

with Ceylon tea selling in the New York market at 25 cents a pound wholesale. It has some of the characteristics of Ceylon tea, but is radically different from Formosa Oolong tea, which it resembles somewhat in appearance.

As is well known, the finest teas made in the Orient will not bear transportation to the United States, and are never seen in this country. As Dr. Shepard is aiming at the production of these finer grades, the leaf plucked from his bushes rarely consists of more than the Pekoe tip and two leaves, and then only to the first Souchong. The picking of a coarser and larger leaf or two would, of course, greatly increase the yield and lessen the cost. The actual cost per pound of the several operations in the growth, picking, and curing of the crop of 1898 were: pruning, 3 cents; manuring, 3 cents; cultivation, 1½ cents; leaf picking, 14 cents; factory work, 6 cents; a total of 27½ cents. Possible reductions on a conservative estimate lessen the cost of production to 16 cents a pound. The chief expense, it is seen, is that of picking, which is about eight times more than the same work would cost in Asia and at present rules out competition as regards the lower price teas.

In facing the difficulty of obtaining laborers when he needed them, Dr. Shepard has hit upon a plan which savors largely of humanitarian endeavor. Seeing the mass of idle young colored people about him, he proposed to give them the elements of an education, providing school house and competent teacher at his own expense, on the conditions that they would learn also to pick tea at reasonable wages for the service, a mutual benefit plan which has resulted favorably to all concerned.

In the establishment of a large tea estate, a considerable initial outlay is naturally required. The expense of raising and setting out the tea seedlings varies from \$25 to \$50 an acre whether raised from foreign or domestic seeds. A suitably equipped factory is necessary, costing from a few thousands upward, according to the proposed scale of operations. But the permanence of the investment commends it. The best Japanese tea comes from bushes 200 years old. The annual output already realized at the Pinehurst tea gardens reached a total of 3,500 pounds during 1898.

The plan of the National Department of Agriculture to establish a tea farm in every Southern State as soon as this can be done intelligently will lead to more general experimentation by our scientists with these plants of the tropics. Aside from the work of Dr. Shepard very little has been attempted in a strictly scientific manner. The Japanese have done something in the way of analyzing the tea leaves at different seasons, but their conclusions are far from being conclusive or satisfactory.

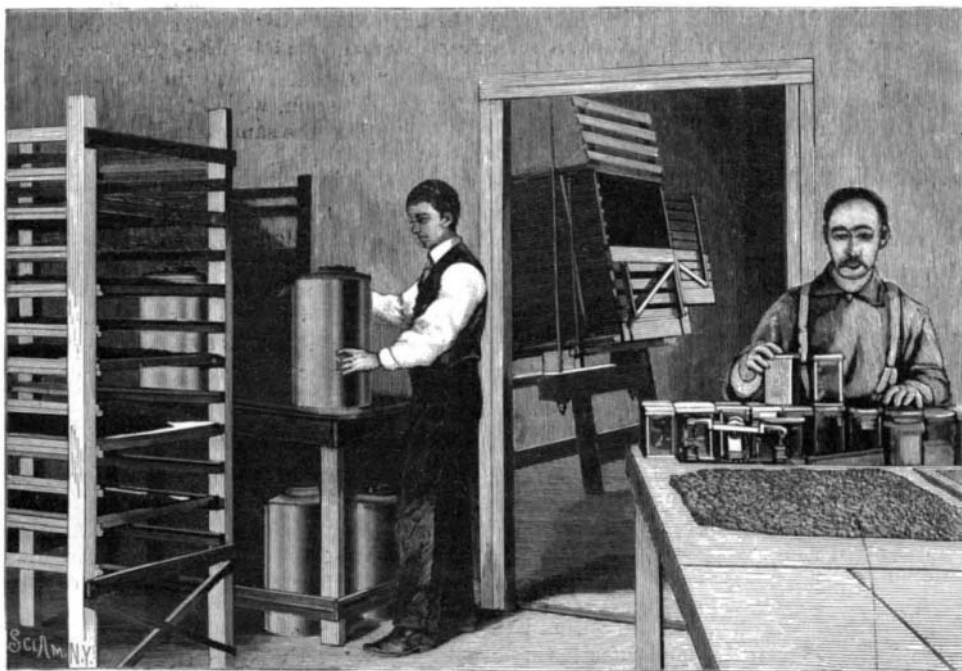
THE RETURN OF ADMIRAL DEWEY.

Since the time of the nations of antiquity, the homecoming of a great warrior, successful either on land or sea, has ever been the occasion of great demonstrations, such as no other event can inspire, so that we feel no apology is necessary for the presentation of a number of views of Admiral Dewey's arrival and subsequent sojourn at Trieste, Austria. The American people hold Admiral Dewey particularly dear by reason of his daring achievements at Manila. To-day personal valor in the navy is not to be underestimated, but it is the mind rather than the hand which wins the day. It takes a brave officer to run his vessel through a harbor protected by contact and observation mines, and this warfare, in which brain power plays such an important part, has begotten an entirely new type of sailor. Admiral Dewey is such a man. With experience in a previous war when ironclads were in their infancy, he combines all the skill of the old school with that of the modern officer who learns from day to day, and who is constantly on the alert to gain information regarding vessels "built and building" or on guns and armor.

The battle at Manila Bay occurred at a most opportune moment, allaying our fears that we were unprepared, and striking terror to the Spanish arms. It was the beginning of hostilities and the beginning of a victorious end. The battle won, Admiral Dewey remain-

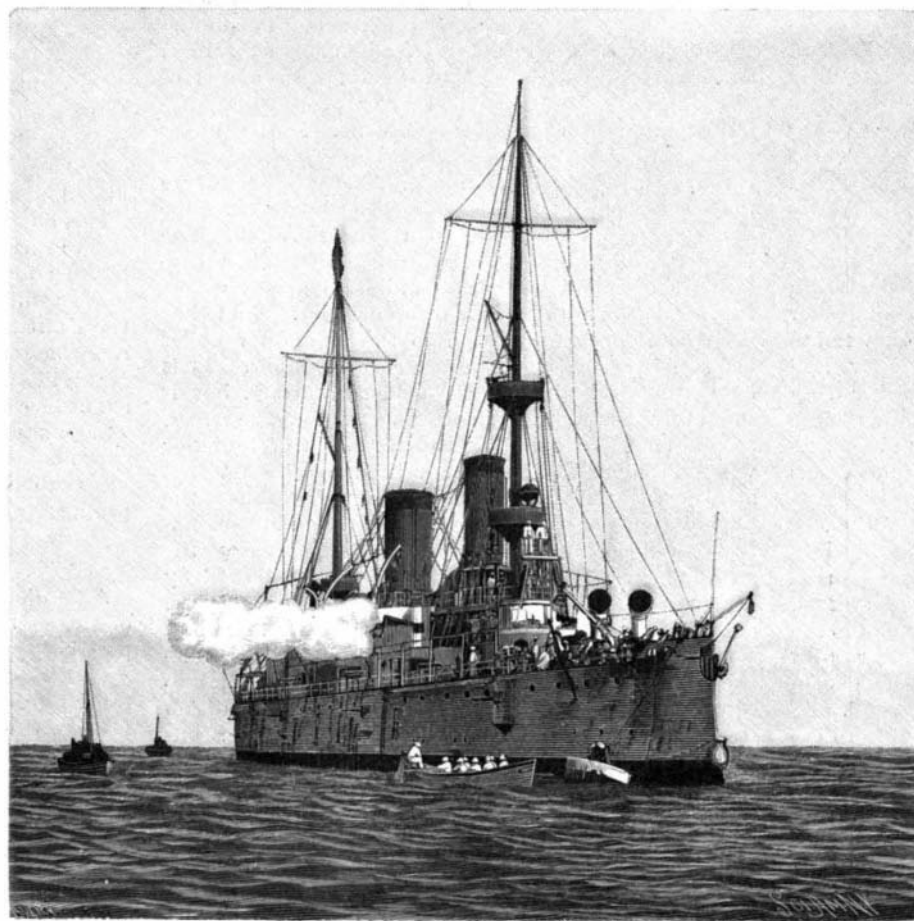
ed at his post administering the affairs of the unsettled community until even he felt the need of a rest, and he is now making his way westward on the flagship "Olympia" via Hong Kong, Colombo, and the Suez Canal, and then by way of Europe, and he will probably arrive at New York about October 1, where he will receive such a welcome as no other American has ever had.

The "Olympia" reached Suez July 13, and then it



DYEING, WEIGHING AND PACKING TEA LEAVES.

was known that Trieste would be the first European port to bid him welcome. The "Olympia" reached Trieste on the morning of July 20; she came into port with her colors flying and exchanged the twenty-one gun salute with the fort. Our engraving is made from a photograph taken as the first gun of the salute was fired. Consul W. S. Hossfeld boarded the cruiser and exchanged congratulations with the Admiral. Subsequently the Port Captain, the Captain of the "Amphitrite," and the Admiralty Captain, in the absence of the Austrian Admiral, boarded the "Olympia" and welcomed Admiral Dewey. The Hon. Addison C. Harris, American Minister to Austro-Hungary, with his first secretary, and Captain Beehler, Naval Attaché to the American Legations at Berlin, Vienna and Rome, next arrived, and then came the local authorities. One of our engravings shows Minister Harris leaving the



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ARRIVAL OF THE "OLYMPIA" AT TRIESTE—THE SALUTE.

"Olympia." Among the other visitors were consuls of several countries and various officials. Then followed a round of visits which the dignity of the Admiral's high rank demanded, and all were greatly charmed with his affability and modesty. A banquet was given in the Hôtel de Ville by Minister Harris. The military authorities posted a guard of honor outside the hotel where the Admiral was stopping.

The visit of the "Olympia" to the port created great

interest, and all day long the piers were crowded with persons anxious to see the vessel or to catch a glimpse of the unassuming victor of Manila Bay, and small boats constantly crowded around the cruiser. On July 22, Admiral Dewey visited the park and castle of Miramar, which was built by Maximilian, whose brief occupancy of the throne of Mexico ended so soon in death. The Admiral was particularly interested in the many mementoes and reminiscences of the Prince which were scattered about everywhere according to the good old conservative European custom. In the evening, a banquet of twenty-two covers was given on board the "Olympia," and the next day a visit was made to Optehima, an elevation of 1,035 feet, which commands a beautiful view of the city and harbor. Notwithstanding the fact that Admiral Dewey objects to have his photograph taken, he found photographers everywhere, and he is said to have been greatly amused by the assiduity with which he was pursued. One of our engravings shows the Admiral with Captain Lamberton and Consul Hossfeld and Lieut. Brumby paying official visits, and the Admiral walking and driving in the park at Miramar. At the various dinners which took place and in the official calls, Admiral Dewey never once let fall a single word which even the most ingenious diplomat could twist into an opinion on international problems.

While at Trieste, he cabled that the arrangements made for his reception at Washington were satisfactory to him, and he will soon have the greatest honor ever conferred on a soldier or sailor in the history of our country, the sword voted to him by Congress being presented to him by the President on the steps of the Capitol at Washington.

On August 1, the "Olympia" sailed for Naples at four o'clock in the afternoon and arrived at that beautiful city on the morning of August 5. An enormous crowd assembled to see Admiral Dewey, and all who are familiar with the mercurial temperament of the pleasure loving Neapolitans will not be surprised to learn that their greeting was enthusiastic, and they cheered him lustily. Many buildings displayed American colors and the reception by the Prefect and municipality was most cordial. Italian officers are to give the Admiral a dinner on a warship, and he has been asked to be present at the launching of an armorclad and there seems to be no chance of a dearth of amusements. His further movements have not been made public at the time of going to press. It is considered very doubtful if he will visit England, but it is greatly desired in that country that such a visit be made.

Decision in the Griffin Mill Case.

The Bradley Pulverizer Company have won their case in their appeal from the decision of Judge Kirkpatrick, of the Circuit Court of the United States for the District of New Jersey, who decreed that the Griffin mill did conflict with the patents of the Huntington Dry Pulverizer Company.

In order to absolutely settle this question, the Bradley Pulverizer Company appealed from this decision to the court of final record in patent matters, the United States Circuit Court of Appeals for the Third Circuit, Judges Acheson, Dallas and Buffington presiding, and that body has rendered an elaborate opinion, reversing the decision of Judge Kirkpatrick, and sustaining the Griffin mill patent, saying: "In short, we have reached the conclusion that, both in construction and mode of operation, the two machines are essentially dissimilar, and that, therefore, they cannot be regarded as being, in the sense of the patent law, substantially identical."

"It follows that the decree of the Circuit Court must be and it is reversed; and the cause will be remanded to that court with direction to enter a decree dismissing the bill of complaint with costs."

It will thus be seen that the Bradley Pulverizer Company have won their case, and established the fact that the Griffin mill is radically different, both in structure and in principle, from those of their competitors.

THERE are 45 admirals in the French navy and 330 generals in the French army.

SCIENTIFIC AMERICAN

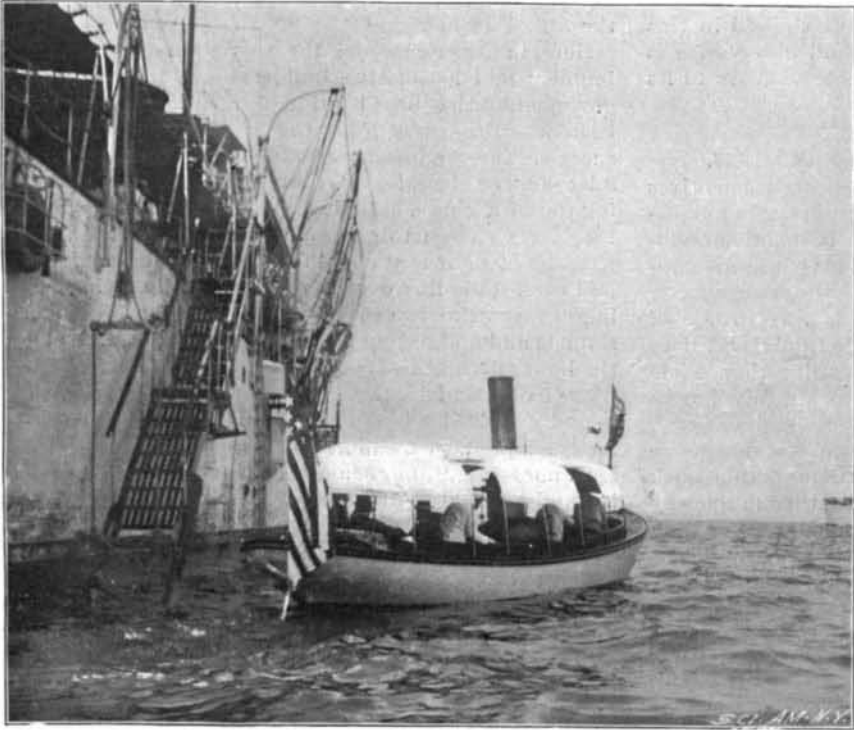
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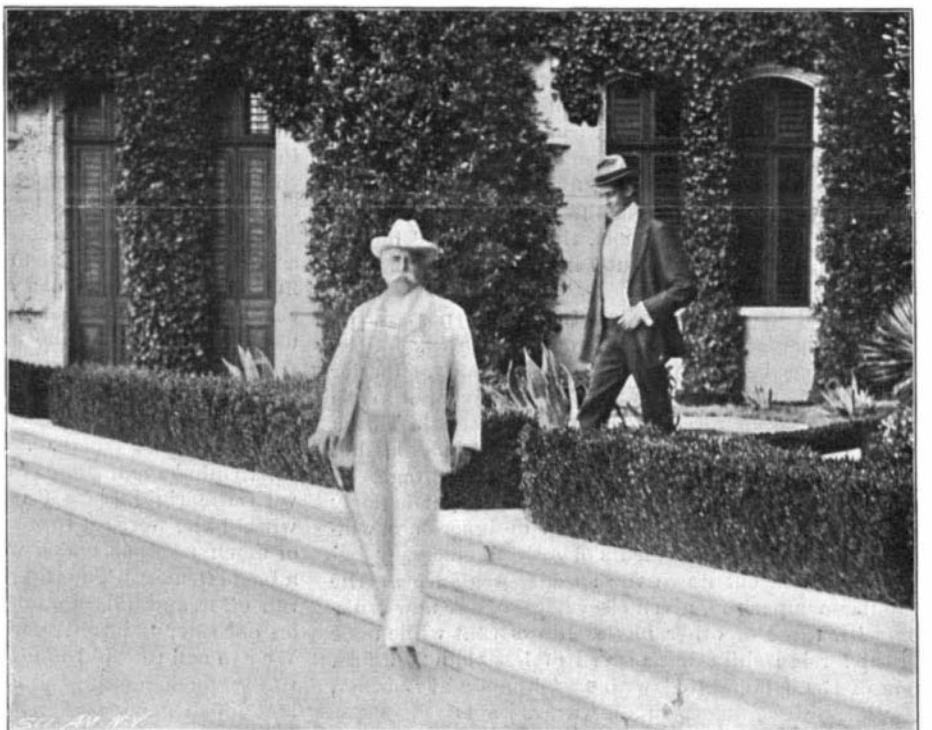
United States Minister Harris Leaving the "Olympia."



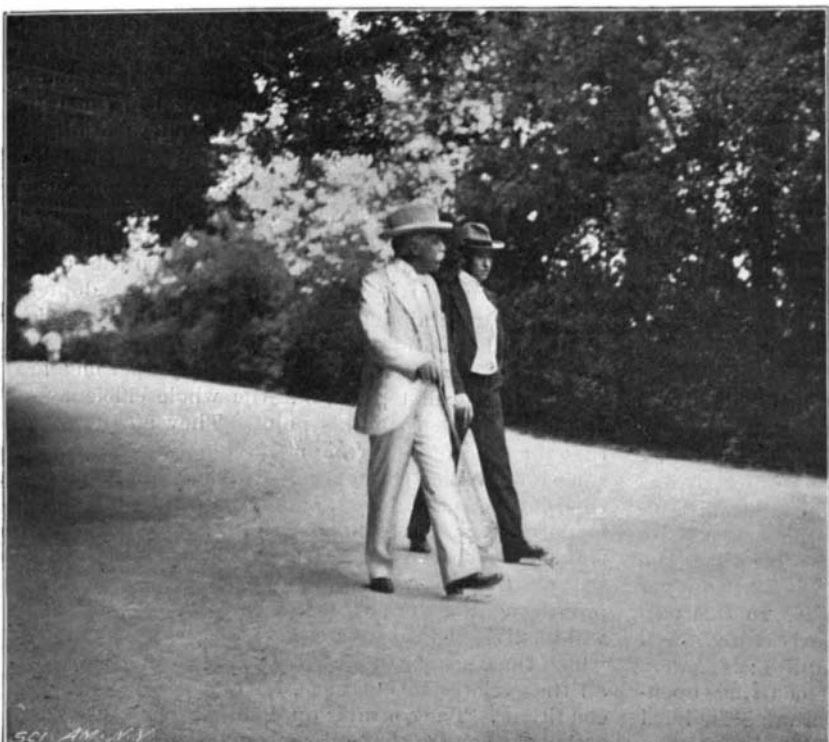
Admiral Dewey, Capt. Lamberton, and Lieut. Brumby Paying Official Visits.



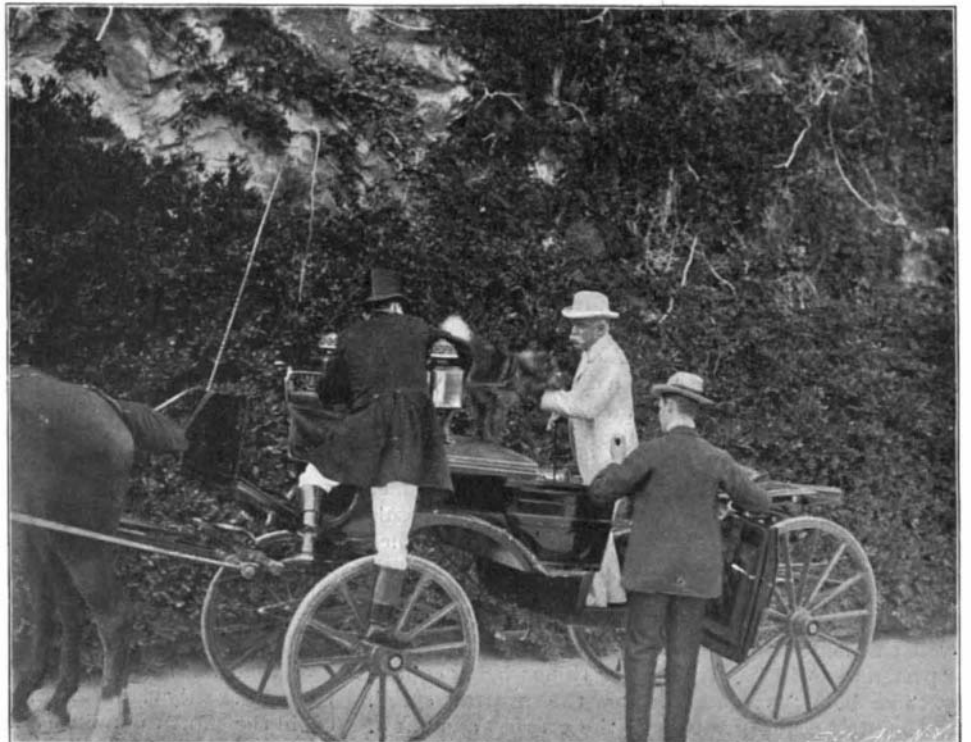
Admiral Dewey Leaving the "Olympia."



Admiral Dewey at the Castle of Miramar.



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Walking in the Park at Miramar.



A Ride in the Park at Miramar.

ADMIRAL DEWEY AT TRIESTE, AUSTRIA.—[See page 121.]

Philippine Fruit Bats.

BY PROF. J. B. STEERE.

A few species of the larger bats of South America vary their ordinary foods now and then by sucking bananas and other soft fruits; but in the East Indies a whole family of bats has become exclusively fruit-eating. In correspondence with their change of foods, these bats are of large size, some of them being nearly as large as cats, with wings that measure five feet in extent. From their large size, sharp noses, upright ears, and often ruddy color, they are sometimes called flying foxes.

The warm climate of the Philippines, with the continual ripening of fruits throughout the year, make them peculiarly favorable to the multiplication of fruit bats, and five or six species at least are found there. They do not roost, like other bats, in caves and hollows, but suspend themselves from the branches of trees. They make no attempt at concealment, which from their large size would be difficult, but congregate in great numbers, hundreds together, in some place far removed from the thick forest. They sometimes choose a lone tree left on the plain. In other cases they retreat to some small island a mile or two from the mainland. They also frequently choose the clumps of prickly bamboos about or in the native villages. These roosts appear to be permanent, being occupied from year to year. Their fear of the forests, and their peculiar choice of roosting places, must have been determined by the character of their enemies, but just what those enemies are seems as yet undetermined. Perhaps their habits were formed before their ancestors left the mainland of India.

They are, of course, most helpless during the daytime, when they hang exposed to the view of everything that passes. Carnivorous mammals are rare in the Philippines, being almost limited to a few species of civet cats. These would not refuse a meal of fruit bats, and they are also able to climb well, but like the bats they are nocturnal in habit, and would find the bats alert or away from home.

Perhaps the monkeys, which are everywhere abundant, may feed on the bats when they can be captured. The larger hawks and eagles are found in great numbers and of many species in the Philippines, and among these is the great monkey-eating eagle, which no doubt frequently contents himself with bats, when his more wily prey escapes him.

During the day the bats, when undisturbed, hang as quietly and apparently as lifeless as great hanging birds' nests; but as twilight comes on they leave their roosts by ones and twos and threes and fly to the forests and fruit trees and cocoanut groves.

The roosts are usually many miles apart, but the bats spread themselves over the whole country, and probably fly to distances of eight or ten miles without difficulty. They create great havoc in the fruit orchards, and compel the fruit grower to gather his fruit long before it is ripe. They also interfere seriously with the making of tuba (palm beer), the common native drink. While the poor tuba gatherer is fast asleep, they visit the cocoanut groves, where the sweet juice from the great blossom spathes is being collected for tuba, and drink from the bamboo cups. Snares and scarecrows are hung in the trees, but with little effect.

Sometimes the juice has already fermented enough to make them drunk, and then instead of making their way back to their roosts before daylight, they fall to the ground and are at the mercy of the crows and swine. Several of these drunken bats were picked up by the Indians and brought to us for sale, and a large proportion of the bats procured by us for our collections were found to have their stomachs full of this sour palm juice.

The little island of Santa Cruz, in front of the city of Zamboanga, and forming part of the harbor, has one of these bat roosts upon it, the bats occupying a low mangrove swamp which is flooded at every tide. Every evening the bats could be seen flying across the harbor and over the city, some of them dropping down into the fruit trees along the streets and others keeping on to the wooded hills and mountains beyond.

By the light of the street lamps I was able to see how these animals, whose hands had turned into wings, were able to eat fruits. They were feeding in the low talisay trees which had been planted along the streets for shade. The fruit of these was green and of the size of a small peach, and having a thin layer of flesh over a large pit. The bats were crawling about through the trees, carrying the wings partly folded, and hooking their way along by means of their short thumbs, which stand out from the inner edge of the wings and are provided with large curved claws. When they had found a fruit to suit them, they would swing down by the hind feet from a branch above and grasp the fruit between the thumbs. It is a wasteful way of eating, and the next morning I found many fruits under the trees with the marks of their claws and teeth upon them. I visited this bat roost in 1874, and again in 1887, twelve years later, when it appeared to have changed but little.

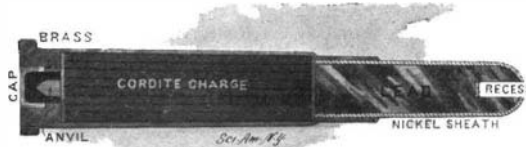
While in the northern part of the island of Panay,

we visited one of these roosts at the little village of Sara. The bats here occupied a number of clumps of tall prickly bamboos which overhung the native houses. They had become accustomed to the people passing beneath them, and at first paid no attention to us. They were hanging, head down, by the hind feet, and with the wings closely folded and twisted about the body, and might have been taken for some strange, great fruit as they hung there in the burning noonday sun. When we fired among them, they rose by hundreds, squealing, into the air, and after wheeling about over our heads like great specters for a few minutes, they would again approach the trees, and throwing the body nearly upright, they would thrust the hind feet forward, and grasping a branch, would fall head downward, folding their wings at the same time.

As soon as they became alarmed, they would take flight at our approach, and we found that they could see quite well, even in bright sunlight. There were at least three species, differing in size and color, roosting there together, though each species seemed to occupy distinct trees. The fruit bats have a strong bat odor, but the natives of the village came in while we were skinning our specimens and carried the bodies away for eating.

THE ENGLISH MARK IV. CORDITE AMMUNITION.

The Peace Congress considered the "Dum-dum" bullet at considerable length, and England strongly opposed any restrictions against its use among savage tribes. There are certain cases, however, where its use really seems to be advisable. When dealing with fanatics like the Soudanese, a war of extermination must be carried on, and the Dum-dum bullet seems to be the most effective remedy for placing the enemy hors-de-combat, and the bullets are also used in the prison of one of our Western States. Nowadays all the chief powers have small-bore rifles and are liable to become involved in warfare with more or less savage races, as when their colonial possessions are menaced, so that many of them doubtless desire to use the most effective bullet possible. Our engraving shows what is known as the English "Mark IV." cartridge containing a cordite charge as sent to the Cape. The bullet has a hollow in the head, and the nickel sheath ends

**THE ENGLISH DUM-DUM BULLET.**

on a lip at the entrance. A small disk of nickel is forced down to the bottom of the recess. This bullet when it comes in contact with any moist substance, such as the living body, spreads out into a sort of rounded knob, but the nickel cover prevents any flying or separation of the fragments. If the bullet strikes any hard substance, such as wood, it passes through it, cutting a clean hole. The cordite charge takes the place of the powder in the ordinary cartridge and it is set off by means of a cap and anvil. The Peace Congress prohibited the use of bullets covered with a hard outer case unless the case covers the core entirely and is free from incisions. There has been considerable objection to the Dum-dum bullet because it is said it does not carry straight. It is likely that it is doomed for modern warfare, but it should not be forgotten, in dealing with savage tribes, they are not particular as to what form of bullet or weapon they use. This ammunition has been tested at Bisley, England. Some of the cartridges caused the bore of the gun to become obstructed and momentarily checked the free expansion of the gas by the stripping on the nickel sheath; this was followed by injury to the guns such as the blowing out of breeches, etc. Cordite is a true explosive, and its use in guns of small caliber requires that the cartridges shall be mechanically perfect to avoid obstructions which tend to cause the barrel to be shattered. The ammunition tests at Bisley showed that economy must not be considered where cordite is used.

A Woman's Invention.

A woman inventor of Bradford, England, has designed a most ingenious apparatus for the removal of wool from skins by electricity. This is an interesting example of what a woman inventor can do when she sets her mind at work on some practical problem. The machine consists of an electric cautery or fleshing knife in such a handy form that the wool may be shorn or cut rapidly from the skin without injuring either the wool or the pelt. Electric cables pass through the handle and are connected to the two terminals. From this the current is passed through a wire of platinum-iridium which is thus rendered incandescent. The wire is fastened to and supported by a highly refractory substance specially made for the purpose, the current requiring about 60 amperes at a pressure of 4 volts. The method of removing the wool, says the English

Electrical Engineer, is to push the cautery along the surface of the skin. The red hot knife mows down the wool, and the only limit to the speed with which the work can be done is the deftness of the operator. The work is performed so quickly that the heat in no way injures the skin or the wool. It is without doubt a very ingenious and valuable invention.

The Nobel Prizes.

At last the question of the Nobel prizes has been finally decided and definite arrangements have been made. After settling up the estate, it was found that the amount available for prizes exceeds \$7,500,000. According to the will of the Swedish inventor, his vast wealth was to be invested and the proceeds distributed to five persons who make the most important discovery or invention of the year. The prizes to be distributed are given annually for discoveries and inventions in physics, chemistry, medicine, and also for the most meritorious work in literature. The fifth prize is to be awarded to the person who has done the best work for advancing the fraternization of nations and for diminishing armies and the propagation of peace. Five institutions, to be called the "Nobel Institutes," are to be created. Each is to be managed by the body to whom the decision was left regarding the prizes, as was originally arranged for by the late Alfred Nobel. Thus the Nobel Institute for Chemistry and the Nobel Institution for Physics will be under the management of the Academy of Sciences of Sweden, that of Philosophy and Medicine will be managed by the Carolin Institute of Stockholm. The literary institution will depend upon the Swedish Academy, etc. Each of these institutions is to be provided with libraries, laboratories, etc., for the accomplishment of the object in view. Each will dispose of 300,000 crowns, or about \$60,000, from which the expenses of administration are to be provided. Each of the five prizes will amount to about \$40,000. The first distribution will take place in December, 1901, and the annual date for such distribution is to be the 10th of December, the anniversary of the death of Alfred Nobel. The prizes will be given on the recommendation of those entitled to present candidates, such as the institutions in Stockholm, certain foreign scientific societies, academies, universities and high schools. They can alone make proposals for the scientific and literary prizes, while the Norwegian Diet or parliaments of other nations only can put forth candidates for the prize for the propagation of peace. The proposals must be made in one of the Scandinavian languages or in German, English, French or Latin. No other language will be considered, and personal application will be entirely useless. Each fortunate recipient of a prize will receive a diploma and a gold medal bearing the portrait of Alfred Nobel. Of course, the prizes will be distributed without any reference to the nationality of the contestants.

The Prize for Life Saving Devices.

We are now able to give some additional details regarding the Pollok prizes, although final details can only be given as soon as definite rules have been formulated. Notification to foreign governments has been made, and steps will be shortly taken to lay the matter before them so that they can announce it to their own citizens in the most approved way. Details of the matter will be placed in the hands of Lieut. W. S. Sims, the United States Naval Attaché at Paris. The arrangements for the competition will then be made. Mr. William Ker, of Washington, has been selected to act as secretary of the committee for the United States. The prizes will be awarded at the Paris Exposition. It is probable that there will be a large number of devices submitted, and the competition will certainly be productive of good.

Fruit of Grasses.

According to the view of M. P. Guérin, the ovule of grasses has, in general, two integuments, each composed of two layers of cells. The outer integument always disappears shortly after fertilization, while the inner integument is persistent, and constitutes a true testa to the ripe seed. In some cases, as in *Bromus* and *Brachypodium*, the epiderm of the mucellus takes part in the formation of the integument. In the pericarp the absorption is more or less complete; the endocarp usually persists in the form of long isolated cells or of a sclerified ring. Except in a few cases, there is a complete fusion between the pericarp and the integument of the seed justifying the retention for the fruit of grasses of the special term caryopsis.—*Morot's Jour. de Bot.*, 12, 365.

SOME interesting particulars as to the extent and cost of fox hunting in England were given the other day by Lord Bathurst. There are now 221 packs of fox hounds in the United Kingdom—180 in England, 26 in Scotland, and 15 in Ireland; and these packs consist of 8,000 couples of hounds, and they necessitate the employment of 100,000 horses of the value of \$35,000,000, involving an outlay of \$25,000,000 per annum for their maintenance.