

impressed upon them heretofore by their well-meaning automobilist friends the idea that it often costs more to keep a car and run it than the original price of the car itself.

With the test just cited as a sample, the Chicago Motor Club has decided to conduct a similar test on June 28. Three classes are provided for touring cars, and a separate class for roadsters or high-powered runabouts. There will be but one prize in each class, and the car having the least penalization will win this. In this contest, each time the engine is stopped there will be a penalization of 25 points. The bonnet and coil of each car will be sealed, and a penalization of 50 and 25 points respectively will be made for the breaking of these seals. Five points penalization will be given for each minute or fraction thereof spent in making repairs, adjustments, or replacements. Putting water in the radiator will also be penalized. All cars having the engines underneath must be provided with mud aprons, which will also be sealed. There will be no penalties for repairing tires, but the contestants will have to make up any time lost in this manner within a control. A leeway of ten minutes is allowed at each control. There will be five checking stations, and the total distance is 131.6 miles.

In addition to the sealed bonnet contest just mentioned, California automobilists are to have a two days' endurance run from Los Angeles to San Diego on June 27 and 28, and the Quaker City Motor Club is to conduct the reliability run from Philadelphia to Wildwood, New Jersey, July 3. The race meet will be held at the latter place on the Fourth.

**INAUGURATION OF WORK ON THE CATSKILL NEW YORK WATER SUPPLY.**

On June 21, on the side of one of the mountains to be intersected by the aqueduct, Mayor McClellan cut the first sod of what is probably the greatest municipal engineering work ever undertaken in the history of the world—the Catskill water supply for New York city. At the invitation of the New York Board of Water Supply some three hundred guests, including besides the Mayor, the Comptroller, the Corporation Counsel, the State and Civil Service Commissions, and representatives of various prominent institutions in this city, were taken by steamer to Cold Spring, on the eastern bank of the Hudson River, and were then driven some three miles back into the mountains to the valley of what is known as Indian Creek. Here, after appropriate ceremonies, a silver spade was presented by Commissioner Charles M. Chadwick to the Mayor, who, after turning the sod, announced, "Now I, the Mayor, in the name of the people of New York, declare this work begun."

It was fitting that the work of actual construction should be thus inaugurated by Mayor McClellan; for it is to his appreciation of the grave condition which threatened New York with the terrors of a water famine, and to the energetic and masterly way in which he has used all his influence to push the work through to its present stage, that the present and future citizens of New York will be indebted for this, its most important municipal undertaking. The magnitude of the work will be understood when it is stated that its estimated total cost of \$162,000,000 is not far short of the total estimated cost of the Panama Canal. Next to the Mayor, credit should be given to the Commissioners, President J. Edward Simmons, and his fellow Commissioners, Charles M. Chadwick and Charles S. Shaw, for the enthusiasm and energy which they have displayed, and the excellent results achieved during the brief period in which they have been in office. The speech of President Simmons was of an unusually high order, and the motives and purpose of the work were summarized in a passage which we here quote:

"Why do four millions of Americans who compose the greatest municipality of the New World contribute without a murmur all the treasure required for this gigantic enterprise? The answer comes spontaneously to our lips. It has been demanded and ordered by the people for the people.

"This mighty aqueduct will take away from no man anything that is needful to him. It will bring the purest and most healthful of all drinks to myriads of our fellow-citizens, both in the present and the future. It will bring to their homes the means of cleanliness and happiness. It will be a safeguard to the household goods of the poor and to the merchandise of the captains of industry."

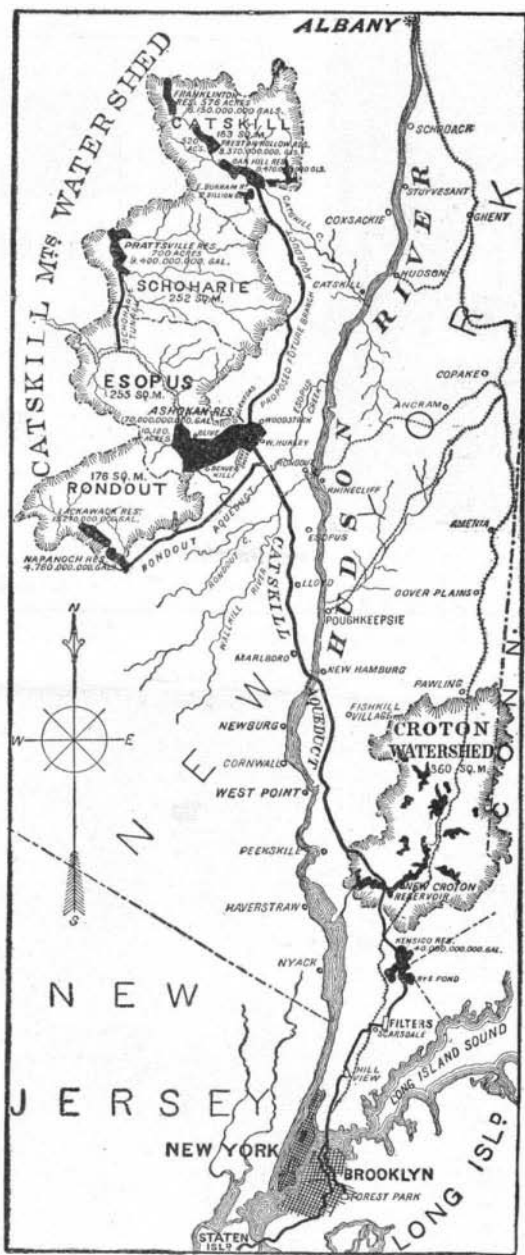
After the ceremony of turning the first spadeful of earth the Mayor said:

"When I took office on January 1, 1904, I found myself confronted with a possible water famine, and with nothing practical done for its avoidance. The imminence of the peril was appreciated by the few who had studied the matter, but the public at large did not understand its seriousness, nor was there any public sentiment in favor of its speedy solution. Some preliminary work had been done and done well, but that was all. My administration found it necessary to do three things before a new water supply system could be actually undertaken. First, it was necessary to pro-

vide an additional borrowing capacity to meet the expenses of the undertaking, by means of a constitutional amendment which had passed the Legislature, but had not been submitted to the people. Second, it was necessary to enact legislation so as to make the powers of the local authorities certain. And third, and most important, it was necessary to arouse public opinion so that the first two obstacles could be removed.

"As the years merge in the decades and the decades in the centuries, when time has thrown its kindly veil over the bickerings and the differences and the quarrels which seem so much to us and are after all so futile and so petty, when friend and enemy, traducer and traduced have passed away, when our very names shall have been forgotten, when this great work conceived in honesty, begun in honesty and completed, God willing, in honesty, shall be administering to the health and happiness of millions yet to come, then God grant that those who shall see it may say: 'It does not matter how they were called who did this thing, or who they were, or what they were, it is enough that they did their duty.'"

The sod was cut on a strip of two and one-half acres



**MAP OF NEW YORK CITY'S PROPOSED NEW WATER SUPPLY.**

of land which has the distinction of being the first land bought by the city for the new aqueduct.

In selecting a new source of water supply, the engineers realized that the conditions surrounding New York city were exceedingly difficult. To the east it is shut in by the Atlantic Ocean; to the west it is excluded by the laws of New Jersey from tapping any of the water sources of that State. The excellent supply which might have been drawn upon from the sources of the Housatonic River was shut out of consideration because of the location of that river in the State of Connecticut; and hence the city has been driven by its geographical and legal restrictions to the splendid sources of supply which lie in the Catskill Mountains. This water supply is not only abundant, but the water is of most excellent quality. By reference to the accompanying map, it will be seen that four separate districts are to be drawn upon. The first of these is what is known as the Esopus Creek watershed, which has an area of 255 square miles. Its waters are to be impounded by the construction of a great dam 220 feet in height across the valley of the Esopus, at the Olive Bridge site. The dam will create the Ashokan reservoir, 12 miles in length and 2½ miles in width, with a capacity at full level of 170,000,000 gallons, and capable of supplying 250,000,000 gallons of water per day. From the dam a huge aqueduct 17½ feet in its largest diameter will be built, partly by the

cut-and-cover method and partly in tunnel, which will extend to the westerly bank of the Hudson River at a point between Cornwall and West Point.

It was originally intended to carry the aqueduct in tunnel below the Hudson River at New Hamburg, but the preliminary borings at this and other sites proved that it would be difficult to find a rock sufficiently free from fissures and other imperfections to render it suitable to withstand the enormous pressure of the water at the depth below the river at which it would have to be carried. Borings are now being made near Cornwall at a site where geologists assured the engineers that it would be possible to find a thoroughly sound and suitable rock. The aqueduct passes through the mountain and reaches the westerly slope of the Hudson River at an elevation of 400 feet above tide level. Here a vertical shaft will be sunk until a depth probably of 700 feet below the river surface or 1,000 feet below the level of the aqueduct is reached. The tunnel will then pass beneath the river to connect with another vertical shaft of almost equal depth on the easterly bank of the river. From this point it will be constructed through the mountains until it reaches the new Croton reservoir. Here connections will be made to enable the water to be drawn directly from the Ashokan reservoir into the Croton reservoir, with a view to augmenting the Croton supply until the whole aqueduct from Ashokan to New York city shall have been completed.

From the Croton reservoir the aqueduct will be continued south to Kensico reservoir, which will be enlarged to include Rye Pond, and form an auxiliary storage reservoir at an elevation of 355 feet above mean tide, capable of containing 25,000,000,000 gallons, or sufficient to supply the city at the rate of 500,000,000 gallons for a period of fifty days. About four miles south of Kensico, at Scarsdale, there will be built a large filtering plant, and six miles to the south of this will be another storage reservoir at Hill View. With these two auxiliaries or emergency reservoirs provided, the city will be secured against any sudden interruption of its supply through failure of the 69 miles of aqueduct lying to the north of them.

By the construction of a tunnel of 200,000,000 gallons daily capacity below the East River, Brooklyn and Staten Island will be provided with a supply of 100,000,000 gallons daily, and this aqueduct will terminate in a large reservoir to be constructed in Forest Park. From the point where this tunnel reaches the shores of Long Island, a line of 20,000,000 gallons capacity will be built through Brooklyn and below the Narrows for the supply of Staten Island.

The rate of growth of Greater New York is so rapid that it cannot be many years before the watersheds of the Rondout, the Schoharie, and ultimately of the Catskill rivers will, in turn, be brought into service. The Rondout watershed covers 176 square miles, and would be capable of yielding 130,000,000 gallons daily. This water will be stored in what will be known as the Mapanoch reservoir, from which its waters will be led by an aqueduct into the main Catskill aqueduct a couple of miles below the Ashokan reservoir. Later, the Schoharie watershed will be brought into service by the construction of the Prattville reservoir, its waters being brought into Esopus Creek by means of a tunnel through the divide. Lastly, the Catskill water will be impounded in several reservoirs located along that stream, and brought into the Ashokan reservoir by an aqueduct whose location is shown on the accompanying map. Altogether, when the whole scheme is completed, New York city will have at command over 700,000,000 gallons daily water supply from the Catskill Mountain watershed, in addition to the 375,000,000 gallons already available in the Croton watershed.

**The Current Supplement.**

More than 10,000 men are in daily attendance at the largest railway university in the United States. The university is described by Frederic Blount Warren in the current SUPPLEMENT, No. 1643. "False Back Repetition Casting" is the title of an article which will interest the amateur founder. Some practical tests of rubber are given. Several forms of telegraph railroad signaling systems have been proposed, and a number of tests have been carried out. The most recent of these systems, invented by Frank W. Prentice, is described. Walter F. Reid tells how to use waste India rubber. "Bacteria in Cheesemaking" is the title of an essay by Prof. Herbert W. Conn. "The Amateur's Foundry" is simply described by Walter J. May, a well-known English expert. If the same region of the sky is photographed at two epochs, the comparison of the photographs in the stereoscope at once shows what stars have altered in brightness in the interval, for in the photographs the diameters of the star disks vary according to the brightness of the star. This method is described in the current SUPPLEMENT by Dr. Max Wolf, the well-known Director of the Heidelberg University Observatory. The maintenance of the equilibrium in aeroplanes is a subject of vital importance to the aeronaut. Robert W. Goddard shows how the gyroscope may be used for balancing and steering aeroplanes.