

struction of a dam at Gamboa has this advantage over the dam at Bohio, that whereas the destruction of the Bohio dam either by floods or by the act of man in time of war, would close the canal absolutely to traffic, the destruction of the Gamboa dam would cause only temporary interruption.

An Aerial Torpedo.

A test was recently made at Rockaway Point, Long Island, of a novel projectile invented by Mr. Joseph J. McIntyre, of Brooklyn, N. Y. As the title implies, the new projectile is of the explosive type, similar to a torpedo, but arranged to be driven through air instead of water. The torpedo, which resembles a huge rocket, carries a load of steel shrapnel and a high explosive which may be detonated by a time fuse or a percussion cap, scattering the shrapnel over a wide area. A brass cylinder contains at the lower end the lifting charge by which the projectile is fired into the air. At the upper end is the shrapnel and the high explosive. Several hundred steel shrapnel bullets are used. They are cast in strips and arranged about the inside of the casing, while in the center are three sticks of dynamite. The bullets and dynamite are all incased in plaster of Paris. A percussion cap at the upper end of the cylinder explodes the charge when the projectile strikes an object. The time fuse passes up through the center of the cylinder between the sticks of dynamite. The projectile is arranged to be fired like a rocket from a tripod which may be raised or lowered to different angles, and thus regulate the distance the torpedo will cover. This may also be governed by varying the quantity of lifting charge in the cylinder. In the Rockaway Point test a small charge was used, so that the action of the projectile could more easily be followed. The rockets in this case covered only a quarter of a mile, while with full charges they would have covered a mile or more. The tests were very successful, the rockets exploding when striking the ground, tearing large holes in the sand and scattering bullets over a large area. Several rockets were also fired out to sea, and exploded on striking the water. The third test, that of exploding a rocket in mid-air with a time fuse, was also successful. Mr. McIntyre has equipped his invention with a safety device which prevents premature explosion. This permits large quantities of the rockets to be transported in perfect safety.

World's Power Boat Record.

The official world's record for a power boat has been established by the "Napier II.," of Great Britain. This boat competed in several contests last year, but her performances were not considered satisfactory, although every indication of speed was manifested. It was therefore handed over again to the builders, Messrs. Yarrow & Co., of Poplar-on-Thames, and drastic alterations have been effected in the design of the hull, which is practically a new structure. Officially timed on the builder's recent trials the world's record for a knot was attained. Three runs were made over the measured mile, the first against the tide occupying 2 minutes 25 seconds, which is equal to 24.827 knots or 28.57 miles per hour; the second, with the tide, took 2 minutes 14 seconds, a speed of 26.86 knots or 30.93 miles per hour; the third, also with the tide, was timed to be 2 minutes 12 3-5 seconds, a speed of 27.149 knots or 31.26 miles per hour. The conditions were not propitious for fast speed, as the boat had to contend against half a gale of wind. The mean pace of the first and last runs, with and against the tide, is 25.988 knots or 29.925 miles an hour. For a 40-foot boat this is a meritorious performance. The previous best speed was attained by "Trefle-à-Quatre" at Juvisy, when 22.7 knots were recorded. "Napier II." is reconstructed upon original lines. It is perfectly flat-bottomed, with the sides of the bows perfectly perpendicular. The boat is propelled by two four-cylinder engines each developing 60 horse-power driving twin screws. At full speed the craft rides with about 6 feet of her bows out of the water, but makes very little wash.

The Current Supplement.

The current SUPPLEMENT, No. 1535, is opened with an excellent article on the car-ferry steamer "Detroit" of the Michigan Central Railroad. Rear-Admiral George W. Melville contributes a splendid review of the epochs in marine engineering. A technological article of interest is that on the manufacture of bronze colors. The artificial production of rubies is described and likewise illustrated. Steel-hardening metals have become of such importance, that Joseph Hyde Pratt's discussion of the subject will be followed with interest. Inventors will find of value an article on distance control by electric waves. Producer-Gas Power Plants is a subject which is fully discussed by A. Frederick Collins. Prof. Blondlot's puzzling discovery of the N-rays is made the subject of exhaustive inquiry by C. G. Abbot. The usual electrical notes, engineering notes, and trade notes and recipes are to be found in their accustomed places.

Automobile Notes.

In view of the recent lowering of the 1,000-mile non-stop track record 4 hours, 3 minutes, and 36 seconds by Charles Wridgeway on a Peerless car, further attempts at cutting the new time of 25 hours, 50 minutes, and 1 second will doubtless soon be made, and automobile enthusiasts will probably have a chance to witness several more such tests during the summer. Wridgeway covered 934 miles in 24 hours, or 123 miles more than the Packard machine, driven by Schmidt, made in the same time last summer. His average speed was about 39 1/2 miles an hour. The car was run at an even rate following the indications of a speedometer. The only mishap was the breaking off of the exhaust pipe at the end of the twenty-second hour. The right-hand front wheel was changed four times because of the constant great strain upon it and its tire. The motor, however, did not stop during these or any of the other stops for supplies.

An overland long-distance endurance test of two Oldsmobile runabouts is now under way. The two machines started from New York on May 8 and are expected to arrive in Portland, Ore., on or before June 21, or within 42 days. The driver of the first machine to arrive is to receive a \$1,000 prize. The runabouts will be the first machines to have crossed the continent from east to west. The drivers expect to attend the Good Roads Convention at the Lewis and Clark Exposition, to the president of which they are carrying messages. The machines reached Des Moines, Iowa, on May 20, after having encountered muddy and flooded roads in Illinois and Indiana and being pulled through Skunk River marshes with a block and tackle, during which passage they were completely submerged. They started from Omaha, Neb., on the 25th after spending one and one-half days there getting extra gasoline tanks fitted and preparing for the rest of the journey, during which they will cross Nebraska, Wyoming, and Oregon.

The opening of the track racing season in the vicinity of New York occurred on May 6 at Brighton Beach. The chief excitement of the day was furnished by the remodeled Ross steamer, which performed so successfully at Ormond last winter. Driven by Joe Nelson, this machine, which has been christened the "Lightning Bug," ran through the fence and was damaged considerably, though Nelson fortunately escaped injury. Besides a 5-mile exhibition performance by Walter Christie on his front-drive racer, there were no other specially interesting performances. The first meet at Morris Park—the new automobile race track—resulted in the cutting of one-fifth of a second off Barney Oldfield's old track record of a mile in 53 seconds. The new time was made by William Wallace's 90-horse-power Fiat. The new White steam racer did a mile in 53 seconds, and took second place in a 3-mile free-for-all race, which was won by Chevrolet on the Fiat in 2:51 4-5. The track was not in very good condition, it being too soft and not sufficiently banked at the sharp turn.

The first hill-climbing contest to be held this season took place at Springfield, Mass., recently, where a new Groust steam racer covered the 2,175 feet up a 9 to 12 per cent grade in 34 seconds. This new racer is fitted with two boilers and a 50-horse-power steam engine. The next best time for the hill was made by a 60-horse-power Napier car, which took 1 3-5 seconds longer to make the ascent. A Ford, a Reo, a Stevens-Duryea, and a large Columbia won first place in their respective classes, their times being in order, 57 3-5, 54 4-5, 47 2-5, and 41 1-5 seconds. A double opposed-cylinder Buick car made the climb with four passengers aboard in 50 1-5 seconds.

An automobile street cleaner is being placed on the market by an English firm of motor manufacturers. The vehicle is not only propelled by a gasoline motor, but is provided with four separate attachments, each of which is operated by the motor, and is designed for a special function. These comprise a rake to loosen caked mud upon the surface of the road, squeegees for use in wet weather, a revolving brush to clean up surface rubbish or dust, and a set of overlapping scrapers to complete the cleansing work. The revolving brush is so arranged that the dust and rubbish which it removes is deposited in a special receptacle, and no dust is raised in the air. This is a conspicuous advantage over the existing machine of this type, which can only be used at night time, when pedestrian traffic is practically nil, owing to the excessive contamination of the air by dust particles. The motor vehicle costs about \$4,000, but working at an average speed of eight miles an hour, and being so varied in its operations, can carry out the work of some fifty men. These machines are to be introduced in English thoroughfares during the coming summer.

In making an electric furnace, according to Engineering Record, with limestone blocks, it is necessary to dry them in a stove or otherwise for 10 to 24 hours, as the least moisture will cause a block to crack when subjected to the heat of the arc.

Correspondence.

Why the Stone Ball Moves.

To the Editor of the SCIENTIFIC AMERICAN:

Concerning the spontaneously moving stone ball at Marion, Ohio, noticed in the SCIENTIFIC AMERICAN for April 15, assuming its description to be free from error, permit me to suggest that such a movement must be due to some artificial cause or to the axial rotation of the earth.

If to the latter, its direction should be somewhat to the east of south, its southerly motion being due to centrifugal action, while its easterly deflection should be the result of a "throw," due to the velocity of terrestrial rotation in that latitude, which should vary but little from 800 miles per hour; the actual direction of the rotation of the ball being the resultant of these, modified by friction.

Akron, N. Y., May 19, 1905. JULIUS PETERSON.

The Stone Ball Again.

To the Editor of the SCIENTIFIC AMERICAN:

We were very much interested in the moving ball described in your issue of April 15, and think there is another probable cause not given, at least we have not noticed it referred to, viz., the capillary attraction hypothesis; and assume that the ball does not fit the socket perfectly, leaving a space to be filled with water, frequently by rain and dew distilled at night, which would be drawn up by the force of capillary attraction between the cup and ball, and this film of water would be evaporated by the sun's rays on the south side first, and the ball drop to that side, causing the ball to move from north to south, just as we find taking place in the instance referred to.

Oshawa, Ont., May 23, 1905. J. W. PROVAN.

An Automobile for Market Gardeners.

To the Editor of the SCIENTIFIC AMERICAN:

The market gardeners and farmers of the country, and particularly the market gardeners, need an automobile for working the soil. To one who reads the papers devoted to agriculture regularly this will seem to be at first glance a ridiculous statement, because the farm papers, almost without exception, denounce the automobile. Nevertheless, the machine for working the soil is needed, and a sale can be made of the right kind of a machine in spite of prejudice. Let me specify some of the features that such a machine should have.

That it should be simple in construction is, of course, the first of all the requisites. It should then be small, so as to require but little space at the end of a furrow. It should be easily steered, and turn within its own length. The width of tread should be variable. The rims of the wheels should connect with the hubs by means of sheet-metal plates instead of spokes. The width of tire should be about five inches. The whole machine should weigh as little as possible consistent with strength. It should be geared to run at two speeds, if not three. The motor should be designed so that it could be disconnected from the wheels of the machine, and used for the numerous purposes for which motors are wanted on the farm, such as thrashing and pumping. The machine must be arranged to drag all kinds of farm implements, and to haul the crop to market. If it were able to do service as a carriage as well, so much the better.

In proof that such a machine can be sold in spite of prejudice, consider this one fact: Gardeners now plant many vegetables in rows three feet apart, that might better be planted a foot apart. The wide spaces are required because a horse must be used to cultivate the vegetables. I have heard of spaces two feet wide between rows being cultivated by a horse, but I never saw it done. A well-built machine could travel between rows a foot apart, or at worst fifteen inches apart, and that is to say that an automobile cultivator would just about double the truck crop that can be raised on an acre of ground.

When the late W. W. Huntley, of Silver Creek, N. Y., began making bran clusters to take flour out of bran, the millers laughed at him. They said to take out the flour would spoil the sale of the bran. But Huntley persuaded one, here and there, to try the machine, and he agreed to take the flour thus saved during a stated period as pay for the machine. That always sold the machine. In like manner place a well-designed automobile in the hands of a reputable truck-grower, and the machine will sell itself. Where is the manufacturer who will first occupy this field?

Northwood, N. Y., May 22, 1905. JOHN R. SPEARS.

The Crater of Kilauea.

A correspondent located at Hilo, Hawaii, informs us of two heavy earthquakes occurring there early in May, and of the great activity of Kilauea crater. Two fountains of lava were playing in the bottom of the crater pit, causing a large flow of lava, making an interesting sight for tourists.