

**RAILROAD DEVELOPMENT IN CUBA.**

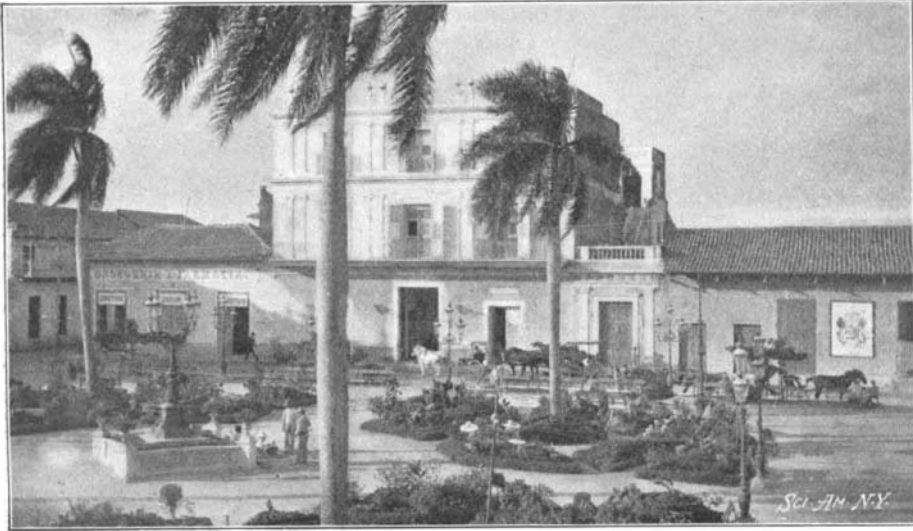
BY I. W. DAVIES.

With the opening of the new railroad, Cuba now enters upon an era of industrial development which must soon tend to ameliorate her existing political and economic condition and internal difficulties; to en-

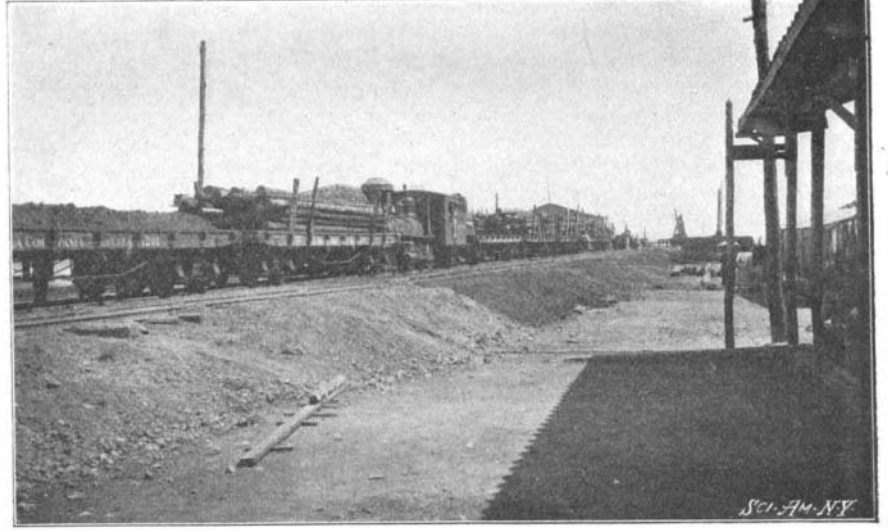
the island has possessed railway facilities: the eastern and larger area, running from Santa Clara to Santiago de Cuba, a distance of some 500 miles, has remained practically unexplored and undeveloped.

Immediately after the surrender of the country to the United States in 1898, the late President McKinley,

companies, the aggregate length of whose lines is only 917 miles, is entirely inadequate in bringing the extreme ends of the island together, Santiago and Havana in point of time being as far apart as San Francisco and New York, though only separated by a distance of a few hundred miles. The facts gathered



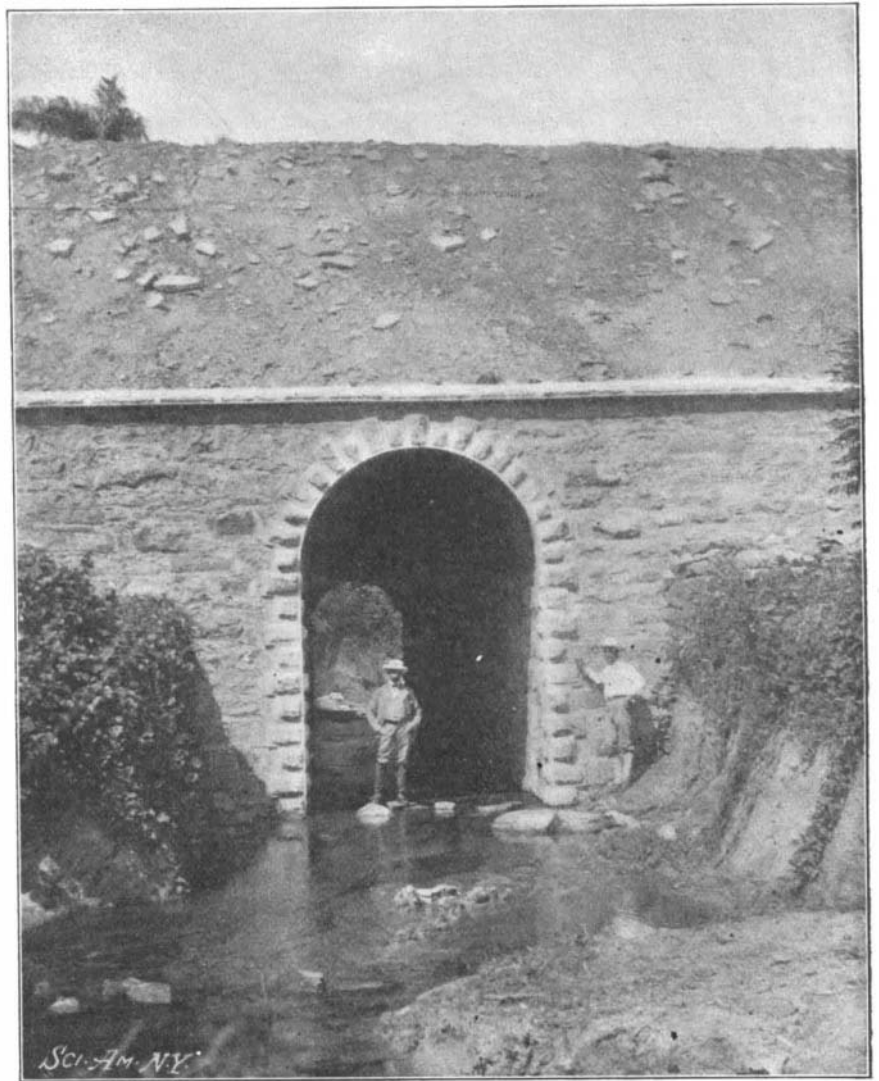
The Company's Temporary Headquarters at Puerto Principe.



A Work Train.



Right-of-Way Cleared and Grading Under Way.



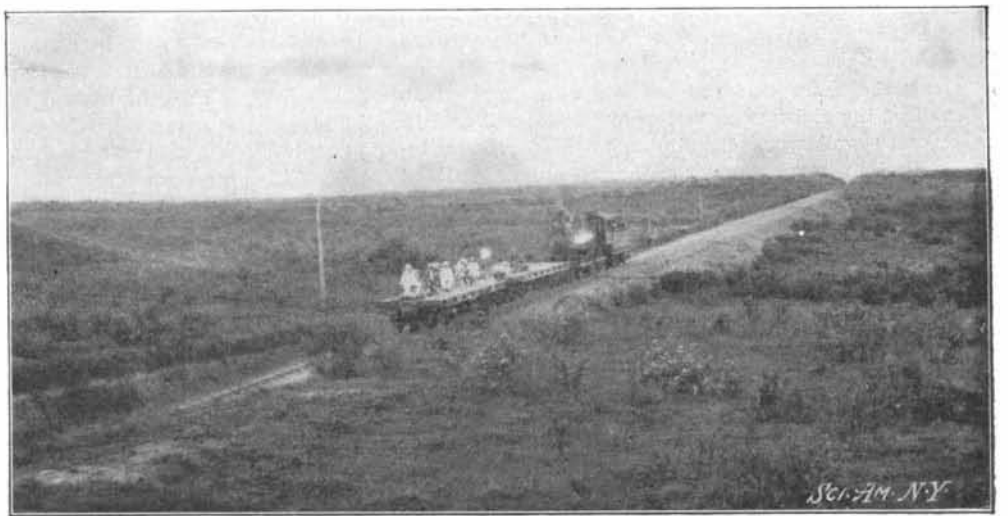
A Stone Culvert; Characteristic Masonry on the Cuba Railway.



A Deep Cut on the New Railroad.



Modern Locomotive of the Type That Will be Used on the New Road.



President Sir William Van Horn and Party Inspecting the New Track.

**NEW RAILROAD IN CUBA CONNECTING HAVANA WITH SANTIAGO DE CUBA.**

hance the commercial prosperity of the country, and consequently conduce to the conciliation and betterment of the inhabitants, far more effectually and expeditiously than the wisest of legislative enactments or the most reasonable and agreeable of treaties.

Until now barely one-half of the western portion of

with characteristic promptitude, commissioned Mr. Robert B. Porter to visit the island to make investigations and to report on her industrial, commercial, and financial condition. In dealing with the question of railway communications there, Mr. Porter reported:

"The railway system of Cuba, consisting of seven

on this subject point to the advisability of immediately constructing a trunk railway from end to end of the island, with branches extending north and south to the important cities and ports. From whatever standpoint it may be viewed, no one enterprise could do so much to improve the situation on the island. No revolution

could have existed in Cuba if such a railroad had been completed by the former government, and nothing will so rapidly tend to the revival of commerce and general business as the facility for quick passage from one end of the island to the other, and from the trunk line over branches to the seaboard cities. All political turbulence will be quieted thereby and prevented in the future. The entire country will be open to commerce, lands now practically of no value and unproductive will be worked, the seaport towns will become active, and commerce between the island and the United States will soon be restored to the former figures. . . . After a careful study of the situation, it would seem extremely doubtful if such an enterprise could be made a commercial success for many years to come."

The ominous, though honest, warning contained in the concluding sentence of this report certainly tended to defer rather than encourage any prompt measures being adopted, either by the government or a body of capitalists, to provide Cuba with what she most urgently needed for her present and future welfare, as well as for the ultimate benefit of the United States. With wonted alacrity, however, and regardless of any immediate prospect of commercial reward, Sir William Van Horn got together a well-chosen company of American and British gentlemen interested in railways, and without loss of time a body of competent men were dispatched to Cuba to make a thorough survey of that large portion of the island to which Mr. Porter had referred as being so much in want of railway facilities, and with equal promptness the Cuba company decided to at once undertake the enterprise at all hazards. The result is that in less than two and a half years the whole work has just been completed most successfully and satisfactorily, and to-day Cuba enjoys a through line of railway communication from one end of the island to the other, running through the very heart of the country.

There are also several branch lines—some in course of construction, and others in contemplation. The most important branches soon to be opened are those running across the island, connecting Santiago de Cuba with the Bay of Nipe and Jugaro with San Fernando, and two smaller lines forming a connection with Sancto Espirito at one end of the trunk line and Holguin at the other.

The railroad is of standard gage, and its bridges are of steel and masonry; its equipment will be similar to that of the best American railways, and it is intended to run through sleeping cars between Havana and Santiago de Cuba—a distance of nearly 900 miles.

The main object of this new railroad is stated to be "the development of the eastern and larger part of the island of Cuba, by establishing direct rail connections between Havana, Sancto Espirito, Puerto Principe and Santiago de Cuba and to open up a vast extent of new and attractive country for settlement and cultivation." The new line will also add largely to the attractions Cuba offers to tourists, for it will make many important and interesting places and districts easily accessible which have hitherto been difficult to reach, and which have been rarely visited.

Along the main line are to be found great areas of land of the richest description, well watered and in most cases well wooded, suitable for sugar cane, tobacco, Indian corn, cotton, coffee, cacao, and all of the fruits of the tropical and sub-tropical regions. Other districts are peculiarly adapted to cattle; indeed, cattle do well everywhere, for the grasses are luxuriant and highly nutritious, and there is usually an abundance of water. Around the coast are to be found many excellent harbors, and it is reported and believed that the unexplored part of the island contains much hidden mineral wealth.

The interior, which is sparsely populated, is comparatively level, and largely covered with hardwood timber, and while the soil of the different districts is generally of extraordinary fertility, some places are more desirable than others, both in this respect and in regard to healthfulness. On the whole, the climate is for the tropics, a tolerable one, and the island will soon be rendered more healthy by foreign irrigation, drainage, and an improved system of sanitation. The northern employes of the Cuba company have as a rule been free from illness of any kind, notwithstanding their employment on railway construction under conditions not always favorable to health. Unlike many of the West India islands, Cuba is entirely free from poison-

ous reptiles, and has fewer mosquito and similar pests than any other southern regions.

There are no obtainable government lands in Cuba; practically all of the lands are held by individuals, and in the eastern half of the island they are usually held in large areas. No systematic land survey has yet been made, and the large tracts are mostly in irregular forms and their boundaries are difficult to define and trace; land titles in the unoccupied and in the newly settled parts of Cuba are in many cases defective and need strict investigation, though the government has recently taken steps toward the perfection of titles.

Not the least important and remarkable feature in connection with this modern Cuban railway enterprise is the combination of American and British interests and influences. The international infusion is in happy consonance with similar existing vested interests on the island, and has already produced unmistakable evidence of a very promising future for Cuba, commercially, politically, socially, and generally.

#### Stationary Fire Pumps.

BY GEORGE J. JONES.

There has just been installed in the city of Philadelphia an advanced type of fire-fighting system which seems to indicate that the fire engine as we know it today will soon be retired from service to a very great extent, the necessary water pressure being secured from a large stationary pumping plant. Some of the advantages claimed for the system are the following: In the first place, it offers, for fire purposes, a stream of water which is almost instantly available, and which has more volume and can be thrown higher than that delivered by any fire engine yet in operation. It avoids the possible delay which may occur in getting a fire engine to the scene of the conflagration and into ser-

vice, to say nothing of the elimination of the element of danger, always present when these heavy vehicles are driven rapidly through the streets of the crowded portions of a large city.

The installation consists of four principal mains laid along Market, Arch, Race, and Walnut Streets, from the Delaware River to Broad Street, the gridiron being formed by cross connections on Second, Fifth, Eighth, Eleventh, and Broad Streets. The pipe is of especially constructed, tough, gray cast iron. The principal main, on Market Street, is 16 inches in diameter, while that on Race, Walnut, and Arch Streets is 12 inches. The diameter of the cross connecting pipes is 8 inches. The thickness of the pipe ranges from  $\frac{7}{8}$  to  $1\frac{1}{2}$  inches. The joints are flanged and securely bolted together, and other precautions have been taken to make them as strong as possible, in order to withstand the great strain to which they will be put. Heavy cast iron sleeves, or sockets, are provided at intervals in the pipe system, to allow for the contraction and expansion of the metal. Crosses have been put in at the principal street intersections, to meet any further demand for extension. There are 139 especially constructed hydrants on the system, each with two outlets for  $3\frac{1}{2}$ -inch hose. The hydrants are of the heavy post pattern with 6-inch inlets and 4-inch outlets. The couplings in use are what are known as the "Siamese," with which it is possible to make six connections at one time.

The new system was recently subjected to a severe test by the members of the Fire Underwriters' Association. The trial took place on Broad Street, at a point which is about 8,000 feet from the pumps. The most satisfactory results were secured, although it was impossible, under the existing circumstances, to test the pipes to their full capacity. After being laid, each

section of the pipe used was subjected to a pressure of 400 pounds, and with the stationary plant in operation, it is expected that the pressure will almost reach that point; but at the test, with the combined efforts of the three fire boats, the pressure on the pipes was less than half that figure. However, the work done at the test and at subsequent fires has demonstrated that this kind of a service is far superior to anything which could be secured with the use of portable fire engines. At one time there were twelve streams of water issuing from two hydrants, the water being hurled a distance of 175 feet through a 300-foot section of hose. The hose used was  $2\frac{1}{2}$  inches in diameter and had a  $1\frac{1}{4}$ -inch nozzle. A single stream, with a  $3\frac{1}{2}$ -inch hose

and a 2-inch nozzle, was thrown a distance of 262 feet in a horizontal direction, the nozzle being held at an angle of about 30 degrees. With two streams, the distance was decreased to only 258 feet. A single stream thrown in a vertical direction reached to within a dozen feet of the top of the North American building, in front of which the test was conducted. The roof of this structure is 255 feet above the pavement, and it is the tallest building in the city. A stream from the high-pressure system was sent aloft beside one from one of the most powerful fire engines owned by the city. The stream from the latter reached the ninth story, while that from the high-pressure hydrant touched the nineteenth. While these tests were being conducted, hydrants in distant parts of the high-pressure section were opened, in order to note the effect on the Broad Street streams, but the decrease in the flow was hardly appreciable.

As a result of the successful demonstration of the high-pressure service, the insurance rates in the portion of the city thus protected were at once lowered, and it is possible that a further reduction will be made.

The system was installed by the Hoffman Engineering and Contracting Company, of Philadelphia. The use of gas engines in the permanent pumping plant is one of the notable features of the installation. These engines, of 300 horse power each, are now being built by the Westinghouse Company.

The computation of the figures for the steam plant must take into consideration the coal consumption for the entire month, with steam pressure on the boilers all the time; but this calculation contemplates only about ten hours of actual service per month. This would cost \$50 per hour. The gas plant will require gas for the time of the run only, as when the engines are idle there is no consumption of gas; and, on a



THE RECENTLY COMPLETED RAILROAD THROUGH THE ISLAND OF CUBA.

basis of ten hours pumping per month, the gas plant would cost \$39.20 per hour. The services of nine men are required for the steam plant, while six are sufficient for the gas plant. Chief Hand says that in actual practice the economies of the gas plant will be even greater, for it will very rarely happen that the entire plant will be in operation ten full hours each month.

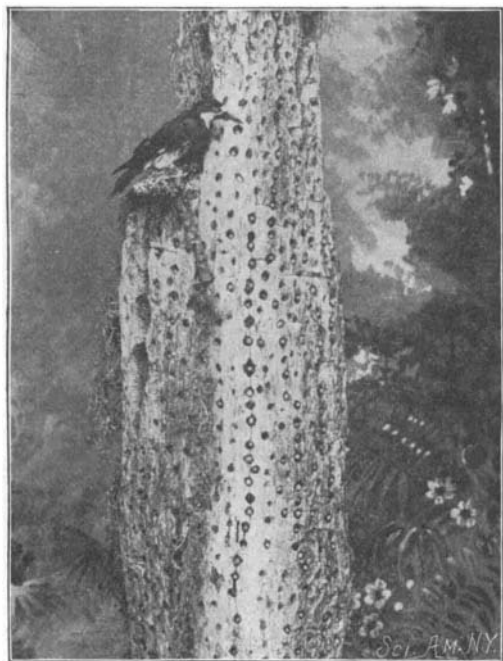
**QUEER CAPRICE OF CALIFORNIA WOODPECKERS.**

BY M. C. FREDERICK.

For bees to establish themselves beneath the roof or over a window in a dwelling occupied by a human family, is not rare; but it is seldom that woodpeckers follow their example and choose a residence for a storehouse.

The region of Santa Barbara was once well wooded with fine live-oaks, the headquarters of large numbers of woodpeckers. Their incessant noisy hammering from daylight till dark as they cut holes in the trunks of the trees and fitted in the acorns, their sharp calls, and the frequent flashes of brilliant red, white, and blue-black, as they flitted from branch to branch, gave a certain gala atmosphere to the woods and added much to their charm.

Montecito Valley, contiguous to Santa Barbara and



**WOODPECKER'S TREE-TRUNK STOREHOUSE FOR ACORNS.**

the home of most of her wealthy residents, still retains many of these old oaks, often the chief feature of landscape gardens widely noted for their beauty. A fairly large number of woodpeckers continue to ply their vocation with unabated energy. Why they should prefer a residence in the midst of one of these groves, for a granary, instead of the regulation tree trunk, is a mystery. Perhaps they discovered that redwood is more easily worked than oak or sycamore, or perhaps it was the labor-saving feature that appealed to their thrift, since, instead of a separate hole for each acorn, a single hole answered for many acorns.

Whatever the reason of their curious choice, they have so thoroughly drilled the wood of the building as to cause serious damage and necessitate extensive repairs.

The cornice, or strip of molding that finishes the under edge of the roof, known as the crown molding, has most attracted their fancy, inclosing as it does a small triangular space back of it, extending entirely around the roof. One can well imagine the surprise of the first industrious little cabinetmaker who, having chiseled out a cavity of the proper size, was driving his acorn into place, when it suddenly disappeared.

A second acorn tried in the same place meeting the same mysterious fate, his unconquerable persistency doubtless led him to try again and again, in the hope of unraveling the mystery until, the immediate space being filled, he at last comprehended the situation and delightfully adopted the new method instead of the old. Anyway, the woodpeckers have made holes at convenient intervals, and literally crammed the space to overflowing. In some instances the molding is sprung half an inch or more from its place, the tightly packed acorns protruding through the cracks.

The holes are usually made in the upper edge of the molding, next the shingles, the shrinkage of the wood having evidently left a slight opening which facilitated their labors; but holes have also been made directly through the cornice, as the illustration shows. The shower of acorns that fell to the floor when the molding from the roof over a corner of the balcony was removed, is also shown.

The adventurous by no means confined themselves to the cornice. The sides of the upper story

being shingled, they have made a number of perforations down the corners and elsewhere, and in the middle of a gable is an opening large enough to admit the birds themselves. Whether they found the interior to their liking, and nested there, is not known, since there is no way of entering the attic to see. It is believed, however, that there are bushels of acorns stored away in various parts of the building.

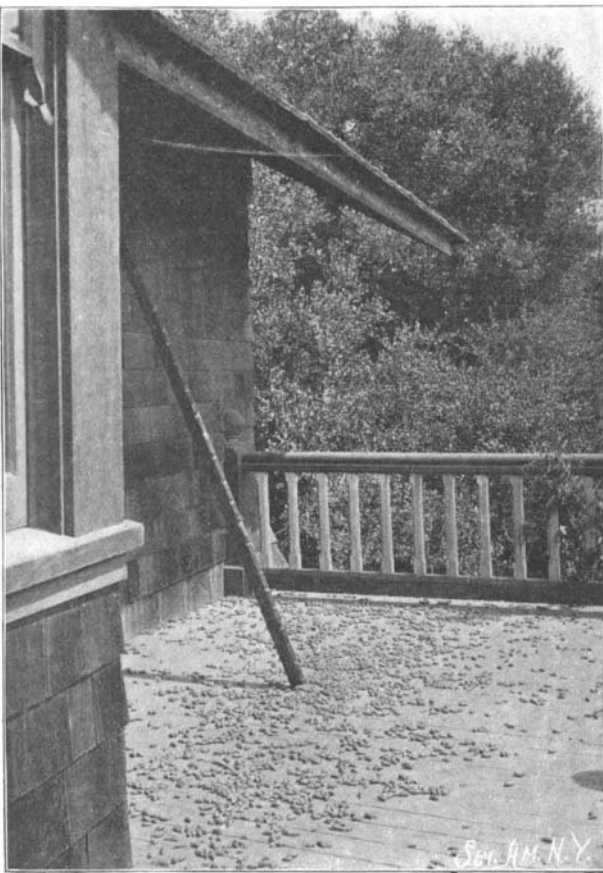
Other houses in the same locality have been attacked by the birds—in one instance they made holes along the comb of the roof, plugging them up with acorns; but in no other case have the depredations approached this in magnitude. If any one appeared while a woodpecker was at work, he would stop for a few moments, eye the intruder saucily as if trying to divine his intentions, and then go on hammering as unconcernedly as if no one were watching.

**Automobile News.**

Henri Fournier, the noted French automobilist, arrived in New York last week, bringing with him five French machines to sell to wealthy Americans. Two of these automobiles are 9 horse power Renault cars, one of which is patterned after an English cab and the other after a landaulet; the third is a 40 horse power Mercedes of double phaeton pattern, with entrance in front, King of the Belgians seats, and finished in pearl gray; the fourth is an 18 horse power Mors, with a very low frame, triple phaeton body, and seating room for seven; and the fifth is the most novel of all, being a Lohner-Porsche, 28 horse power, gasoline-electric tonneau car, with electric motors in the hubs of the front wheels, which also steer the machine. A gasoline motor direct-connected with a dynamo furnishes power for generating electricity to run the car, any superfluous current being sent into a storage battery, which supplies extra power as it is needed. The car is said to have 14 different speeds, the maximum of which is 48 miles per hour. This system has been so successful that the Panhard Company has purchased the patents and is making machines.

When questioned regarding his new 120 horse power racer, Fournier said: "It is short in front, like a fish's head, and then long, like its tail. After you break the air, it rushes in behind and pushes you; so you must have the car short in front and long behind. The seat is just a bicycle saddle on the rear axle. It will have four speeds and drive direct on the highest. What will it do? Oh! 32, 33, or 34 seconds to the mile."

In regard to the 1,600-kilometer (993.6 mile) Paris-Madrid race of next summer, Fournier stated that Mors machines are being built for W. K. Vanderbilt, Jr., and D. Wolf Bishop to drive in it. He gave it as his opinion that in all probability the International Cup race would be over the first day's stage of this race, i. e., from Paris to Bordeaux, a distance of 585 kilometers (362.28 miles). The German entries in the cup race consist of two 100 horse power Mercedes ma-



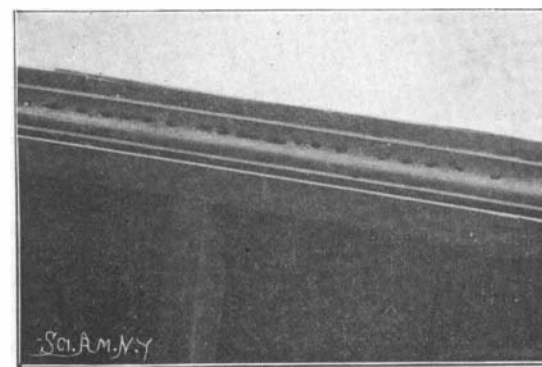
**ACORNS REVEALED BY THE REMOVAL OF A CORNICE.**

chines, to be driven by Baron de Caters and Camille Jenatzy; Fournier and the Farman brothers will represent the French, the latter driving Panhard machines; S. F. Edge and Charles Jarrott will mount English Napier cars; and Alexander Winton, with two other

of his countrymen, will run American machines. While on the subject of racing, Fournier said that he would like to have a track race with Mr. Winton or Barney Oldfield, who drives the Ford racer, for any distance they might name; and that if such a contest could be arranged, he would bring over his new cup racer for it.

The Daimler Company, of Cannstadt, Germany, have brought out a new 60 horse power model of their popular Mercedes car, in which the frame is hung lower than usual, and which has a novelty in the shape of an electrically-manipulated change-speed lever that enables the operator to effect a change of speed by merely pressing a button. This improvement is a great one, as the changing of gears is an operation that requires considerable skill to perform properly on most of the large gasoline cars.

The New York Automobile Show closes its doors on January 24. Some of the novelties that were exhibited there we shall describe in our next issue and in a special Automobile Number, to be published the middle of next month. Most of the manufacturers



**HOLES DRILLED BY WOODPECKERS THROUGH A CROWN-MOLDING.**

of steam and electric carriages have added gasoline automobiles to their list of cars, and the gasoline machines are becoming more widely used than ever. Those with air-cooled motors are more numerous than heretofore, and the tendency is to simplify all parts of motors and machines as much as possible. Several cars propelled by two-cycle gasoline engines were an example of simplicity aimed at in engine construction, while the planetary transmission gear mounted on the engine shaft, as used on many of the runabouts, is without doubt the simplest and most compact form of transmission gear. Three-speed transmissions are used on many of the heavy cars, sliding gears being used for the purpose in most cases, and individual clutches, with gears always in mesh, being employed in a few instances. Wood wheels with detachable double-tube tires have taken the place of wire wheels and single-tube tires; and almost all parts are made stronger, in order to stand hard use on bad roads.

The North-Eastern Railroad of Great Britain, a portion of which is to be converted to electric traction, proposes to carry out a series of experiments with petrol auto-cars to be used upon the 37 miles of track near the section to be electrified at Newcastle-on-Tyne. An order has been placed with a motor power company in London for the supply of a number of large four-cylinder petrol engines to develop 100 horse power each. It is intended to employ these engines for the haulage of light and frequent trains on local branches. The petrol cars which have been ordered for this purpose have done excellent work on common roads, and it is anticipated that they will achieve even better results on the specially constructed track of a railroad. The advantage of this innovation in railroad traffic is that it will not necessitate any alterations of the track, such as the laying of the third current rail with its complications at crossovers and junctions.

**Chief Engineer Melville Retires.**

On January 10 Rear-Admiral George W. Melville, Chief of the Bureau of Steam Engineering, was placed on the retired list of the navy, having reached the age limit of sixty-two years. By special authority of Congress, he is to continue his service at the head of the Bureau until August 9, 1903. Admiral Melville was appointed to the navy from New York in July, 1861.

**New Use for Formaline.**

At the last annual meeting of the Obstetrical Society, Dr. Charles C. Barrows read a paper in which he presented the results of his use of formaline as a cure for sepsis or blood poisoning. Formaline has been used as an antiseptic, but the use to which Dr. Barrows has put it is probably new. Further experiments will be watched with interest.

Motorman John G. Flynn, of Bridgeport, Conn., is the inventor of an insulated switch iron which will save the motorman from getting many shocks while working around his car.