

Models of the Navy Vessels.

The model shop of the United States navy is a part of the Bureau of Construction and Repair, and is under the direction of Rear-Admiral Hiebhorn. It is in the northwest corner of the house sheltering the marine railway in the Washington navy yard. Here are made exact reproductions of our war vessels from keel to truck and from stern to stern, only the models are, of course, on a very small scale. The workmen use the scale of a quarter of an inch to the foot, and the regular blue prints are used. The builder first lays the keel piece, then carves out another blank to make a horizontal section of the hull and glues it firmly above the keel piece, and by successive layers, each carrying approximately the shape of the hull for a new section, wood is added until the entire model is completed. The rough edges that remain after shaping and building up the hull are finished with knife, plane, and sandpaper before the paint is applied. Other model makers are engaged in making the tiny guns of different calibers, which are made of steel. The gun mounts are exact reduced copies of those actually in use on the war vessels. All the fittings are made with the utmost fidelity. The government possesses models of a large number of war vessels, says The New York Times, from which we glean our facts, and the larger ones are quite expensive, the "New York" and "Columbia" costing \$7,000 and even the small ones cost \$2,000, including the case. In all, something like \$75,000 has been spent on models. It is considered, however, by the Navy Department that the money is well spent. The models are exhibited at various expositions which have been held throughout the country and have been seen by many thousands of visitors and doubtless many will never see the real warships. The completed models are to be seen ordinarily in the hall at the main entrance to the Navy Department at Washington, and in the hall above, just outside the door to the reception room of the Secretary of the Navy, and they are a never-failing source of interest to visitors. Several of them will be exhibited at the Paris Exposition.

AUTO-QUADRICYCLE AT THE BICYCLE AND AUTOMOBILE SHOW.

Continuing our notice of the display of automobiles at the recent Bicycle and Automobile Exhibition at the Madison Square Garden, New York, we now present illustrations of the auto-quadricycle, a four-wheeled vehicle which is arranged to carry two persons, tandem fashion, one in front on an upholstered seat of the kind commonly used in a buggy, and the other on a saddle, of the bicycle type, in the rear. It will be noticed that this compact little machine marks a transition stage between the bicycle and the automobile, retaining many features of the one and embodying the essential features of the other.

The framing of the auto-quadricycle is arranged in three fore and aft planes. The central frame, which carries the saddle, is of the standard diamond frame construction, except so far as the rear stays and forks are spread and additional stays inserted to accommodate the necessities of a four-wheel vehicle. On either side of the center frame is a light frame built up of angle iron and steel brackets. The whole is well braced together and forms a light but very strong construction. The machine is carried upon four 26-inch wheels of the common bicycle type with $2\frac{1}{2}$ -inch pneumatic tires. It is 7 feet 6 inches in length, 3 feet 6 inches in width. The motive power is supplied by a gasoline engine of the Otto type with a flange-cooled cylinder, which is mounted over the rear axle, and when running at economical speed develops $1\frac{3}{4}$ horse power. The band brake on the rear axle is controlled by a lever at the handle bar of the ordinary bicycle type. The speed may be controlled from five to twenty-five miles per hour. When it is complete, all ready for service, this machine weighs only 350 pounds. It was built at the factory of the Canda Manufacturing Company, Carteret, N. J.

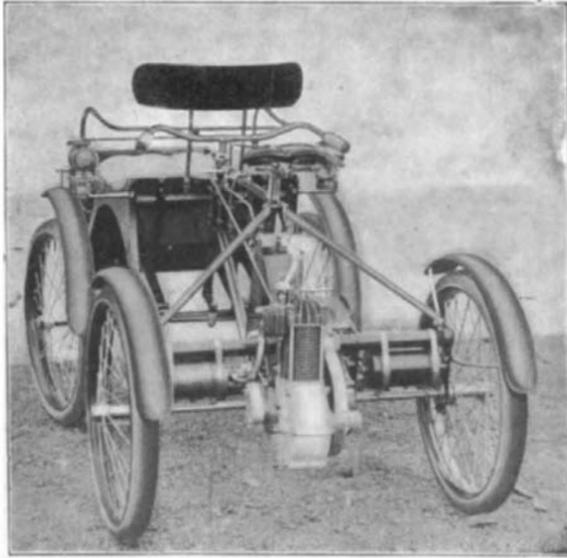
R. H. BIFFEN describes a fungus belonging to the Hypocreaceæ found on germinating cocoanuts, which has the property of breaking up the oil contained in the endosperm. The reproductive bodies observed were megaconids, microconids, pycnidiospores, and peritheces; but no ascospore could be discovered in the latter. The author attributes the property of splitting up oil to an enzyme, which can be obtained as a flocculent precipitate by the addition of an excess of absolute alcohol.—Annals of Botany, 1899, p. 363.

Old Fort Ancient.

BY W. G. IRWIN.

One of the many remarkable relics of prehistoric races to be found in the upper Ohio Valley is old Fort Ancient, in Warren County, Ohio. Grass-grown circumvallations, shaded by majestic trees moss-grown with age, and stray mounds containing broken pottery, fragments of bones, arrow heads, and buried altars where the sacrificial ashes still linger, mark the former home and final burying place of an unknown race.

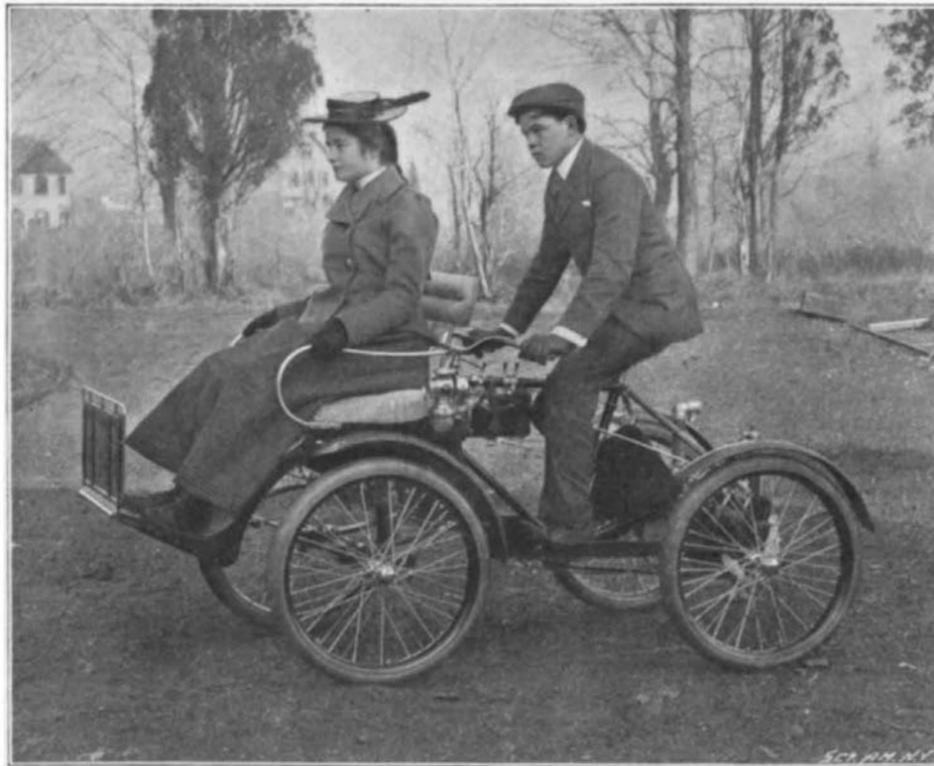
The old fort is located close to the banks of the Lit-



REAR VIEW OF QUADRICYCLE, SHOWING THE GASOLINE MOTOR.

tle Miami and is surrounded by fully 5 miles of breastwork. This outer earthwork follows the irregular line of the hill, its greatest length north and south being about one mile, while its greatest breadth is probably half that distance. It is 10 to 20 feet in height and its thickness at the base is fully 75 feet. The outline is not unlike North and South America, and the fanciful theory that the mound builders designed to imitate the form of these continents has been advanced.

At a point to the east, where there is no natural defense, there are parallel walls run out from the main embankment which extend nearly half a mile, the parallels being about 300 feet apart. At the eastern termini of these are two small mounds, which probably served as watch towers. In the entire wall there are seventy openings, some of which have been made by the action of the water, while others, it is almost



AUTO-QUADRICYCLE EXHIBITED AT THE BICYCLE AND AUTOMOBILE SHOW.

certain, were used for exit and entrance to the fort. Trees which are over 200 years old are now growing from the walls, and much of the earthwork is covered with trees and bushes which will protect it for ages to come.

The fort is divided into three sections: the northern, which is called the New Fort, from indications that it was built last; the Middle Fort, which is narrow and had gateways and walls dividing in from the others, and is thought to have been designed as a citadel; and to the south the Old Fort. Opening into it from the Middle Fort is the Great Gateway, which is flanked on either side by a large mound. This central point is perhaps the most interesting of all. Bones, weapons, and other signs of human occupancy which have been

found lying near the surface, indicate that a battle once raged at this point. In the Old Fort is a part known as the cemetery, where many stone graves have been located. When the earth is removed, the stones are found in regular order on the top of the grave, making a complete covering, and beneath the stones the skeletons are found buried in the earth. Weapons and pottery are also found in the graves.

The skeletons which have been exhumed in the fort, and nearer the surface, are supposed to be the remains of those who fell in battle; while a large number of human bones found on the west side of the hill under a pile of stones are supposed to be remains of enemies who were interred after the battle. The skulls that have been exhumed are of two classes, the long heads and the broad heads, which indicate either that two races have occupied the fort, or that its occupants were a mixed race. The arrow heads and spear heads are of several kinds of flint, red, white, black, and yellow. As flint is not found in the vicinity, the natives doubtless procured their supplies from other sections. A few pieces of quartz arrow heads as well as pieces of quartz have been picked up. Specimens of copper, hammered in the cold state, have here been discovered, as have perforated ceremonial slates. The pottery bears a resemblance to that found in the mound ruins of Western New York, rather than in those of Tennessee. Some of it is decorated with curved lines, some with dots, while some bear the marks of wicker-work.

There is but one natural spring within the walls of Fort Ancient, and there has been considerable speculation as to where the people obtained their water supply during times of siege. At several places there are indications that artificial reservoirs were constructed, and there are also traditions of a subterranean passage to the river. Within the inclosure there are many evidences of long occupation. Weapons of all shapes and sizes are found, and the flint flakes, the chips of their weapon making, are innumerable. The circles of lodges are discernible as depressions, and half a century ago these were more numerous. In the valley of the west are the remains of two villages, one above the other. From the older village at a depth of 5 feet the pottery obtained resembles that found in the fort; while that of the upper village, at a depth of 2 feet, is of ruder manufacture. Numerous graves as well as the ash-pits of these villages have been opened. Some of the skeletons are well preserved. Bones of animals and the antlers of deer have been dug up, and shells of the mollusks which flourish in the river on whose banks the village stood are found in the graves and in ash heaps, showing that they were used as ornaments, and that their contents were appreciated as food. The natives valued the pearls that these mussels produced, and there is a theory that the great heaps of shells at the mouth of the river were cast there by pearl hunters.

To the north and south part way down the Fort hill and on the hills opposite, are terraces 20 feet in width, which extend distances of several hundred feet. These, like the stone pavement which lies between the parallel walls, are a puzzle to antiquarians. They are the only specimens of pavement known to have been the work of the aborigines, and two suggestions have been made as to their purpose; one that it was used for games, the other that it was a place for sacrifices.

Thousands of relics have been already carried away from the Old Fort and its vicinity, and many good specimens can still be easily obtained. The Smithsonian Institution made a survey in 1892, and numerous relics were exhibited at the World's Fair. As early as 1820, the walls of the Fort had been opened; but there yet remains much to be done in the way of a complete study and exploration of this great work of prehistoric man.

The similarity of the weapons and of the mound indicates that one people inhabited the whole region. We may conclude that Fort Ancient was a citadel erected by a union of forces as a retreat in times of danger.

There are few Indian traditions which throw any light upon the history of these great pre-historic works. As to the age of the Fort, it has been asserted by some to be four thousand years old; but the weight of opinion is that one thousand will cover its existence. Meanwhile the walls of old Fort Ancient, the graves of the moundbuilders, their tools, implements, weapons, relics of their spoils and the ashes of their fires, are mute as to the origin or destiny of the race.

ALUMINIUM tubing used in the sciences is made so fine that 1,000 feet of it weighs but a single pound.