

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-Nordenfolt 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.

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 Coast, 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

"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 where-

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.

with 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 albinos 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

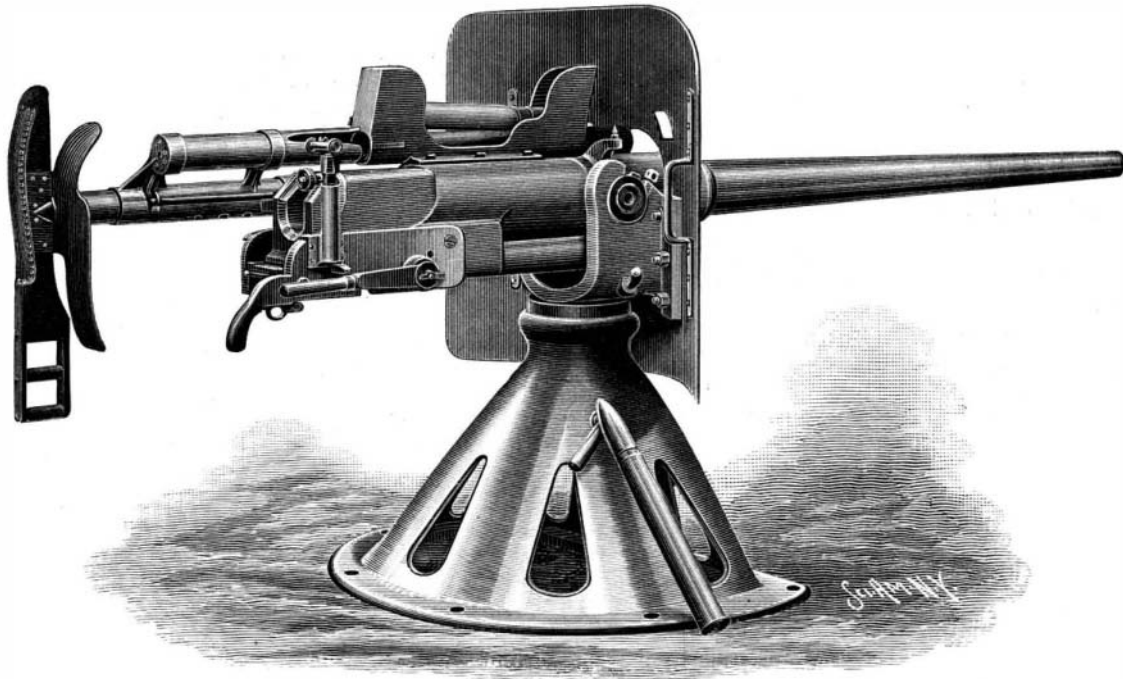
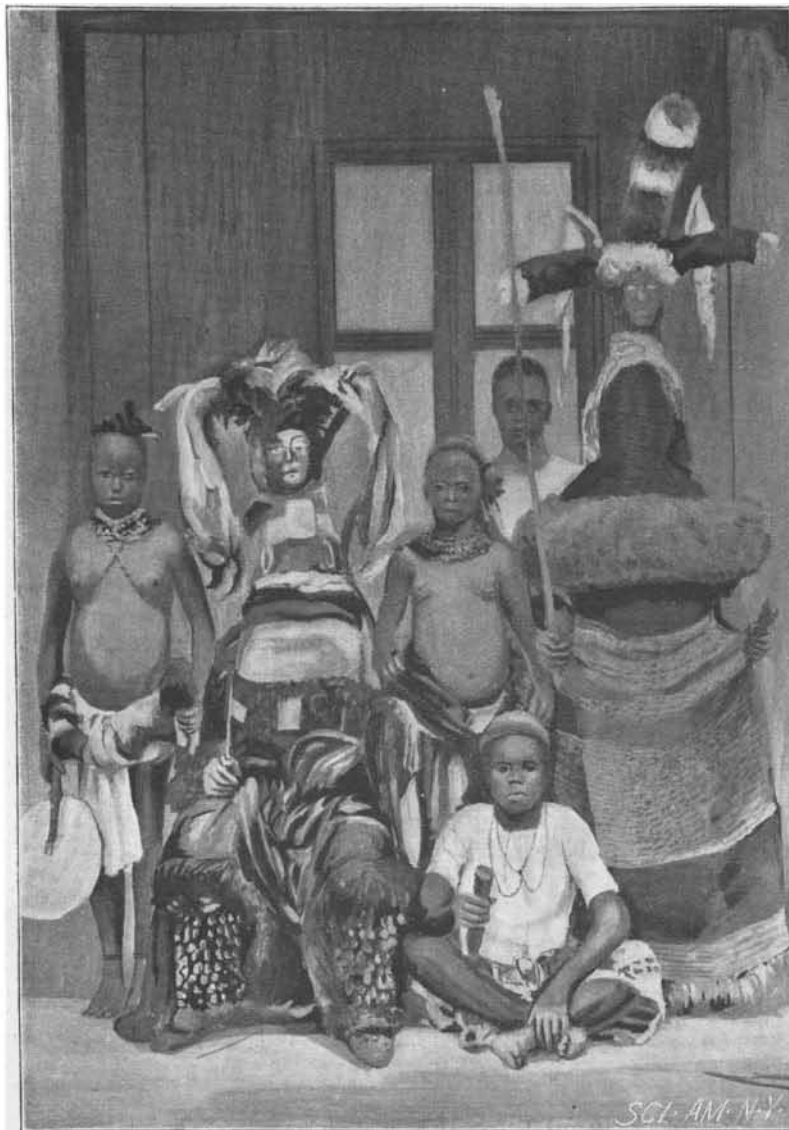


Fig. 2.—FULLY AUTOMATIC MAXIM NAVAL GUN.
Weight of shell, 9 pounds. Rapidity of fire, 60 rounds per minute.



DEATH DANCE COSTUMES, OLD CALABAR.

and German territory — of the officials of which countries she speaks very highly — possess a strong interest both for geographer and statesman. Like the true patriot she is, Miss Kingsley not only sees the possibilities of the usefulness of these West African colonies to Great Britain, but is desirous that they should be utilized to their fullest extent. Since the force of circumstances, duty, and profit all seem to tend to our occupation and administration of these extensive districts, it is the duty of all patriotic persons to know as much as they can of them. To acquire this knowledge it would be almost impossible to go to a more instructive, informative, and withal eminently enjoyable work than that in which Miss Kingsley describes her travels in West Africa.

For our engraving and the foregoing review we are indebted to St. James's Budget.

Science Notes.

Professor Von Voit, of Munich, Germany, has investigated the nutritive value of extracts of meat, and now announces as the result of his researches that such extracts have very little nutritive value, if any, and that their action is almost entirely a stimulating one, being due to their contents of alkaloids, such as creatine and creatinine.—Prometheus.

A very interesting account of some simple experiments on central attraction is contributed by Mr. R. W. Wood to the Physical Review. Mr. Wood employs a circular glass plate having a hole in the center through which the "somewhat conical" pole of a powerful electro-magnet projects. This glass plate is worked and set quite level, and then a bicycle ball is blown across it in the direction of—but not exactly to—the pole of the magnet. Parabolas, hyperbolas, and ellipses can thus be described on the plate by giving varying initial velocity to the ball.

The great objective of the Yerkes telescope at the Yerkes Observatory, Williams Bay, Wis., has been successfully placed in position, and on May 21, President Harper, of the Chicago University, and a party of representative Chicagoans were present. The visitors were shown the two motions of the telescope, the clock was started, the lifting floor came up with a motion almost imperceptible, the great dome revolved, and the telescope was turned on Jupiter. Director Hale then adjusted the instrument and President Harper was the first of the visitors to look through the greatest telescope in the world. Professor Barnard declares that it is not possible to estimate what the telescope may do for science. It may take several weeks, and possibly months, for the operators to successfully solve the problems which the atmosphere may present.

The property acquired by gases, after being traversed by electric sparks, of cooling heated bodies as if the gases had become better conductors of heat, forms the subject of a short note by Prof. E. Villari (Rendiconti della R. Accademia di Napoli), says Nature. The phenomenon was observed by studying the action of different gases on a platinum spiral heated to redness by the electric current, the sparks being produced by a powerful coil reinforced by large Leyden jars. In some cases the apparent cooling produced a fall of resistance of 10 per cent. Under similar conditions, the effect was nearly the same for oxygen, nitrogen, and air, but was much less marked in the case of hydrogen. It increases with the energy of the sparks, and also, at first, with the temperature of the spiral; but after this exceeds a certain limit, the refrigerating power decreases. Experiments made with a similar apparatus, with a view of testing whether Roentgen rays modify the thermal conductivity of the gases they traverse, have as yet given negative results.

Those who have studied rocks from the point of view of their magnetic properties, observes a writer in Nature, have long been aware of the existence of certain isolated portions, or zones, endowed with intense magnetization, the distribution of which, in general, bears no fixed relation to the direction of the earth's magnetic field. The theory has been frequently advanced that these singular points owe their magnetization to discharges of lightning, and this theory is said to have received a remarkable confirmation at the hands of Dr. G. Folgheraiter, who finds, as the result of numerous observations of the remains of walls and ancient buildings in the Roman Campagna, that these structures frequently exhibit singular points and zones in every respect identical with those observed in rocks. It is suggested that the presence of singular points in walls might be accounted for by supposing that they had existed in the stone before it was used for building; but this explanation is incapable of accounting for the singular zones in which a number of adjacent stones, as well as the mortar connecting them, were found to be so powerfully magnetized that even a small detached portion of the mortar was capable of deflecting a compass needle through 180°. These zones could only have derived their magnetization after the wall had been built, and the presence, in some cases, of cracks down the wall in the neighborhood of the singularities, such as would be caused by lightning, tends to confirm the present theory of their origin.

The Truth and the Trusts.

Perhaps the most discussed subject in this republic to-day is the question of capitalistic combination for carrying on business operations. The agitators, taking advantage of the general interest in this question, have been quick to take up the cry that the liberties of our people, the resources of our land and the land itself, are being acquired by the few and so utilized as to defraud the many out of their just and inalienable rights and privileges. Without taking the trouble to acquaint themselves with the truth, many citizens of the republic give credence to the assertions of the agitators, and out of the falsifications by malicious propagandists and the ignorant credulity of their followers have arisen confusion, perplexity, discord and conflict. The only way to fight erroneous public opinion is to meet it with the weapons of fact and figure, and this is what conservative men are doing. The propagandists of hatred of capital, of hostility to wealth in general, and of discord and conflict have laid down the general propositions that a rich man is a criminal, that a corporation is a conspiracy, and that, wherever a large combination of capital is employed in business, it is employed to rob the many for the benefit of the few.

Against these vicious propositions, in the abstract, it may be fruitless to argue, for opinions are not easy to change, but there is a concrete side of the question which must appeal to even the opinionated ignoramus who have been deluded by the empty assertions of the propagandists. Neglecting the slanderous proposition that a rich man is necessarily a criminal, and the equally absurd proposition that a corporation is a conspiracy, the student of current affairs may meet the concrete position, that capital in business is always employed to rob the many for the benefit of the few, with substantial proof of the falsity of that theory. The record of market movement and prices is the weapon with which the student may successfully assail this pet theory of the crank legislators and of the falsificationists in general. What does that record show? Does it prove that large combinations of capital have controlled standard articles of consumption and increased the cost of those articles to consumers? Take the most notable of these combinations. The Standard Oil Company was formed in 1872, and it found the markets supplied with dear and dangerous illuminating oils. This company employed scientists, inventors, mechanics and business men, laid pipe lines, reduced the cost of package and transportation, and made illuminating oil safe. In 1872 dangerous oil sold at 25 cents a gallon, and in 1897 it sells for 6 to 8 cents a gallon. So much may be said for the one great "trust." The example of the one great "corporation," the American Sugar Refining Company, is similar. This corporation was formed in 1887. It found sugar selling at 7 cents a pound, and in 1897 it sells the same grade of sugar for 4 cents a pound. The Cottonseed Oil Trust, formed in 1884, has reduced the price of standard summer yellow oil from 48 cents a gallon in 1884 to 24 cents a gallon in 1897.

Among other capitalistic combinations are many that have similarly cheapened the products which they manipulate. The United States Rubber Company, formed in 1892, advanced prices far enough to insure a profit, but outsiders have compelled a reduction. The United States Leather Company has controlled since 1892 the sole leather output of the country, but prices have gone down until leather is selling at 17½ cents a pound, while the raw hides sell at 18½ cents a pound. The National Cordage Company smashed itself in its attempt to smash others, and its successors are now selling for 6 cents a pound the same product that sold for 10 cents a pound before the original trust was organized. The Whisky Trust, formed in 1890, found alcohol selling at \$1.44 per gallon, including the revenue tax of 90 cents, and to-day it is selling at \$1.16 per proof gallon, including the revenue tax of \$1.10. The bituminous coal producers combined in 1896, and sold coal at \$2 to \$2.10 per ton, and to-day it is quoted at \$1.70 per ton. The anthracite coal producers put stove coal up from \$3 to \$4.10, and after one year, of combination they dissolved, and coal again fell in price. The telegraph companies have been denounced as "gigantic conspiracies." They formed a combination in 1866. In that year it cost \$2.20 to send a 10 word message by wire from New York City to Chicago, and to-day it costs 40 cents. They have reduced the cost of such a message during thirty years proportionately to all parts of the republic. The business man in New York finds his 10 word message to St. Louis reduced from \$2.25 to 40 cents, to New Orleans from \$3.25 to 60 cents, to St. Paul from \$2.25 to 40 cents, to Galveston from \$5.50 to 75 cents, to San Francisco from \$7.45 to \$1, to Oregon from \$10.20 to \$1, and to the State of Washington from \$12 to \$1. The railroads of the country have likewise reduced the charge of moving a ton of freight a mile from 2-21 cents in 1873 to 0-84 cent in 1897.

Even these achievements, which are beyond dispute, do not tell the whole story. While these trusts, firms and corporations have so enormously reduced costs to the consumers of the country, they have, on the whole, increased the average of the wages which they pay to

their laborers. According to the theories of the agitators, all these combinations have robbed the people of their money and their liberty, but the record shows that the combinations, like business men in general, fail in some lines and succeed in others, that they have, by making use of scientific economics, reduced the cost of all standard products to consumers, and that, instead of having robbed the people of any privileges or liberties, they themselves have been subjected to restrictive legislation in the different States and in the national council. Thus do the plain truths and facts tell against the main indictment in the charge of the demagogues against the capitalists of the land. An illustration of the trust question was furnished in the recent collapses of several conspicuous and much-maligned combinations in the metal industries. The moment these concerns dissolved, the prices of their products were cut, and they were forced either to close their establishments or to cut down the wages of their laborers enough to cover the drop in prices. This, again, was contrary to the teachings of the demagogues, who have all along insisted that in "securing to labor its just reward or remuneration," the "first and necessary step is the squelching of the capitalist." Indeed, wherever and whenever the demagogic theories collide with the commercial and industrial facts, there is a wreck, and it is never the fact that is wrecked.

Demagogic agitation will continue so long as the agitator can find men to accept their falsehoods as truths and their baseless claims as facts, but it seems probable that, with the spread of a more general knowledge of what has been accomplished by the great capitalistic concerns, agitation must become a less harmful and a less dangerous evil than it has been.—By A. B. Salom, in the American Wood-Worker.

Oscillations of a Tower.

Prof. W. Ritter gives in the Schweizerische Bauzeitung of February 13 the results of his experiments on the oscillations of a tower in Zurich produced by the ringing of bells, says the Railway Gazette. The tower, which is 39½ meters high, contains five bells, ranging in weight from 425 to 3,430 kilogrammes, and it is remarkable that the light bells produced greater oscillations of the tower than the heavy ones. The horizontal oscillations were elliptical in shape and variable in size, those produced by a bell of 705 kilogrammes, which was swung fifty-three times per minute, being at a maximum 3-6 mm. long and 2-4 mm. wide, the longest axis being in the direction of the movement of the bell. When the five bells were rung at once the ellipse had a maximum major axis of 5-8 and a minor axis of 4-4 mm. The bells were swung from forty-three to fifty-seven times per minute, while the tower oscillated quite uniformly 160 times per minute. It was shown that the oscillations were felt at any point in the tower below the bells and that the amount of movement was proportional to the height above the ground. According to the principle of the conservation of center of gravity the tower tends to move in the opposite direction to that of the bell, and this movement increases until the resistance of the masonry produces equilibrium with the impulsive forces.

THE WASHINGTON MONUMENT, PHILADELPHIA.

The new Washington monument, erected at the Green Street entrance of Fairmount Park, Philadelphia, which was presented to the city by the State Society of the Cincinnati, was unveiled on May 15 by President McKinley in the presence of thousands of spectators. The statue is one of the most important and imposing monuments ever erected in the United States. In 1783 the officers of the revolutionary war, wishing to perpetuate their friendship and raise a fund for relieving the widows and orphans, organized the Society of the Cincinnati. In 1810 they began to raise a fund of \$150,000 to build a monument to George Washington, but owing to the troublous times following the war of 1812 this movement was stopped temporarily. When Lafayette visited Philadelphia in 1824, the absence of any monument caused some adverse criticism, and a new fund was started which was soon forgotten, but was revived in 1832 on the one hundredth anniversary of Washington's birth. The fund of 1810 had in 1880 grown to \$137,000, and the funds of 1824 and 1832 had grown into \$50,000. The union of these funds, together with their further increase by investment and donation, was sufficient to pay for the splendid memorial which has just been unveiled, which cost in all \$250,000. The design was made by the German sculptor, Rudolph Siemering, and represents an equestrian statue of George Washington on an immense pedestal of bronze placed on a granite platform or base. The figures and ornaments are all in bronze, and the monument as it now stands is forty-four feet high. The base of the monument is oblong in shape, 61 x 74 feet, and is built of pink Swedish granite, having thirteen steps, symbolical of the thirteen original States. At the corners are fountains representing four great American rivers, the Delaware, Hudson, Potomac and Mississippi, with allegorical figures of Indians. These fountains are guarded on either side by native animals, all in bronze. From the platform rises a