impaired and its conclusions discredited. The experiment at Stanford University is now in its second year, and, thus far, has met with very general approval, at least so far as the writer's knowledge goes. By this plan, the initiative of the president is sought to be preserved, but he is provided with a board of counselors, representative of the faculty, to advise him in the most important of his administrative acts. This influence can not amount to a veto unless sustained by the trustees, while it all the time cooperates with him by keeping him in constant touch with representative faculty opinion which has been carefully considered and formulated.

Certain purely administrative functions are placed under the control of the president rather than under the faculty. Such are the maintenance of discipline, the conduct of athletic, social and literary student activities, and public health. The president appoints committees from the faculty to assist him in these functions and the membership of these committees is also subject to the approval of the advisory board.

Other committees dealing with strictly academic questions are directly under the control of the academic council and answerable to the council.

The Executive Committee of the council is entrusted with much of the work which consumes so much time and energy at frequent and long-drawn-out faculty meetings at many universities. It consists of the president of the university, the vice-president and the registrar, as *ex-officio* members, and ten other members, two from each of the five department groups, elected by the council, much as the members of the advisory board are elected. The executive committee appoints the other standing committees of the faculty and controls their policy, subject to the approval of the academic council, and subject to instruction by the council.

The teaching force of each department of the university is organized as the *Department Faculty* under the chairmanship of an executive head appointed by the president, with the approval of the advisory board. The department faculty conducts the internal affairs of the department, subject to the control of the academic council in such matters as involve relations with other departments, and with the university at large.

The academic council thus controls through its various committees and departmental faculties the educational policy and machinery of the university, the president's influence herein being conserved by his position as presiding officer of the council and of its executive committee. Speaking generally the whole idea of the organization is to commit the business of the university in all its activities to the direction of those who are most qualified experts, to preserve the initiative and influence of the trustees, president and faculty within their respective spheres, to protect the rights and privileges of all arms of the university authority, and to insure, in so far as may be, the interests of the whole university as paramount to the interests of any one factor.

John Maxson Stillman.
Stanford University.

Scientific Books.

Flashlights in the Jungle: A Record of Hunting Adventures and of Studies in Wild Life in Equatorial East Africa. By C. G. Schillings. Translated by Frederic Whyte, with an introduction by Sir H. H. Johnston. Illustrated by 307 of the author's untouched photographs taken by day and night. Pp. xxii + 782. New York, Doubleday, Page & Co. 1906.

Herr Schillings's work on the wilderness of East Africa, called in its latest English edition 'Flashlights in the Jungle,' should interest a wide class of readers, but in particular

the naturalist and all who find the truth about animals often stranger and always infinitely better than fiction. One should not look here for biographies or detailed studies of any of the animals, nor for a critical analysis of their behavior, nor, indeed, for a hint of many of those problems which appeal most to a philosophic naturalist of the type of Darwin, or Wallace, and the author's zoological training is evidently not that of the schools. His frequent reference to 'my genus' and 'my species' takes us back to a period when the aims of natural history were too apt to reach a climax in the discovery of new forms. But we should not expect everything of a hunter of big and dangerous game, who is a good field naturalist in the bargain.

Taking it all together this author's accomplishment is remarkable, whether considered as a record of travel and adventure, as a portrait gallery or rather as a panorama of the great world of animal life under the equator, or as the journal of a field-naturalist whose sole object, as he tells us, was to study the lives of the animals.

It should be added that this narrative is not the only outcome of Herr Schillings's labors, for aside from the discovery of many plants and animals, ranging from giraffes and antelopes to insect-parasites, and including several species of birds, he was the first in recent times to take alive to Europe the East African rhinoceros, the white-bearded gnu, and other interesting denizens of the velt; he himself collected, and, at his private expense, with the help of a large caravan, prepared and forwarded to Berlin, and to the museums of other German cities, thousands of the skins, skulls and skeletons of the vanishing fauna of the great East African velt, besides collecting embryos and other anatomical or biological material.

This signal work has been achieved literally through the sweat of his brow, with the help of a physical constitution happily more than a match for the fevers which often laid him low, with the aid of a private fortune which seems to have been ample—in the famine year of 1899 his provisions alone (for he never had less than 130 men) cost him over five thousand dollars—with a keen enthusiasm for nature, and as he would add, with the aid of a lucky star which never left him for long at a time.

Schillings's book now authoritatively translated and published in this country makes a large and handsomely illustrated volume. It is admirably printed upon thin, highly polished paper, which serves well the purposes of engraving, even if it does not keep the size of the volume within bounds. The publishers seem to realize what many have not learned, that good half-tone engravings do not require the heavy weight of paper so often employed, and that the prints once made are easily marred by careless handling when fresh from the press. The illustrations are exceptionally free from 'pencil marks' produced in this way.

Preceding this edition by a few weeks there appeared an abridged translation of the same work, but under another title,[1] which the publishers of the complete and better edition denounce as 'pirated.' The illustrations of the lesser volume, which apparently were made direct from the engravings of the German work, rather than from the original photographs or blocks, are necessarily inferior, and do but scant justice to the beauty of much of Schillings's photographic work. One of these half-tone engravings, entitled 'Ibis Nests' (see p. 46), is even placed bottom-side up, but really it matters not how it is regarded on the page, for it is only a blur of printer's ink, and illustrates nothing.

There is an introduction by Sir H. H. Johnston, the discoverer of the okapi, and author of a recent elaborate work on the native races of man in East Africa, entitled 'The Urganda Protectorate.' The translation seems to be well done, and the text is extremely interesting from end to end. Appendices give full lists of the vertebrate animals discovered and collected, but the reader will look in vain for either an index or a map.

Both author and editor make an eloquent

[1] 'With Flashlight and Rifle,' Photographing by Flash-Light at Night the Wild Animal World of Equatorial Africa, translated and abridged by Henry Zick, Ph.D., pp. xiv + 422, with 123 illustrations; Harper and Brothers, New York, 1905.

and moving plea for the salvation of at least a remnant of the great Tertiary fauna of Africa—the lions and elephants, the hippopotami and rhinoceroses, the zebras, giraffes and big antelopes, which have all but vanished from South Africa, and which are now rapidly falling before the bullets of both whites and blacks all along the equatorial belt. The fate of these great beasts and many others besides is in the balance, and the history of the American buffalo is already being repeated in one section after another of the dark continent.

The world will, indeed, become very uninteresting if, as the author of the introduction remarks, man and a few domestic animals, with the mouse, the rat and the sparrow, are the only survivors among terrestrial vertebrates.

As an illustration of the reckless slaughter of the big animals by white travelers or temporary residents, the case of a certain German doctor is mentioned, who in the course of two or three years of fanatical zeal killed one hundred and fifty rhinoceroses (a companion having killed one hundred and forty more), and all for no useful purpose, "each one being a far more interesting mammal than himself. At the end of this career of slaughter, a rhinoceros killed him—perhaps appropriately." Notwithstanding such onslaughts, Herr Schillings thinks that the rhinoceros will survive, to impale such prodigies of human greed and folly, for generations to come, because of their fierce habits, their great numbers, and the inaccessible character of the mountain fastnesses over which they range. It would seem as if nothing short of disarming the native, and international legislation could save anything more than a remnant of those amazing hosts of interesting animal forms, which it has taken nature long geological ages to bring to perfection. The natives, equipped by the white traders, have already devastated South Africa. The white-tailed gnu, the true quagga, the mountain zebra, the Cape buffalo, the elephant, black and white rhinoceroses, the giraffe, the hippopotamus and the South African ostrich have been totally wiped out there with the exception of a few preserved individuals. The retreating squadrons have reached their limits under the equator. There they must be preserved now, if at all, for in a few years it will be too late.

While Herr Schillings disclaims any skill as an artist, his pictures reveal an artistic appreciation, and he is able to describe the scenes which he has witnessed with admirable vividness and enthusiasm. The great velt, the mysterious wonder-world of German East Africa, which, as he declares, must forever remain a forbidden and uninhabited land to the northern races of Europe, with its annual succession of flood and drought, and corresponding periods of rapid vegetable growth and decadent life, burning the traveler by day and almost freezing him at night, its pestilential marshes, its arid, salt-encrusted plains, its diversified surface and scenery, suggesting in places, during the wet season, great open parks in England and northern Europe, in others presenting perfect *chevaux-de-frise* of thorn bushes, impassable to every animal but a mouse or an elephant; flat in some places, in others undulating, with broken hills, lofty tablelands, volcanoes and almost interminable mountain ranges, the highest peak of which, Kilimanjaro, rises 19,500 feet above the sea, is crowned with eternal snow, and bears a whole upper world of glaciers under the tropical sun.

The most celebrated animals of the equatorial fauna, all of which Schillings has hunted, photographed and studied at close range, the great-tusked elephant, the fierce rhinoceros, the saber-like horns of which in old cows are sometimes nearly five feet long, the hippopotamus, the lion, the leopard, dreaded for its stealth and swift attacks, the fleet zebras and gnus, the strange giraffes, hyenas and antelopes of many kinds stalk through his pages in all the semblance of life, and, as a German zoologist has remarked, will live on in some of his admirable pictures 'long after they have been sacrificed to the needs of advancing civilization.' We see the largest of these, the elephants and rhinoceroses, in their endless migrations between the high mountains and the plains, following

the water courses, and the advancing growth of new vegetation with unerring precision, living among the clouds as readily as on the ever-changing plains of the great velt. Says Schillings:

> The velt is a book difficult to decipher, being written all over with the tracks and trails of the animal world. Right and left in our path, trees of vast strength are to be seen broken like bits of straw, showing where a herd of elephants have made their way. Large holes in the ground are come upon, which have been made by the elephants in the wet season, and which remain visible for a year or more. . . . The rhinoceros, too, leaves his mark. For many miles long tracks, which cross and recross, are found leading to the watering places. . . . And like the elephant the rhinoceros levies toll upon the shrubs and thornbushes.

Herr Schillings's first expedition to East Africa was made in 1896, when he determined to study the velt, and to obtain specimens of its representative animals, as well as photographs which should be transcripts from nature, and really illustrative of zoology. His last journey was undertaken in 1903. The second expedition failed in photographic results, owing to the unsuitable character of his apparatus. Accordingly, he returned to Europe, and after many trials succeeded in constructing at the celebrated Goerz establishment at Friedenau, a metallic camera and flashlight apparatus, strong enough to stand not only the strain of travel in tropical jungles, but more especially the effect of the powerful explosives employed.

Returning to Africa for the third time, he started for the interior with a caravan of one hundred and thirty people, but after an illness of three months from acute heart disease and malaria, he was obliged to throw up everything, and return again to Europe to recover, if possible, his health. On his fourth expedition to the dark continent he learned that 'a naturalist traveling on his own account encounters almost insuperable difficulties,' and his application to explore English territory was refused apparently because an Englishman had recently been debarred from German East Africa.

To appreciate the great advance in book illustration one has but to take from the shelf some works of travel and exploration, like those of Sir Samuel Baker of a half or even a quarter of a century ago. How ridiculous many of the pictures really are, and how they shame the text!

Since most of the large animals are nocturnal, Herr Schillings was obliged to resort to the flashlight, and some of his night pictures, obtained in spite of the greatest difficulties and hazards, are remarkable. The telephoto lens seems to have proved useful also, but he does not appear to have been equipped with a reflex camera, although this is a German invention, the improved forms of which are now fifteen years old, while the principle has been known for half a century. At least the lack of such an instrument would seem to account for so many of his moving objects, like birds, being out of focus. The lack of sharpness, on the other hand, lends to some of his landscapes a peculiar attraction. Thus some of his pictures of gnus and gazelles suggest the sentiment and poetry of a master like Corot. As evidence of this the reader should examine two charming pictures on pages 327 and 481—a herd of gnus and zebras taking flight from beneath the shade of a huge monkey-bread tree, and another herd of seven curious gnus all facing the camera and lighted from behind. In both of them what looks like a 'painted' sky is really the steep slope of a distant towering range of mountains.

Some of the rhinoceros pictures, showing these huge pachyderms feeding on the velt, bathing in the jungle, coming to the stream-courses and water pools at night, all most hazardous to obtain, are among the best in the book. The 'rhino' is dull of sight, but has keen ears, and a most phenomenal power of scent. When aroused it is up in an instant, swings quickly around, snorting loudly, to get the scent. Now is the opportunity for the photographer, but it lasts only a second, and the hand which releases the camera must be quick to seize the rifle. The animal is almost sure to charge, and when it does so, it comes with the speed of an express train; escape by running or dodging is no more effective than climbing imaginary trees or pulling oneself

up by the boots; a bullet well placed, and that quickly, can only check the fury of the beast, and there may be more than one adversary with which to reckon. Possessed of such a wonderful scent, together with certain other habits which are described, not to speak of memory, it is not surprising that they seem to possess such unerring knowledge of the velt.

Many interesting facts in natural history are recorded in the pictures and text. The South African ostrich breeds in September and October, and nests were found with eight to twenty-five eggs during those months, while a single egg was taken from the ovary of a female shot at the end of February. This sporadic activity of the reproductive organs outside of the breeding season, attributed to excessive feeding on newly sprouted grass, was often observed by the natives, who frequently found single eggs scattered over the velt. Many similar cases among our own wild birds could be given.

The common stork, *Ciconia ciconia,* which winters in vast numbers in equatorial East Africa, were preparing to migrate in early February, while some even remained until the first of April. On April 2, 1904, I saw great numbers of these storks, on the desert in Nubia above the first cataract of the Nile, huddled together like a dense flock of sheep. They were very wary and would not allow even a rider to approach them. Five days later the advance guard had reached Edfu, sixty miles northward, and were fraternizing with Arabs in the ploughed fields. Though bound for Europe, they appeared to be advancing at the leisurely pace of twelve to fifteen miles a day.

Schillings speaks of hawks seizing locusts on the wing, of 'sign-post' trees of elephants, or rubbing places, some of which he thinks must have been in use for hundreds of years: of the sleeping places of hippopotami on islands, 'which seem to have been in use for ages,' and their deep-worn paths leading down to the water; of the tail-language and dumbness of the giraffe, the harmony of the zebra's stripes with the coloring of the velt, the cunning of the ostrich in enticing the lion from its nest and young, the alarm-calls of the reedbucks heeded by birds, the watchfulness of the yellow baboons, and their wonderful alertness in flight, the tameability and affection of the marabou storks, the attachment which sprung up between a young rhinoceros and an East African goat, and the often fatal policy of first shooting at the lion when the lioness is near.

The connection between malaria and mosquitoes is well illustrated by the following account of the usual sequel to a night of shooting and photographing on the velt, although the very brief incubation here suggested does not accord with the common type of this disease:

> When the morning breaks I return to the camp, feeling as if broken to pieces, stung all over by mosquitoes, and with that peculiar sensation which unmistakably heralds an attack of fever. I was not deceived, and for two days I am confined to camp by a bad attack of malaria.

The water-famine in the dry season, the terrible pests of mosquitoes and flies of many kinds, which the traveler to the Nile valley in March and April should be able to appreciate, the scourge of malaria and dysentery following in their wake, not to speak of many other enemies which make the white man's burden well-nigh insupportable on the velt, will for long postpone the day when Herr Schillings's studies on the general natural history and photography of animals in equatorial East Africa are equaled or surpassed.

Francis H. Herrick.

SCIENTIFIC JOURNALS AND ARTICLES.

The Journal of Comparative Neurology for March contains the following articles: Margaret F. Washburn and I. Madison Bentley, 'The Establishment of an Association Involving Color-Discrimination in the Creek Chub, *Semotilus atromaculatus*.' An association involving the discrimination of red from green in the feeding reactions was quickly established under rigid experimental control. H. H. Newman, 'The Habits of Certain Tortoises.' Detailed observations upon five American fresh-water species. T. H. Boughton, 'The Increase in the Number and Size of the