy borders of lakes and streams.

The various pages in the history of this evolution are presented as they have been recorded in the book of nature till at last the genealogy is traced back to the five-toed and otherwise generalized type, *Phenacodus*, of early Eocene age.

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