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## SAVING THE ANIMAL LIFE OF AFRICA—A NEW METHOD AND A LAST CHANCE

BY HENRY R. CAREY

Towards evening, on rising a hill, we were suddenly greeted by a sight which seemed to astonish even the oldest amongst us. The whole plain, as far as the eye could discern, was covered by an enormous mass of buffalo. Our vision, at the very least computation, would certainly extend ten miles, and in the whole of this great space, including about eight miles in width from the bluffs to the river bank, there was apparently no vista in the incalculable multitude. It was truly a sight that would have excited even the dullest mind to enthusiasm.

So wrote John Townsend of Philadelphia of the plains of the United States in 1834. Today the buffalo on the whole continent number but a few thousand. In all the history of pioneering, there is no more striking example of the horrible effect of combined blood-lust and modern firearms. Before 1834, the senseless slaughter had already begun. Huge numbers of buffalo were shot, Townsend tells us, "merely for the tongues, or for practice with the rifle," and ton after ton of "delicious and savory flesh, which would delight the eyes, and gladden the heart of any epicure in Christendom, was left neglected where it fell, to feed the ravenous maw of the wild prairie wolf, and minister to the excesses of the unclean birds of the wilderness . . . but when are men economical, unless compelled to be so by necessity?"

From the early nineteenth century, in all parts of the world, the pioneer and the modern firearm began their most deadly work. The "acres of golden plover" are gone. Lucky is the man who sees one of these birds in a season. The great flocks of Carolina paroquets, green and yellow masses wheeling and gleaming in the sunlight, are no more. The bird is extinct. The pronghorn antelope, of which multitudes once

gave life to our plains, has passed away, except for a few thousands. The myriads of prairie hens which could once be seen on the great plains are decimated. Of the heath hen, forty living birds remain! Of the flocks of passenger pigeons that used actually to darken the sky all day, not one bird now exists alive. The sea otter is nearly extinct. The story of "The last of the whales" will soon be written. They have retreated to the polar regions, and even there man is exterminating them. In the last century alone, about two dozen species of birds disappeared. It is unnecessary to add to the list of atrocities.

Fortunately, this orgy of killing among the pioneers gave place, in the United States, to a sudden painful awakening and a period of self-control. President Roosevelt led the forces of moderation for a short period. He created many reservations both for mammals and for birds. But even these have been destroyed, in some cases, by the politicians and the forces of wastefulness and disorder. Thus, the bird marsh sanctuaries which President Roosevelt created in Oregon at Lower Klamath Lake and nearby have been drained. Millions of breeding wild fowl have died there, and now—oh beautiful irony—the drained land is found to be useless for cultivation! Nevertheless, conservation has made its gains in America since a century ago, for, as Mr. Townsend wrote in 1834, men can be economical, though only when "compelled to be so by necessity."

It is safe to say, nevertheless, that the early settlement of the United States was accompanied by three high crimes, bad faith in dealings with the natives, waste of the forests, and waste of animal life. Africa is the continent where many of the larger mammals are making their last stand. Is history repeating itself in Africa? Treatment of the natives has unquestionably improved under the Mandate System of the League of Nations.<sup>1</sup> There is little danger of forest destruction, first because the African forests are limited in area, but chiefly because much African timber appears to be of two types—"the kind you can't drive a nail into, and the kind that splits if you do!" But the birds and mammals of Africa are in many cases going the way of their brethren in other lands. It is the same sad story all over again.

If we would realize the desolation which threatens to brood over the African wilderness in a hundred years, we must keep in mind the horrible history of the animal massacres of South Africa. In the beginning of the last century, Gordon Cumming saw in South Africa vast legions of

<sup>1</sup>See "Kenya." by Norman Leys (London, 1924), p. 376. and note. See also Minutes of the Permanent Mandates Commission, 1925.

springbuck streaming through a neck of the hills in unbroken phalanx for two hours. As far as the eye could strain, the landscape was a ive with them. In 1830, "what is now the site of Pretoria was inhabited by a number of rhinoceroses."<sup>2</sup> Near Mafeking, zebras and white-tailed gnus literally covered the whole plain. Captain William Cornwallis Harris, at this same period and locality, saw a herd of more than three hundred elephants, so that "the plain looked like one undulating mass." As late as 1860, a native drive of animals in the Orange Free State (instigated by Europeans, and provided, of course, with firearms) collected 25,000 animals of many species, and 6000 were killed at one time! A century ago, the South African plains were "in the literal sense of the word, covered with countless herds of Cape buffaloes, white-tailed gnu, blesbok, bontebok, zebras, quaggas, hill-zebras, hartebeests, eland-antelopes, horse-antelopes, oryx-antelopes, waterbucks, impallah-antelopes, springbucks, and ostriches. Herds of hundreds of elephants were to be seen. Every marsh, every river bed, was literally overcrowded with hippopotami. All other kinds of animals that are now so scarce, such as the large and handsome kudu, and all the different kinds of small wild animals, were to be met with in vast number. About a hundred years ago, the great war of extermination began." The outstanding cause was the improvement in firearms.

"So disappeared from South Africa the gnu, the quagga, [apparently the only species of zebra which gave signs of yielding to domestication] the bontebok, the mountain zebra, the beautiful bluish horse-antelope, the cape buffalo, the elephant, the powerful white rhinoceros, the black rhinoceros, the giraffe, the hippopotamus, and the ostrich. Thirty or forty years ago [1865] these animals were still plentiful; a hundred years ago their number was simply fabulous. They were to the natives of South Africa what the buffaloes were to the American Indians—the chief source of food; and, like the Indians, they used the surplus, but did not eat up or destroy the main supply."

As in America, the slaughter was reserved for "civilized" white men. The white rhinoceros of South Africa is now practically extinct, though so abundant in 1844 that a single trader caused the deaths of thousands by arming four hundred Matabele natives. The last "blaubok" was killed by the Boers about 1800; the last quagga died in 1880. Like the white rhinos of South Africa, those of the Upper Nile are now doomed, unless the traffic in horns and hides be stopped at once. The South African mountain zebra, bontebok, blesbok and white-tailed

<sup>2</sup> This and other information is from C. G. Schilling's "In Wildest Africa," 1907, and "With Flashlight and Rifle," 1905.

gnu are on the verge of the abyss. Such are the hecatombs of animals knocked into oblivion in a single century by the Boers and the rifle. Perhaps some species will be preserved in small numbers, in a reservation, for a century or even several centuries. But what do a few centuries amount to compared with the aeons of time it must have taken Nature to develop these harmless creatures in their present perfection!

Turning now to what is going on in the rest of Africa today, the picture is almost equally distressing. In 1910, hippopotami were abundant on the Tana River. They have vanished in 15 years! The klipspringers of the Lucania hills have gone since 1905, and the reedbuck with them.

*At this very day*, the natives of the Belgian Congo are killing elephants for their ivory. As the great tusks become scarcer and more valuable, the pursuit of the last stragglers is redoubling its energy. Although herds of giraffe still flourish in remote districts, yet in the opinion of a naturalist writing in 1907 "this wonderful and harmless animal is being completely annihilated . . . the day cannot be far distant when the beautiful eyes of the last 'Twigga' will close forever in the desert." The superb and rare sable antelope has curved and sculptured horns reaching 64 inches in length. It is a great prize. A traveller who has recently returned from Angola reports that it is destined to disappear from its limited range unless drastic measures are taken. Even the rare and beautiful okapi, though it lives in the dense forests and travels—a moving patch of brown velvet—only at night, is already threatened with destruction *only twenty-five years after its discovery by the white man*. It is being hounded by the natives into its most distant retreats. Again, who is to blame if it is not the European, who offers rewards to the negroes, and furnishes them with up-to-date arms? Professor Henry Fairfield Osborn, President of the American Museum of Natural History, has said, "We paleontologists alone realize that in Africa the remnants of all the royal families of the Age of Mammals are making their last stand, that their backs are up against the pitiless wall of what we call civilization. Human rights are triumphing over animal rights, and it would be hard to determine which rights are really superior or most worthy to survive."

When our coal and oil are exhausted, the scientific experts can doubtless give us some substitute. But no scientist, says another Nature lover, "can give us back anew those high developed organisms of the plant and animal world which man today is recklessly sweeping out of the list of living things. They can not restore to us the green woods and

their animal life. We preserve with punctilious precision every vestige of the art of the past. The older the documents of earlier historic times, the more eagerly they are coveted, the more highly they are valued. Our collectors gladly pay the largest sums for an old papyrus, an old picture, an object of decorative art, or a marble statue. . . . But the same man who, in this respect, acts so reverently, so conservatively, looks on with folded arms while treasures are destroyed that ought to be guarded with special affection and care, in these times when the great value of all natural science is so fully recognized." Let archeology wait. The relics of the men of a former time will be in the ground a hundred years from now. But the rescue of the African animals *can not* be delayed. They are falling to the ground as I write.

But mankind, not the animals, is the great sufferer. Sad as is their physical death, it is even sadder to see the shrinking of our own intellectual and spiritual resources as Nature is unhorsed. For just as we need the forests in order that we may keep our water supply, so we crave the living things of the wilderness for our spiritual enlargement. Man is stripping a vast playground of the beautiful creatures that give it life. What will our children and grandchildren enjoy most, the stuffed specimens in museums, or the living creatures in their own home—glorious Africa,—whose vast healthy regions have already become the playground of visiting white women and children? Africa calls us to that simple mode of existence for which Nature originally intended us, and from which our modern life in cities is an abrupt and violent change. For many thousands of years, our ancestors were hunters, herdsman, shepherds, tillers of the soil, fishermen, sailors; however adapted our intellects have become to the age of machinery, our instincts still point to the outdoor life of the wilds as one great source of our deepest enjoyment. Like love and worship, so hunting, fishing and exploration are portions of our nature of deepest and remotest origin. They are as much a part of a man as his hands. We need a place in the world where we can recapture "The lost arts of wildcraft" in such surroundings, because "the self dependent life of the wilderness nomad brings bodily habits and mental processes back to normal, by exercise of muscles and lobes that otherwise might atrophy from want of use." That there is a dash of the gypsy in everyone is simply a sign of our wholesomeness, and of a past which our natures can not wholly forget. Yet in spite of this, man the conqueror is converting the world as rapidly as possible into a desert of houses and factories. He has vanquished the whole globe, and he is to be master of a dry crust of earth! If only civilized

man had the wit to know what he is throwing away! If only those *in every country* who see the danger could shout a warning to the whole world! If only we could start a campaign to save these creatures, a campaign which is *militant, unified, international!*

There are two rather brighter spots in this picture; first the British animal reservations in East Africa, the Sudan, British Somaliland, British Central Africa, and the Union of South Africa, and, secondly, the Belgian Parc Nationale Albert, established to protect the vanishing mountain gorillas of the Kivu district, in March, 1925. But unprejudiced naturalists assert that even the British reservations are anything but perfect game sanctuaries. In one reserve in the Transvaal shooting was allowed as late as 1907, and the same condition probably prevails today.

There is always the possibility, moreover, of an organized slaughter, with official sanction, such as the massacre of the Addo Bush elephants in 1919. The strongest sentiment for game preservation is in England, but the local government of the colonies is swayed more by the European colonists in Africa than by the British Parliament, hundreds of miles away. Therefore, since the colonials are as much hunters as they are conservationists, the British policy of animal conservation is apt to be modified, from time to time, in individual cases. Someone is always looking for an excuse to break into the reservations.

The most thoroughly satisfactory reservation is the new Belgian Gorilla Park, for which we have to thank the tireless efforts of Mr. Carl Akeley, and the enthusiastic coöperation of distinguished Belgian officials. But mark! This reserve is the result of pure accident. If Mr. Akeley had not been travelling in Central Africa at the precise moment of the century when a certain royal hunter was decimating the gorillas of the Kivu, these great apes—the product of the ages, the cynosure of the eyes of biologists and physicians—would have been extinct today! Why, in future, leave the preservation of such creatures, some possibly yet to be discovered, to blind chance? Will fortune so favor a careless world a second time? For every Nature-lover in Africa, there are a hundred white men whose chief joy is in dealing out death or in adding to a trophy collection. What chance, then, have the wild creatures of any district, of meeting, not their murderers, but their friends, in the areas where shooting is freely allowed?

Indeed, with few exceptions, past efforts at conservation have been by no means wholly successful. We may sum up the defects as follows: (1) Reservations in the British Colonies, and in the Union of South

Africa, are not closed to *all* persons. In one important British reserve, moreover, the Southern Game Reserve of Kenya Colony, every time there is a drought, the natives and their cattle, which are privileged, are apt to take possession of the watering places, thus driving the game from the reserve to the outside districts, where they are foredoomed. (2) An international convention of Powers interested in Africa met in 1900, and devised a set of regulations for animal preservation. But obedience to these rules has never existed, chiefly, it would seem, because the machinery of enforcement, including a *permanent* body to keep watch on conditions, has never been set up. The need of such a permanent organization can not be too strongly emphasized. (3) No such body, to watch conditions and stress rules, could succeed unless the regulations could be enforced equally in *all* the African provinces at the same time. The rules adopted by the 1900 convention, little more than a fine gesture expressing a pious wish, are good rules, but they must be made binding all over Africa. Of what use would it be to insist on the shooting of males only, on closed seasons, on game sanctuaries, on restricted export of skins, horns, and the like, and on the prohibition of grass fires and certain forms of traps, in British Somaliland, if these principles were not, for example, respected in Italian Somaliland just across the frontier? (4) Protection of animals in a given locality must not be the result of accident. Animal extermination must be *prevented*. It can not be cured.

The needed reforms, therefore, seem to call for:

(1) More perfect sanctuary in British and other reservations already established, so that the animals may be protected independent of the vagaries of influence.

(2) The exclusion of natives and native cattle from certain drinking places in certain preserves.

(3) A *permanent* international body to make inter-colonial regulations and keep constant watch on conditions. Game protection in a given spot must not be, as heretofore, the result of a happy accident. Prevention is better than a belated cure.

(4) Enforcement of the established regulations in *all* parts of Africa where they apply.

It will be quite obvious to every reflecting person that what is needed is an organization which is *permanent*, *disinterested* and *international* and has power to enforce its rules. A temporary organization<sup>3</sup> has failed,

<sup>3</sup>The International Game Protection Convention of 1900. Its recommendations were never ratified by the various home governments, much less enforced.

already, to protect African game in general, and the Kivu gorillas in particular. No *single* nation has been always sufficiently disinterested to put the needs of the animals, and of society in general, above the demands of the colonial European hunters. No *single* nation has made genuine animal sanctuaries. There has been a tendency to distinguish between the influential hunter and the weak. No *single* nation can or will patrol all of Africa, or make or enforce uniform regulations on the entire continent. Without intercolonial uniformity of regulation, and of enforcement, there might as well be none at all. In the United States we realize how futile it is to protect our migratory birds, when they are slaughtered just over the border in Mexico. The problem is the same with the migratory game of Africa.

Turning now to the opinions of naturalists who have actually studied conditions in Africa, we find our conclusions strikingly confirmed. Says one "Through the trifling fact that we have ivory balls for billiards, the African elephant goes to destruction. *The individual can not stop this.*"<sup>4</sup> Says another,<sup>5</sup> measures of protection can not succeed "by merely putting limitations on the enjoyment of the chase by the individual hunter. On the contrary, a beneficial result can be obtained *only by all European travellers in those countries interchanging their experiences, collecting material, and exerting themselves to the utmost and in concert* to devise measures that will, as far as may be, put a stop to the threatened extermination." And again, "But how can these measures be enforced, no matter how well they may be thought out?" Finally, Mr. Herbert Lang, of our own American Museum of Natural History, wrote in 1924, "Were there a united great nation in Africa, *with all people acting in concert*, perhaps the problems [of animal conservation] would not be so difficult."

Two of the naturalists quoted wrote before the world war had brought about a new era,—the era of international coöperation. Few persons, whether naturalists or not, seem to realize that there exists in the world today a permanent international organization of surpassing value for the purpose which we are discussing. It is the greatest clearing-house of ideas and information, the greatest organizer of enlightened public opinion, that the world has ever known. It is a telephone exchange for nearly the whole world! It softens the tension between nations by the force of organized public opinion alone. Its

<sup>4</sup> Wilhelme Bolsche, quoted in C. G. Schilling's "In Wildest Africa," 1907 (*Italics mine*).

<sup>5</sup> C. G. Schilling's "In Wildest Africa" (*italics mine*).



work among nations at peace is far more voluminous, though less well known, than its deeds among nations on the war-path. Though its main object is to prevent war, it is developing the most astounding number of peace-time activities. Always and always public opinion is its chief force. By this means *alone*, it stopped the Greco-Bulgarian War of October, 1925.

Today, it is dealing with questions as divergent as the standardization of biological sera and the problem of legal assistance to the poor; a study of the question of double income tax, and an investigation of sleeping sickness and tuberculosis in Africa; it has commissions doing nothing but study malaria, tuberculosis, and cancer. It has summoned an international conference which has greatly reduced the passport difficulties of post-war travellers in Europe. It has begun a reform in the calendar, involving a conference, for the first time in history, between delegates of the Vatican, the Church of England, and the Oecumenical Patriarch. Its Health Committee, sitting in Geneva, is the "general staff of a great army at war with disease." It has won successful battles against disease in the field. In 1926 it will cause an extended tour to be made in Africa to study health work and tropical disease. Disease conditions are cabled weekly to Geneva from the far-flung parts of the world. Besides this Health Committee, a veritable mine of world information for doctors, there are the Financial, Economic, and Disarmament committees, the Committee on Intellectual Coöperation, another active committee on world statistics, and another on traffic in opium and other drugs. Then there are the Jurists' Committees and the Permanent Mandates Commission, which is gradually improving the condition of the natives of Africa and elsewhere. Truly it takes no great stretch of the imagination to believe that this League of Nations may in fifty years guide the world in most of its important activities. And if it has already accomplished so much, could it not undertake to employ a dozen observers in Africa to see that the harmless and beautiful game shall receive a square deal, and a permanent commission to guarantee to our children their rightful heritage?

It is not enough to say that nothing in the League of Nations Constitution—the Covenant—*prevents* wild life conservation. Such work is *directly in line* with the whole policy of the League. Article 24 of the Covenant reads in part, "all commissions for the regulation of matters of international interest hereafter constituted shall be placed under the direction of the League," and several such independent commissions have already so applied, and have been admitted. That the League

commissions already established—the Health and the Mandates Commissions—have habitually received reports from the field in Africa is well known. That points to one definite line of action by the ten countries, all League members, which are interested in African Territory. Another possibility is a game protection bureau of the Committee on Intellectual Coöperation, one of the functions of which, according to Gilbert Murray, is “international action for the practical advance of knowledge.” (The most practical way to advance our knowledge of African animals is to keep them alive.) This bureau might be called the “Permanent Subcommittee on the Protection of African Fauna,” and its duty might be to collect and publish information on the status and needs of African wild life, so as to promote better coöperation among the friends of wild Nature throughout the world. A third line of action might be through the International Institute of Intellectual Coöperation, of which the League committee of similar name is the governing board. This Institute opened its doors in Paris, November 1, 1925, and is now a going concern. It is staffed by noted scholars of many nations, and it is expected to be a vital factor in the world interchange of scientific and other data. Its financial support is assured, since the French government has pledged two million francs a year to be set aside for its use. Finally, an American committee has already been organized to cooperate with the scholars of twenty-five other nations in furthering international intellectual coöperation. Dr. Robert A. Millikan, the distinguished American physicist, is chairman.

In any case, a set of intercolonial principles or regulations should be drawn up by representatives of the ten countries interested, and whatever body is organized under the League, it should (1) send observers to Africa and receive game reports; (2) make recommendations to the Council or Assembly; (3) publish the recommendations. These would include special investigations in special localities, the making of further reservations on waste land, intercolonial hunting and trapping regulations, and the like. Savages, left to themselves, do not destroy the balance of Nature between man and beast. Europeans with modern firearms have long ago destroyed this balance. Reasoning man must now entrust the League with the task of replacing the lost balance of Nature by a balance of justice and common sense. Nature lovers have rights as well as hunters.

Certain matters already are crying out for adjustment. An American naturalist, tells us, speaking in 1924 of African elephants, that “governments have reaped the benefits of increased income derived from taxes

on permits, and the exploitation of ivory, and have thus consented to their doom. And this has gone on in spite of all assurances to the contrary. . . . Today, in the Belgian Congo, the natives are killing elephants in the search for ivory, which now brings unprecedented gain." We have already noticed the fact that the ivory billiard ball is the chief factor in exterminating the African elephant in certain sections. The first step, therefore, will be to abolish the traffic in ivory altogether, throughout the whole of Africa.<sup>6</sup> A substitute for ivory billiard balls *must* be found. Similarly the traffic in the horns and hides of the "white" rhinoceri of the Upper Nile must be ended. There is not a moment to lose.

A most important matter which the League body should see to at once is the control of the use by natives of modern firearms, and also, perhaps, of automobiles. These are the two chief enemies of wild life. The natives should have only their primitive weapons. Modern firearms have been the curse of wild life everywhere. The Mandates Commission of the League of Nations is already actively interested in this matter, and would undoubtedly be glad to cooperate.

Organized commercial tours of Africa are another problem. Tourists can do much harm to a wilderness, by lighting fires and indiscriminate shooting, unless closely watched. Cook's tourists have been in Africa, I believe, for some time, and a passenger steamer of a well-known line left New York, January 19, 1926, for the southern and eastern coasts of Africa. The tourists were to visit, among other places, the British East Africa Protectorate, and even the Victoria Falls in the interior! Hunting was on the program. There were 350 passengers, including women and children. There will now be, I suppose, a trail of peanuts and chewing gum from the ocean to Victoria Falls.

The existing game preserves must be set aside as permanent sanc-

<sup>6</sup> According to a British authority on game protection, resident in Kenya Colony, Captain Keith Caldwell, elephant tusks, illegally possessed in Kenya, are now smuggled into Italian Somaliland, and there sold openly. Tusks worth \$250,000.00 are thus bootlegged across the international boundary every year, there being no law in Italian Somaliland restricting such sales of ivory. The only real cure for this evil, says Captain Caldwell, is to obtain the cooperation of Señor Mussolini. Our leading American conservationist has just admitted to me that he has failed to interest the Italian government in this problem. Unfortunately he does not command the publicity, great as are his resources, that is behind the League of Nations. On the other hand, the Mandates Commission of the League is now dealing with the possible smuggling of firearms in Africa, under conditions similar to those of the ivory traffic.

tuaries, free from *all tampering and the whims of politics*. "The interest and beauty of such preserves would in future attract admiring visitors in as great numbers as hunters have been attracted in the past," and the preserves, as gigantic zoos, might yield the colonial governments a considerable revenue.

The protection of such rare and beautiful animals as the sable antelope in (Portuguese) Angola, and the okapi in the Belgian Congo, should receive special attention. Native chiefs should be rewarded for protecting them, and the traffic in the skins and horns, both readily recognizable in these cases, should be prohibited.

New animal preserves ought to be created wherever possible. Large areas might be converted into international hunting, camping, and exploring places, thus preserving for all nations a most manly and healthful recreation. A wise policy will reconcile human and animal rights. As Mr. Akeley says, "it will be a long time before one-quarter of the area of this vast continent is required for cultivation. Therefore, the game, if wisely handled, might well be left on the other three-quarters." And there are parts of Africa, like Kenya, where much of the land is unfit from cultivation and practically valueless from being "mountainous or waterless, or forest covered." Again, "European immigration has not filled, and can not fill, the spaces in Africa left empty by the slave wars."

Finally, the League commission will supervise through the colonial government the granting of hunting and camping licenses, the enforcement of regulations, and the exclusion from African hunting territory of all "game hogs" and others who refuse to obey rules, or to respect the rights of others.

Do not misunderstand me. I do not propose anything remotely resembling a superstate. I propose that intercolonial game protection recommendations be drawn by a permanent League game commission, and enforced by the local national governments; that periodical reports by colonial officials be made to this supervising commission; that the commission shall send observers to Africa to check up on these reports, and shall make recommendations to the League Council, which may in turn pass them on to the government concerned. The chief force behind the Council's recommendations is public opinion, and the League's permanent publicity bureau. That governments are becoming increasingly sensitive to public opinion, no one will deny who remembers how slavery was abolished in the

<sup>1</sup> From "Kenya," by Norman Leys, 1924.

Belgian Congo as a result of British opinion. The principle of national colonial government with League supervision is not new. It is the principle behind the Mandates Commission of the League, which I am ready to prove to anyone has so far been a success.

Friends of wild life must act quickly, if we modern men are not to find ourselves masters of a world shorn of much of its beauty at the very stage when, through the development of machinery, we are obtaining increasing leisure to cultivate an interest in the things of the spirit. Two ways lie open to us. One is the path of coöperation among the nations, with, as a consequence, increased happiness and instruction for our children. There is also the path of laziness and inaction. At the end of this short and easy trail lies a desert, and a stillness which is everlasting.

*Philadelphia, Pennsylvania.*

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## BATS, BAT TOWERS AND MOSQUITOES<sup>1</sup>

BY TRACY I. STORER

[*Plate 11*]

From time to time during the past decade there have appeared references to the supposed service of bats as aids in the control of malarial mosquitoes. Most of these articles have been in popular magazines (see the "Readers' Guide to Periodical Literature" for exact references) but there has been at least one critical paper on the subject (Howard, 1920) which, however, appeared in a periodical not often seen by mammalogists. Most of the publicity given the subject has been in praise or criticism of the activities of Dr. Charles A. R. Campbell, a physician of San Antonio, Texas, who for fifteen years or more has been active in the establishment of artificial roosts for bats, premised on the belief that the bats were effective agents in the control of malarial mosquitoes. Dr. Campbell (1925) has recently published a book describing his work with bats; this volume is reviewed elsewhere in this JOURNAL (see p. 136).

While in Army service in 1919 the writer was stationed in San Antonio where he made the acquaintance of Doctor Campbell. Upon request the latter kindly afforded an opportunity to visit the first of the suc-

<sup>1</sup> Contribution from the Zoological Laboratory, College of Agriculture, University of California.