THREE IMPROVED TYPES OF THE MAXIM AUTOMATIC RAPID FIRE GUN.

The development of automatic devices in the smaller classes of rapid fire and machine guns has given them an enormous superiority over such guns of the common type, the Maxim 1½ inch automatic machine gun, for instance, firing 300 one pound shots per minute, with a velocity of 1,800 feet per second.

The development of the rapid fire and the machine gun has been marked by the display of great inventive skill, and those machine guns in which the gun is rendered absolutely automatic show the very refinement of ingenuity. As many of our readers are aware, rapid fire guns in general may be divided into three classes according as they are operated entirely by hand or are partly automatic and partly hand-operated or are entirely automatic. In the last case the cartridge is extracted, the new cartridge inserted, the barrel returned to firing position and the gun fired at the continuous rate of ten shots a second without any interference by the operator, the motive power being the energy of the recoil.

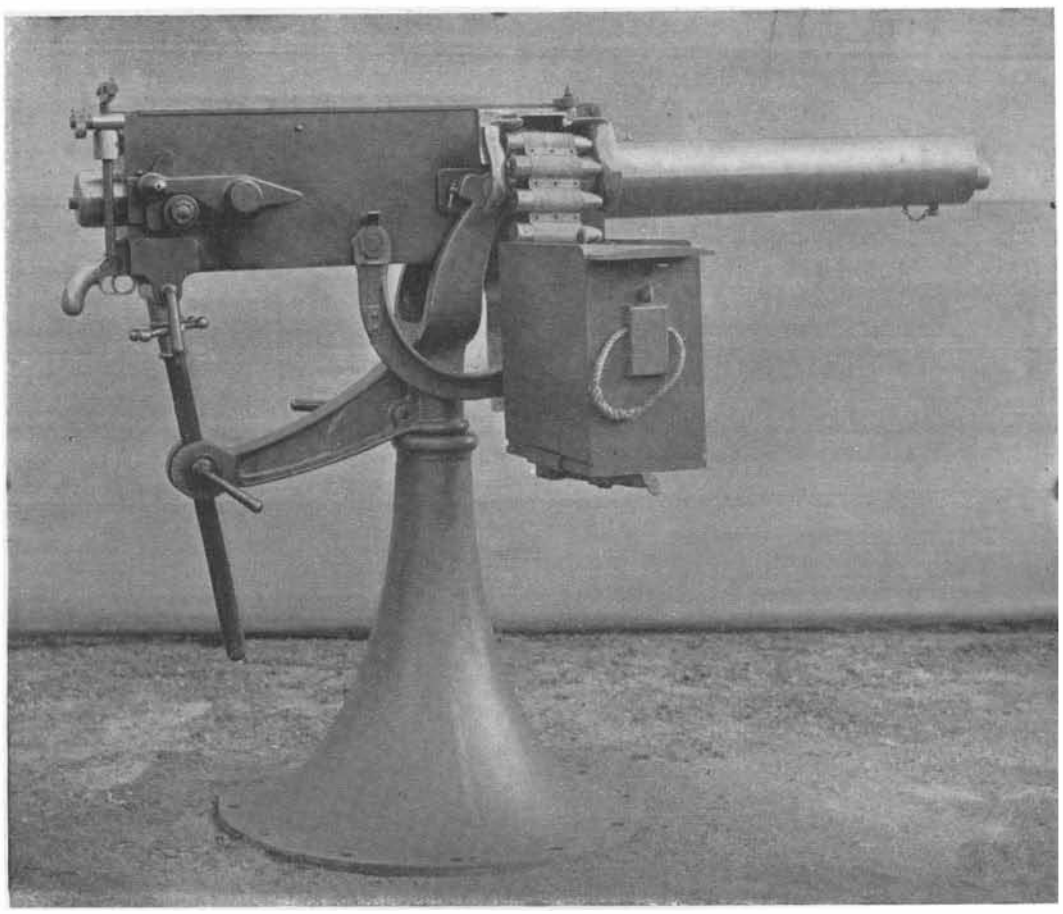


Fig. 1.—MAXIM 1½ INCH AUTOMATIC MACHINE GUN ON NAVAL MOUNTING.

Fires 300 one pound shells per minute. Velocity of shells, 1,800 feet per second; penetration, 2¼ inches of iron.

Our illustration, Fig. 1, shows the Maxim 1½ inch automatic machine gun on a naval cone mounting. The gun proper consists of two parts, namely, the recoiling and the non-recoiling. The recoiling portion is the barrel, the muzzle of which can be seen in the illustration projecting through the front cover of the water jacket, the recoil plates, the lock and the crank handle, which can be seen in the illustration on the nearer side of the gun. The non-recoiling part of the gun consists of the circular water jacket inclosing the barrel, the casing or frame containing the recoil mechanism, the rear cover of the machine and the trigger and pistol grip and a socket carrying the rear sight.

The water jacket is fitted with three openings, one for receiving the water, another for drawing it off and the third for letting out the steam, the third opening being connected to a system of tubes which permit the steam to escape but not the water in whatever position the gun may be laid.

The gun is supplied with cartridges from a belt which is carried in a box to the right hand of the gun and passes through a feed block on the top of the gun from right to left. The feed block carries two movable pawls and two stationary ones. The movable pawls are attached to a slide in the upper part of the feed block, which moves from left to right by means of levers acted upon by the barrel, the recoil of the barrel causing the motion. The pawls are pressed down by a spring and, engaging behind the next cartridge in the belt, move it forward automatically. When the barrel returns, the pawls place the cartridge still in the belt immediately over the chamber. When a shot is fired, the barrel, with the recoil plates to the rear of it, recoils for about an inch and a half, and the strong spiral spring surrounding the barrel is brought into a state of compression. During the recoil the crank handle, which is seen on the right hand side of the gun case, moves upon a small roller, which is placed beneath it, and the curve of the crank handle causes it to rise and throw the mechanism sufficiently far back clear of the breech to extract the empty case (of the previous round) from the barrel and draw a fresh cartridge from the belt. The turning of the crank above mentioned throws a volute spring attached to the crank shaft into tension. As the lock travels backward, the carrier drops down and the new cartridge, which the carrier has taken from the belt, is brought opposite the chamber at the barrel and at the same time the empty case is brought opposite the ejecting tube. The spiral spring above mentioned, which surrounds the barrel, now returns the barrel and the recoil plates into the firing position, and, as the lock moves forward, it pushes the new cartridge into the chamber and the empty case into the ejecting tube. The gun is now loaded and is ready to commence firing, which it will do as soon as the trigger is pulled. It will continue firing at the rate of five shots a second as long as pressure is maintained on the trigger and cartridges remain in the belt. The destructive power of such a weapon in the hands of a cool and skillful gunner would be terrible to contemplate.

This gun is well adapted to all kinds of service where rapid, continuous and accurate fire would be valuable. The various parts of the mechanism are strong and reliable, and, owing to the automatic character of the firing, great accuracy is possible. The lightness and compactness of the gun render it well adapted for use on torpedo boats, and it would also prove very effective for defense against torpedo boat attack.

Of course the mountings of the gun vary according to the different services for which it is intended to be used. The T piece, as will be seen in the illustration, works in a socket in the mounting, and the gun is capable of free motion in a horizontal plane, though, if it is desired, it can be clamped in any particular position. The position of the gun in a vertical plane is determined by means of an elevating screw which works in the end of a suitable arm attached to the T piece above mentioned. The training is effected by the man who lays the gun, who with his left shoulder pressed against a shoulder piece, and his right hand on the pistol grip, has full control over the movements of the gun. The particulars of this gun are as follows:

Caliber	1·45 inches.
Length of gun over all	73·75 "
Rifling, uniform 12 grooves	1 turn in 30 calibers.
Weight of shell	1 pound.
Length of common shell	3·67 inches.
Weight of powder charge (smokeless)	1 ounce 110 grains.
Velocity at muzzle	1,800 foot seconds.
Perforation of wrought iron at muzzle	2·25 inches.

The fully automatic principle has been applied by Mr. Maxim very successfully to guns of larger caliber. Fig. 2 represents a nine pounder naval gun which is provided with a hopper feed and is capable of firing sixty rounds per minute. This gun and all of its class are worked by the recoil of the barrel. When the arm is loaded and the breech closed, the trigger is pulled and the barrel recoils, taking with it the breech block, the energy of the recoil being checked by a hydraulic buffer, and the barrel returns into the firing position by the action of a powerful spring. The breech remains closed during the recoil and also during the forward movement of the barrel, and it is not opened until the barrel has nearly reached the firing position. By this means the breech remains closed long enough to allow the gases to escape. The cartridges, which in this case are three feet long, are placed in a magazine on the top of the barrel, and at each discharge the lowermost cartridge is thrown into a tubular carrier. The tubular carrier falls by the weight of the cartridge, and when opposite the barrel springs rapidly forward, throwing the cartridge into the chamber and liberating the breech block. The carrier, being now relieved of the weight of the cartridge, rises again into position opposite the lowermost cartridge in the magazine. At each discharge the carrier is thrown back against the action of the powerful spring. It might be said that the carrier is in a cocked position after each discharge and remains so until the cartridge falls down into line with the barrel, when it is liberated and the spring projects the cartridge into the chamber with great force. This arm is particularly well adapted for defense against torpedo boats, as it gives the gunner an opportunity of delivering a considerable number of shots in rapid succession without any assistance. Moreover, when the gun becomes heated, it is not necessary that the cartridge shall remain in the chamber while the gunner is watching for a torpedo boat. The cartridge being in the carrier, it is only necessary to allow it to fall in position, when the gun is instantly loaded and may be fired inside of a second.

The two guns already mentioned are shown upon naval mounts for use on shipboard; but the same types are also furnished with gun carriages for use in field service.

Another very interesting gun built by the same company is the hand-worked field gun shown in Fig. 3.

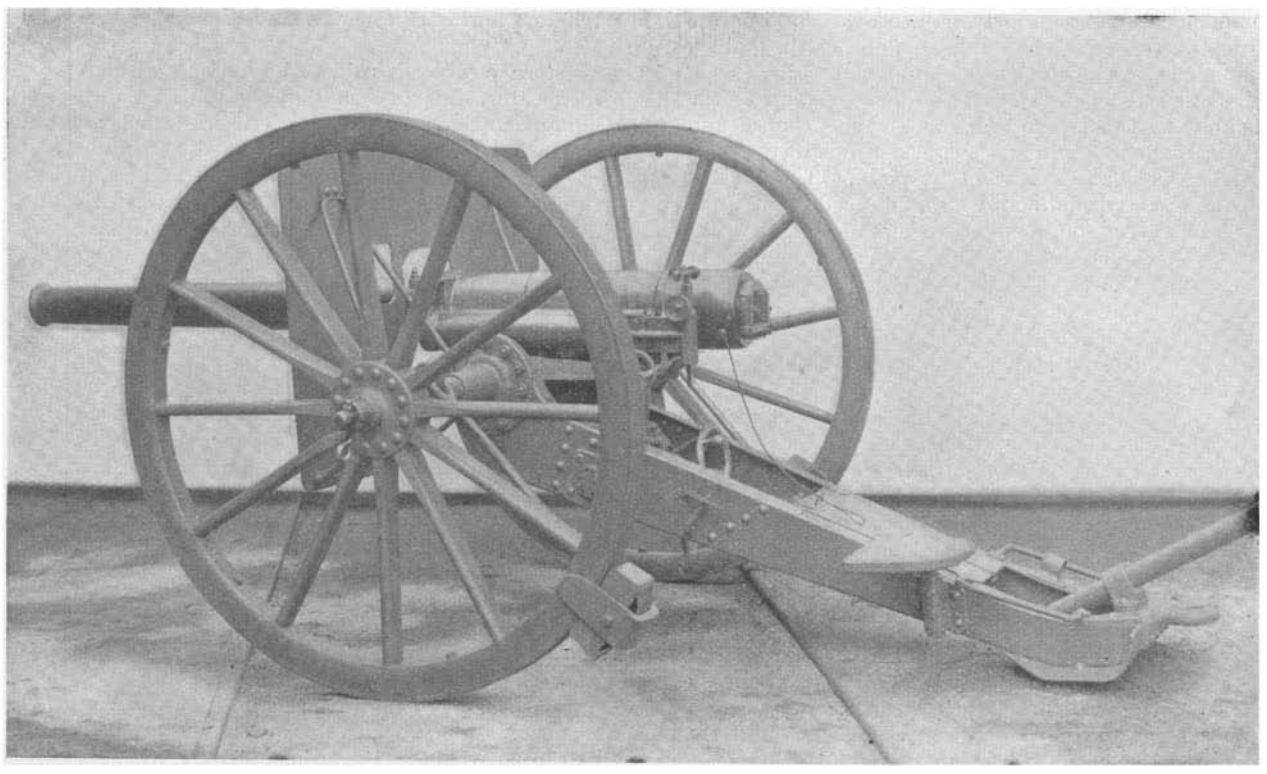


Fig. 3.—MAXIM HAND-WORKED FIELD GUN.

Weight of shell, 12 pounds. Rapidity of fire, 20 rounds per minute.

The caliber of this gun is three inches and the weight of the shot twelve pounds, and they may be fired with a rapidity of twenty rounds per minute. Field guns as ordinarily constructed have an excessive recoil, which is so great that the gun has to be brought up to position after each discharge. The Maxim-Nordenfelt Company has overcome this difficulty by allowing the barrel to recoil through a considerable distance on the carriage itself, the recoil being checked by a hydraulic buffer, the result of which is the carriage remains in approximately the same position and the gun requires only a very slight adjustment after each discharge.

The same company also makes semi-automatic guns, that is, guns in which the recoil of the barrel opens the breech and extracts the empty case, the breech remaining open until a new cartridge is thrust in by hand. The act of pushing in the cartridge disengages the breech block, which then closes itself with a spring. We are informed by Mr. Maxim that he has himself, without any assistance, fired forty rounds in fifty seconds from a gun of this type. The projectiles in this case weighed three pounds each, the cartridges being twenty-one inches long.

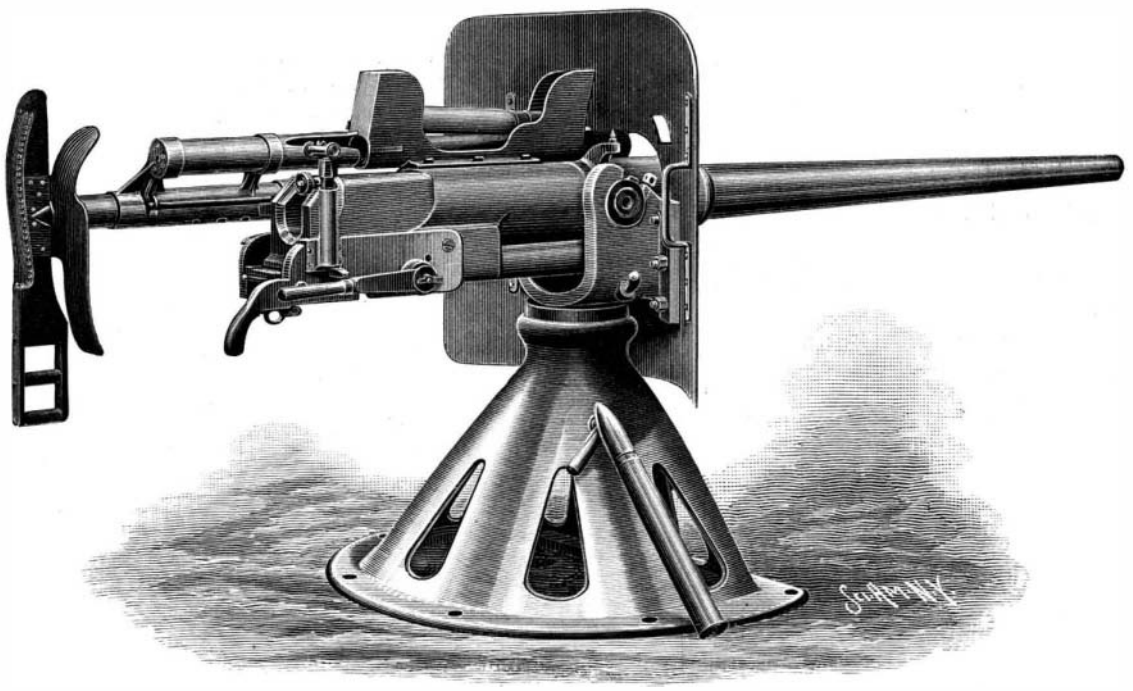


Fig. 2.—FULLY AUTOMATIC MAXIM NAVAL GUN.

Weight of shell, 9 pounds. Rapidity of fire, 60 rounds per minute.

MISS KINGSLEY'S TRAVELS IN AFRICA.

Although needing no such adventitious aid to popular notice as the recent massacre in Benin, the publication of Miss Kingsley's book is peculiarly appropriate just now, dealing as it does with that long stretch of maritime country from Sierra Leone to the Cameroons, including the districts known as the Ivory, Gold, and Slave Coasts. Although comprising some of the oldest colonized portions of Africa, comparatively little is known of these regions, and Miss Kingsley's volume, "Travels in West Africa, Congo Francais, Corisco, and Cameroons," by Mary H. Kingsley (London: Macmillan & Company, Limited), will be welcomed not only by ethnographers and students, but by all who take an interest in queer peoples and strange lands. For it is a wonderful book, written by a remarkable woman. Had it been written by a man, it would have been a monumental performance. But when it is remembered (however difficult it sometimes is to do so) that this is the record of a woman's travels and work, it makes one proud of one's race, and renders it easy to understand why and how the British make the best colonists. That a woman should go alone and unarmed (for Miss Kingsley, unlike some other African explorers, never fired a shot at a native) into these savage and dangerous countries; should brave the terrors of disease, swamps, wild animals, and cruel and bloody customs, just for the sake of making collections of rare fishes and investigating the curious "fetish" customs of the inhabitants, is a marvel indeed. True, Miss Kingsley herself does not appear to think her conduct and adventures very extraordinary. She minimizes the dangers, and makes light of the difficulties and miseries of traveling in this "Land of the Shadow of Death." Intelligently, appreciatively, often enthusiastically, does she speak of the Guineas and their inhabitants, and especially so of her pet tribe, the Fans.

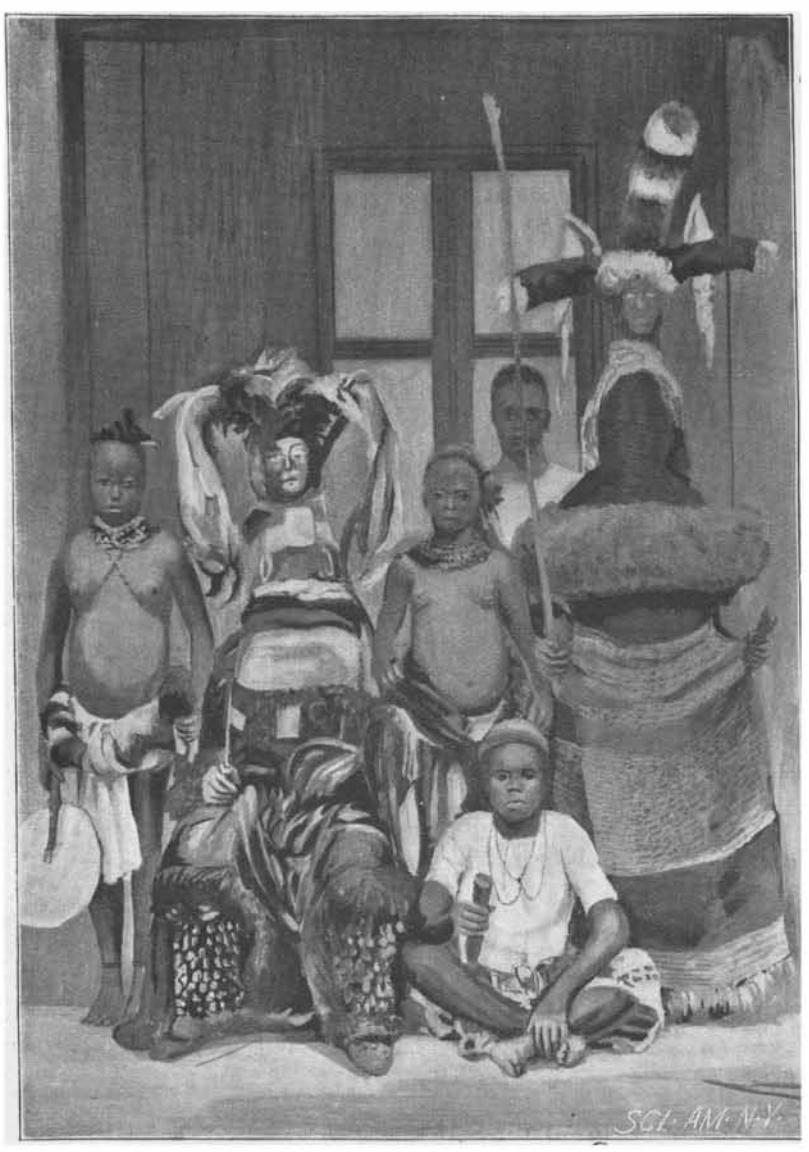
It was on December 23, 1894, that Miss Kingsley left Liverpool for Sierra Leone. Early in the January following she landed at Free Town, concerning which port she gives us some amusing details. Cape Coast Castle and Akkra were the next places of interest at which the author stopped.

Miss Kingsley's chief motive for going to West Africa was to study the African form of thought among a tribe in its original state. It is not surprising, therefore, that she devotes five long and interesting chapters to Fetish, which embraces not only the negro's religious and mental life, but exerts a paramount influence on, and is commingled with, his everyday life, down to his simplest action. About this she says:

"Since 1893 I have been collecting information in its native state regarding Fetish, and I use the usual terms fetish and ju-ju because they have among us a certain fixed value—a conventional value, but a useful one. Neither 'fetish' nor 'ju-ju' are native words. Fetish comes from the word the old Portuguese explorers used to designate the objects they thought the natives worshiped, and in which they were wise enough to recognize a certain similarity to their own little images and relics of saints, 'Feitiço.' Ju-ju, on the other hand, is French, and comes from the word for a toy or doll; so it is not so applicable as the Portuguese name, for the native image is not a doll or toy, and has far more affinity to the image of a saint, inasmuch as it is not venerated for itself, or treasured because of its prettiness, but only because it is the residence or the occasional haunt of a spirit."

Although crude in essence and cruel in application, the negro's Ju-ju, or religious belief and practice, has still many common sense reasons underlying it, and occasionally a poetic idea entwined with a lot of arrant nonsense.

The Ju-ju man frequently combines, as he generally does in all savage races, the offices of priest and medicine man. Whatever he may be as a priest, as a doctor he is mostly a failure.



DEATH DANCE COSTUMES, OLD CALABAR

"The African doctor is not always a witch doctor in the bargain, but he is usually. Lady doctors abound. They are a bit dangerous in pharmacy, but they do not often venture on surgery. So, on the whole, they are safer, for African surgery is heroic. Dr. Nassau cited the worst case of it I know of. A man had been accidentally shot in the chest by another man with a gun on the Ogowé. The native doctor who was called in made a perpendicular incision into the man's chest extending down to the last rib; he then cut diagonally across and actually lifted the wall of the chest, and groped about among the vitals for the bullet, which he successfully extracted. Patient died."

One of the chief reasons for killing wives, slaves, and other persons on the occasion of a great man's death among West Africans is not because they delight in shedding blood, but that the chief may have servants and wealth and position in the next world. In the Niger Delta there is a different reason, but one equally efficacious in the destruction of human life.

"Among the Tschwi the slaves and women killed are to form for the dead a retinue and riches wherewith to start life in Srahmandazi, where there are markets and towns and all things as on this earth, and so the Tschwi would have little difficulty in replacing human beings at funerals with gold dust, cloth, and other forms of riches, and this is already done in districts under white influence. But in the Delta there is no under-world to live in, the souls shortly after reaching the under-world being forwarded back to this in new babies, and the wealth that is sent down with a man serves as an indication as to what class of baby the soul is to be repacked and sent up in. As wealth in the Delta consists of women and slaves, I do not believe that the under-world gods of the Niger would understand the status of a chief who arrived before them, let us say, with ten puncheons of palm oil and 400 yards of crimson figured velvet. They would say, 'Oh! very good as far as it goes, but where is your real estate? The chances are you are only a trade slave boy and have stolen these things.' And in consequence of this, killing at funerals will be a custom exceedingly difficult to stamp out in these regions."

The tribe of West Africans most favored by Miss Kingsley were the Fans, as they have more of the qualities she likes than any other tribe she has met.

"They are brave, and so you can respect them, which is an essential element in a friendly feeling. They are on the whole a fine race, particularly those in the mountain districts of the Sierra del Cristal, where one continually sees magnificent specimens of human beings, both male and female. Their color is light bronze, many of the men have beards, and albinoes are rare among them. The average height in the mountain districts is five feet six to five feet eight, the difference in stature between men and women not being great. Their countenances are very bright and expressive, and if once you have been among them, you can never mistake a Fan. But it is in their mental characteristics that their difference from the lethargic, dying-out coast tribes is most marked. The Fan is full of fire, temper, intelligence and go; very teachable, rather difficult to manage, quick to take offense, and utterly indifferent to human life. I ought to say that other people, who should know him better than I, say he is a treacherous, thievish, murderous cannibal. I never found him treacherous, but then I never trusted him."

Added as appendices are some remarkably able essays on such important questions as trade and labor and disease in West Africa. With the former the missionary question is indissolubly associated, for the missionaries seek to place impediments in the way of the liquor traffic—by means of which most of the trade is done, especially in the interior, where commercial transactions are all conducted by barter, and bottles of spirits are the handiest and safest medium of exchange. The author's travels in French