splendid foundation. It was found that the class of candidates for the forest service was falling off in numbers and quality, the salaries were not sufficiently attractive, and in 1905 only two candidates appeared for sixteen posts, so that a system of appointment by selection was adopted. The Secretary of State has now raised the pay of the Indian Forest Service, and allows 120*l.* a year to such of the two years' probationers who are B.A.s with honours from any university, so that this year there were sixty candidates for twelve appointments. Besides insisting on the qualification of an honour degree, it is essential to secure that all probationers should join the Oxford School of Forestry, with a sufficient knowledge of English, elementary mathematics (including trigonometry), physics, and chemistry. During the two years' course for a forestry diploma at Oxford, botany, zoology, and geology can be taught, as well as forestry, surveying, and forest law. Strange to say, some of our British universities have such an imperfect entrance examination that men are allowed to enter for and take honour degrees in biology or geology without necessarily knowing more than the rudiments of mathematics, chemistry, or physics, and without passing any test in English. The possession of an honour degree in science at a British university is not, therefore, a sufficient qualification for a forest probationer. A certain knowledge of German also is very desirable for admission to the Oxford School of Forestry, and this is but rarely obtainable from our public-school men. Our best Oxford foresters should be capable of teaching scientific and practical forestry throughout the Empire.

Although the forests of India, between 1885 and 1905, continued to be well managed by a devoted corps of practical foresters, very little, if any, progress in forest technology was made during those twenty years. In 1906, Mr. S. Eardley Wilmot, C.I.E., Inspector-General of Forests, following the initiative of his predecessor, Mr. R. C. Wroughton, established a forest research institute the members of which devote all their time to the study of the various branches of forestry, as well as to zoology, mycology, and the physics and chemistry of forest products. The results of this research are published in "Indian Forest Records." Vol. i., for 1909, of these records contains papers on the lac insect, by E. P. Stebbing; on beetles boring in *Chilgoza* bark, by E. P. Stebbing and Capt. E. H. James; the development of *Shorea robusta* in volume and money value, and the selection system in Indian forests, by A. M. F. Caccia; Andaman Padank, by B. B. Osmaston; the Cutch trade of Burma, by R. S. Troup; Ngai camphor, and Burmese varnish from the sap of *Melanorrhoea usitata*, by Puran Singh. Several useful and, for the most part, elementary manuals have been prepared by members of the Research Institute and others, the most elaborate of which are "Indian Forest Engineering," by G. M. Rogers, and "Indian Forest Zoology," by E. P. Stebbing.

Unfortunately, the establishment of this institute was followed by a temporary deterioration of the teaching staff in Dehra Dun, for the Government of India did not accept Mr. Wilmot's proposal to retain an adequate staff of instructors there, but handed over the practical teaching to the provincial staff, the research officers considering that their other duties would not allow them time to teach the students. The Dehra Dun Forest School, recently dignified with the title of Imperial Forest College, was overcrowded with students, 120 applications for admission having been received in 1909, and the students had not sufficient respect for their native teachers, so that discipline suffered greatly.

The Indian Universities Act of 1894, which has exerted its influence so widely on higher studies, has failed to reach Dehra. Engineering, medicine, and agriculture, and science generally, have made great advances of late in response to the stimulus of university reform, but at the Imperial Forest College the qualifying entrance examination is still much the same as when it was a school, and its courses still include an amount of rudimentary science that should have no place at a college. This becomes evident when the standards there are compared with those at the agricultural colleges recently established in the various provinces of India. The final examination for the diploma in forestry at Dehra should also be equivalent to those for a B.A. degree, as is the case at agricultural colleges.

The present Inspector-General of Forests, Mr. F. Beadon Bryant, has recognised that the teaching of forest rangers has fallen off since the Research Institute was started, and that it was a mistake to entrust the teaching of classes of sixty students there to members of the provincial service. Research officers in future will give lectures to the students during the four months' monsoon session, and three officers of the Imperial Forest Service are being appointed to teach the students throughout the two years' course for rangers and the three years' course for the provincial staff. Overcrowding at Dehra is to be avoided by the establishment of a school for rangers in the Madras Presidency, with at least two professors from the Imperial staff, and probably another school on similar lines will be established in the Central Provinces. Indian forest schools have to provide foresters for Kashmir, Mysore, Hyderabad, and the other native States, besides for British India, and Mr. Wilmot has recently been deputed to Nepal to organise a suitable forestry department there.

It is evident that schools of forestry, at home, in India, and in the colonies, must be in close touch with the universities; but while Indian universities have a suitable English and scientific entrance examination, this is not yet the case with some of our most important home universities, and this defect calls loudly for reform in the best interests of our Empire. The prospects of forest technology in India are now very high, and it is to be hoped that, following the example there and that of South Africa, where a forest school has been established, the Dominion of Canada, Newfoundland, Australia, and New Zealand will soon bestow sufficient attention on forestry and establish local forest schools. Besides India and South Africa, the scientific forestry of which has been long established, there are regular forestry departments in Ceylon, the Malay States, the Soudan, British East Africa, Mauritius, Cyprus, and in some of the West Indian Islands. W. R. FISHER.

THE TWENTIETH-CENTURY SPORTSMAN.¹

THIS amazing picture-book (commendable, among a hundred other reasons, in that, though large in size, it is very light to hold in the hand) will probably *faire école*. That it has made a sensation amongst the reading public interested in Africa is already observable by the reviews of it which have appeared in the leading newspapers, and the vogue it has attained in spite of the conflicting interest of current politics. This is little to be wondered at. The author (who is the brother of the Captain W. R. Dugmore who distinguished himself in Uganda and elsewhere as a soldier-pioneer) had, no doubt, supreme

¹ "Camera Adventures in the African Wilds; being an Account of a Four Months' Expedition in British East Africa, for the Purpose of Securing Photographs from Life of the Game." By A. Radclyffe Dugmore. Pp. xviii + 231. (London: William Heinemann, 1910.) Price 30*s.* net.

FIG. 1.—Telephoto of Kilimanjaro about eighty miles away. The entire lack of detail on the lower part of the mountain is due to atmospheric effect, which renders distant objects the colour of the sky unless they are above the heated stratum near the earth. From "Camera Adventures in the African Wilds."

FIG. 2.—Large Herd of Giraffe and Grant's Zebra, showing the comparative sizes of the two strongly marked animals. (Telephotograph at about 300 yards.) From "Camera Adventures in the African Wilds."

good luck, but he and his companion, Mr. James L. Clark, were also possessed of singular courage and skill both as photographers and marksmen, and, if need be, mechanics. Good luck gave them the chance of a telephotograph of Kilimanjaro, eighty miles distant, which is one of the weirdest mountain pictures the present writer has even seen, and confirms his old story of twenty-five years ago that Kilimanjaro, in certain aspects, resembled Swift's floating-island of Laputa. Amongst other episodes of singular good fortune was the photographing of the still very rare black Forest pig. This creature, the existence of which was rumoured by Stanley, George Grenfell, and the present writer in the Congo Forests, was actually first revealed to science by Captain Meinertzhagen and Mr. C. W. Hobley, far away from the Congo basin, on the Nandi plateau and round Mount Kenia (though it was soon afterwards obtained from the north-east Congo, and finally from the Cameroons). But specimens of it are still scarcer than those of the okapi, and to have photographed the creature, *wild and in its forest home*, is an episode that probably Mr. Dugmore never anticipated, even in his rosiest anticipations.

The book gives unrivalled pictures of the fauna of Equatorial East Africa, of that singularly fascinating region between Kilimanjaro on the south and the Guaso Nyiro on the north, the Rift Valley on the west and the Tana River on the east. Here there are long ranges of mountains that only fall just short of the level of perpetual snow, and there are the snow-fields and glaciers of Kenya, rendered marvellously well in Mr. Dugmore's pictures. Immense grassy plains, dense thorn scrubs, lakes peopled with flamingoes, splendid equatorial forests recalling those of West Africa, deep water-courses or canyons, broad rivers with great herds of hippopotami and monstrous crocodiles, and patches of camel-frequented desert—all these phases of physical geography are admirably illustrated, in addition to the pictures of beasts, birds, and indigenous mankind. We are getting almost tired of lions since the advent on the scene of the flash-light photographer: the lion and lioness, indeed, seem to be almost like the popular actress or politician in their desire and willingness to be photographed in interesting attitudes. But although this book has some of the best lion pictures I have ever seen, it will probably be more noteworthy for its photographs of charging rhinoceroses, of buffaloes passing through the long grass, or hiding themselves at noon-day in dense forest. Another notable feature is the numerous studies of giraffes, sometimes looking exactly like withered tree stumps, at others suggesting prehistoric monsters. The most striking of these giraffe studies (and the most beautiful) is that where, by means of a telephotograph, a large herd of giraffe, and a smaller herd of Grant's zebra, are shown together in an immense tract of savannah country dotted with acacias. If that does not suggest the Pleistocene at its best, we do not know what does. The geographical scope of the book extends far enough north to include the Samburu and their camels, camels which have suggested to more than one observer, British or Italian, the possibility of their being derived from a wild camel which may still exist in the remotest, as yet completely unexplored, parts of Galaland.

The book opens with an appeal "to the lovers of sport, and perhaps to those who consider themselves as such, but whose only claim is the insatiate love for killing which characterises their idea of sport." The author goes on to state that, like many others brought up to the use of firearms, he considered the man who did not shoot a very inferior person, in fact, unmanly. But as the years went by he himself

became more deeply interested in natural history, and the idea of killing for killing's sake lost its fascination. In time he found that the most thrilling sport of all was the studying of the life of animals in their native wilds rather than in the killing of them merely to possess the skin or other trophies. Enough is said in his book to show that he and his companion ran, perhaps, greater risks in their attempt to snapshot charging rhinoceroses, lions, and buffaloes than would the sportsman who was merely out to kill, while the acrobatics necessitated in natural-history photography are enough to prove that the follower of this sport has to be a far more athletic and courageous person than the mere shooter.

Whether Mr. Dugmore will meet with any more success in his appeal than has followed the work of Mr. E. N. Buxton, and others of like persuasion is a moot question. His unsurpassed photographs have revealed once more the wonderland in bird and mammalian fauna represented in Inner East Africa, and already a company, with an office in Piccadilly, has issued a pamphlet on British East Africa, illustrated by some of Mr. Dugmore's photographs, which offers every inducement to persons of both sexes to proceed to East Africa "to shoot." In this pamphlet it is stated that the report about the country being "shot out" is far from the actual truth. (Nothing, so far as I can see, is said about the attractions to the photographer.) In the list of animals which may be shot under the ordinary licence (and in this the pamphlet is not to blame, for it merely quotes official regulations) is given "four egrets of each species." What of its kind can be more monstrous than this? Egrets—white herons—are quite uneatable, they are supremely beautiful, and we now know—or ought to know—that they are large consumers of noxious flies—Glossina (tse-tse), Stomoxys, Tabanus—and all the larger gnats. For this reason alone all these smaller herons should be rigidly protected.

H. H. JOHNSTON.

WIND STATISTICS AND AERONAUTICS.

THE practical interest shown in Germany in the navigation of the air is widespread, and goes hand in hand with a determination to utilise all auxiliaries that promise to advance the subject. Among such auxiliaries must be included the observations of wind which form part of the stock in trade of the meteorologist. The "Motorluftschiff-Studien-gesellschaft" of Berlin, founded in 1907 at the instance of the German Emperor, has accordingly requested Prof. Assmann, the director of the Aeronautical Meteorological Observatory at Lindenberg, to undertake a detailed analysis of the wind data available for the German Empire. The society has provided a large part of the funds required for the work. The results have now been published. They give average values, generally for the twenty years 1886-1905, for forty-nine stations. The original schedules were prepared in the various offices which are responsible for the meteorological work of the component States of the Empire. The final discussion was undertaken at Lindenberg under the direction of Prof. Assmann.

Some idea of the magnitude of the work involved may be gathered from the fact that the preparation of the primary schedules is estimated to have occupied about 2550 hours of clerk's time. It was decided to limit the discussion to the Beaufort estimates of

¹ "Die Winde in Deutschland." Im Auftrage der Motorluftschiff-Studien-gesellschaft in Berlin. Bearbeitet von Richard Assmann. Pp. iv+48; taf. xiii. (Braunschweig: F. Vieweg und Sohn.) Price 5 marks.

² "I Venti in Italia." Estratto dalla Rivista Tecnica di Aeronautica e Boll. della Soc. Aeronautica Italiana. Dott. Filippo Eredia, Meteorologista al R. Ufficio di Meteorologia e Geodinamica. (Roma: Officina Poligrafica Italiana, 1909.)