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## THE JEROME PARK RESERVOIR, NEW YORK CITY.

The Aqueduct Commissioners of the city of New York have now in active progress of construction two important works to increase the water supply of New York City. One is the new Croton dam, designed to increase the size of the present Croton Lake and thereby impound a greatly increased water supply for the city at large.

From the present Croton Lake two aqueducts, the old one of 1840, the other the new one completed in 1890, run to the city, delivering their water directly into the reservoirs in Central Park. The city of New York has had one policy as to its water supply; it has always worked on the lines of an increase of reservoir capacity by addition, the old reservoirs being preserved. This conservative method has been so fixed that to-day the proposals to destroy the original reservoir at Fifth Avenue and Forty-second Street are opposed, and we find that for the immediate supply of New York City, in addition to this reservoir, the lower and more recently built reservoir in Central Park has annexed to it the upper reservoir of still more recent construction, and further to the north and west auxiliary reservoirs for the supply of specific districts; but as the case now stands the lower portion of New York City depends upon the Central Park reservoir capacity. If the bottom of this reservoir was high enough when the water was exhausted to its lowest level, a billion of gallons would be available, but, owing to the low level of the reservoir, it can only be exhausted to about three-quarters of its capacity before the pressure fails, and the water left ceases to be of further avail, so that the city can only depend upon this reservoir for three-fourths of its capacity, or three days' supply. While it is not probable that any accident would occur to interfere with the aqueduct service, yet there is always such a possibility, and therefore the Central Park reservoir is to be kept filled; an accident or cutting off of the aqueduct's delivery would leave New York provided with only three days' supply of water.

To provide for additional storage capacity for direct use in the city, construction operations are now in progress on what is known as Jerome Park reservoir, in Fordham, in the annexed district.

Here Jerome Park, with its famous old race course on which so many celebrated horses have been ridden to defeat or victory, with a quantity of adjacent territory, has been selected for a reservoir. The ground offers fair advantages in point of elevation and configuration; its vicinity to the city and its situation in the heart of the annexed district make it peculiarly available for the purpose. The area of about 5,800 feet long and 2,800

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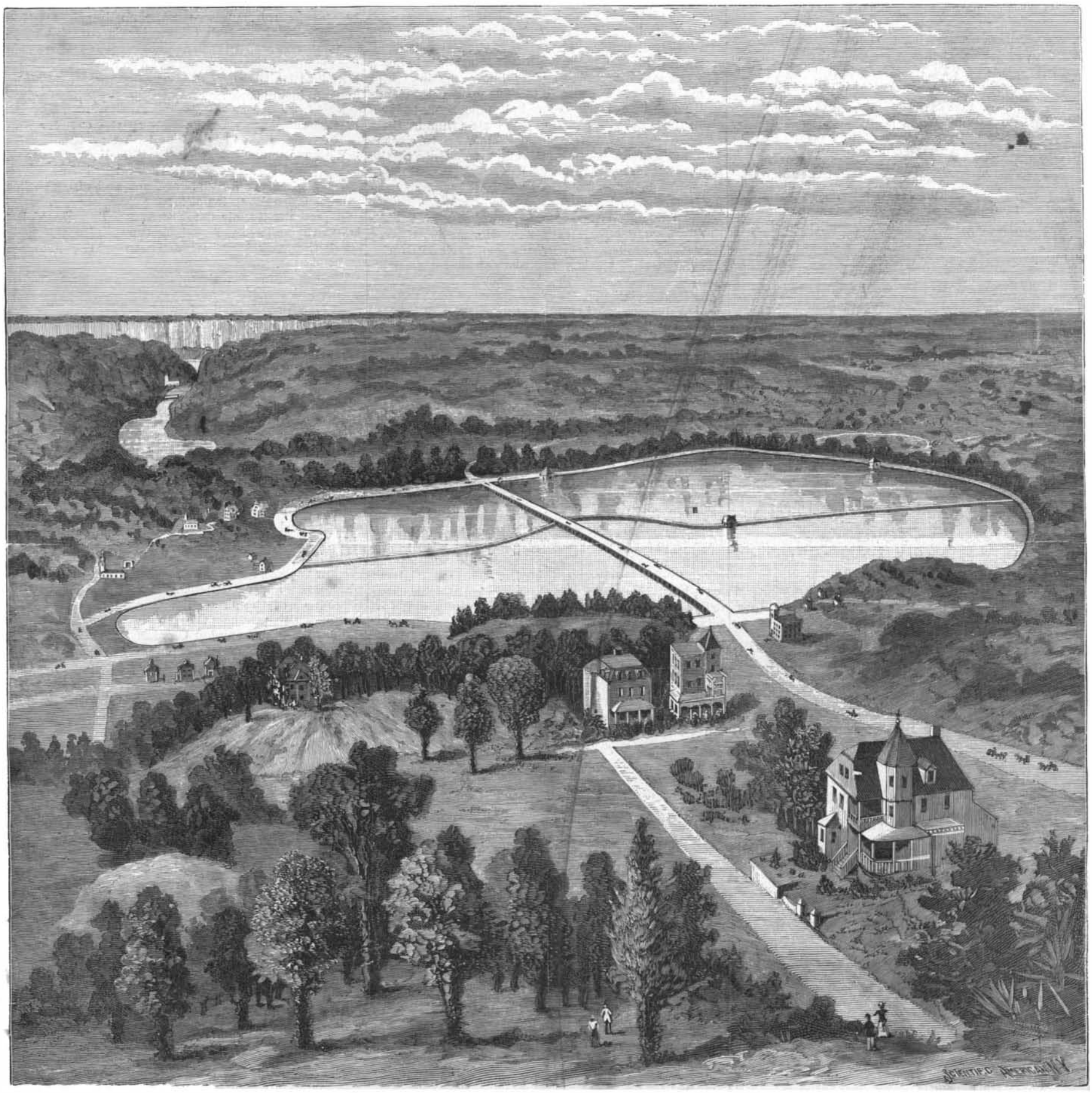

THE JEROME PARK RESERVOIR, NEW YORK CITY.

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(Continued from first page.)

feet wide is to be surrounded by an embankment and the bottom is to be excavated until good surface is reached, so as to establish an available depth of 33 feet 6 inches. This will involve a very large amount of excavating; the engineers calculating that there will be nearly seven million of cubic yards of excavation to be made, of which 3,165,000 will be in solid rock.

The reservoir will be bounded on the west by Sedgwick Avenue, on the east by Jerome Avenue, north by Van Cortlandt Park and south by Kingsbridge Road. One of our cuts is designed to show the general plan as contrasted with the race course so familiar to many. The embankment is made in earth and laid in the well known method adopted by the Aqueduct Commissioners, in six inch layers, worked down and rolled with a heavy grooved roller and rammed at points which the roller cannot reach.

Throughout the center of the embankment a core wall of rubble masonry is carried, which rises above the water level and descends well below the bottom of the reservoir, in many cases having its foot deeply embedded in rock. Thus the strength of the embankment will consist in the earth, and the dam will be absolutely impervious, which imperviousness will partly be due to the earth embankment; but in case of a deficiency in any place in the earthwork, the slightly battered core wall, three feet thick at the top, will be present, and present an absolutely impervious diaphragm. It is so well known as to be obvious that the smallest leakage through earth is subject to constant increase, and it is such leakage which the core wall is designed to prevent. The embankment will be 20 feet wide at its top. On both sides it slopes 2½ to 1, and is sodded on the out slope, and on the in slope is paved and concreted.

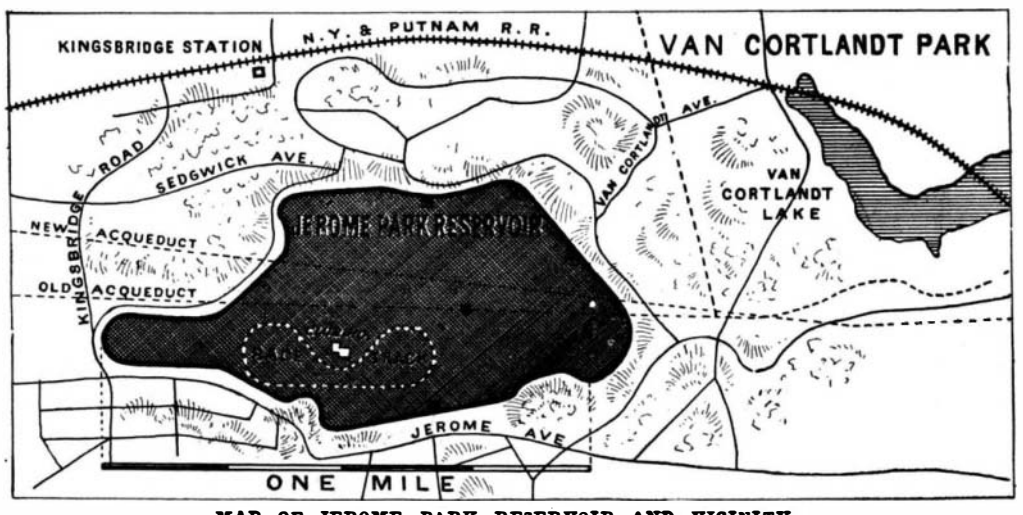
It will be seen that it forms a very perfect type of embankment, and a reservoir so made cannot but be impervious as regards its sides. The nature of the country is such that no trouble can be anticipated from bottom leakage, and wherever any weak spots occur concrete laid upon broken stone is to be used to secure absolute imperviousness.

Running approximately north and south, the reservoir has a masonry structure or dividing wall through which the old aqueduct passes. The old aqueduct is caused to diverge from its course so as to follow the somewhat sinuous line of this structure, and from a mile to the north a branch is taken from the new aqueduct, which is carried to the above masonry structure and follows it to an outlet near the southern end. A little to the north of the center of the reservoir, on the line of this structure, is established a gate house, and near this is a vertical shaft connecting with the new aqueduct (of 1890) and built at the same time. This shaft connection with the new aqueduct of 1890 becomes an important adjunct in providing the requisite connections. From this gate house six lines of 48 inch pipe radiate; two approximately northwest, two approximately west and two approximately east. In the gate house a very elaborate system of connections is provided, so that water may be taken from either right or left hand divisions of the reservoir or aqueducts and distributed to any of the six lines of pipes. Both new and old aqueducts have outlets into the reservoir also controlled from this central gate house, so that the new reservoir virtually supplies two reservoirs of the most perfect possible description, which can be operated entirely independent of each other. As regards capacity, about two billion of gallons will be contained, and taking into consideration the level of the annexed district, practically all the water in the reservoir can be advantageously withdrawn for the supply of the city. The delivery from the six 48 inch pipes will be utilized by the Department of Public Works, who control the city distribution.

One plan suggested is to carry a line from the six 48 inch pipes down across the Harlem River to the city, connecting with its princ pal mains, which in their turn run to the Central Park reservoirs. This would provide for interruption in the supply of the portions of the aqueducts crossing the Harlem River, one over High Bridge and the other by inverted siphon. In addition to the central gate house, which will be a complicated structure, smaller gate houses will be provided where the 48 inch lines emerge from the embankment, and at the point 5,000 feet to the north, where the branch is taken from the new aqueduct, a fifth gate house will be established. For the construction of this branch matters have been so arranged that only twenty-four hours' interruption of water supply will be required to complete the connection between the branch and the original aqueduct, which operation in itself may rank as a minor triumph of engineering.

As the new aqueduct is only partially filled with water, its crown will be broken into and the gate house will be built about it in the rock. The branch will be carried up to the aqueduct's sides and connected thereto; the sides of the aqueduct being reinforced where exposed by temporary masonry laid up against the outside. When all is ready for the connection there will be nothing to be done but to break down these walls and the sides, when the brickwork will be finished at the corners, all of which will be a comparatively small operation.

The line of the aqueduct structure and the place for the location of the gate houses were all indicated by the nature of the ground. The high level of the water will be five feet below the top of the embankment. On the completion of this reservoir, New York will have about three weeks' supply of water available in it and in the present Central Park reservoirs.




MAP OF JEROME PARK RESERVOIR AND VICINITY.

### The Seismic Wave in Japan.

Writing from Tokio on June 26, the correspondent of the London Times gives an interesting though melancholy account of the great wave disaster in Japan, by which in five minutes 30,000 people were killed and 12,000 houses were destroyed.

There was nothing (he says) to presage the disaster. From 11 in the forenoon until half past 4 in the afternoon heavy rain fell. It was followed by a fine evening and a dark, calm night. At about half past 7 three or four shocks of earthquake were felt; not violent shocks, though of the vertical kind that people in Japan have learned to dread. The barometer gave at the time no indication of anything unusual. Some 20 or 25 minutes later a booming sound became audible from the direction of the sea. It appears to have been variously interpreted. Only a very few suspected the real significance of the sound, and fled inland at the top of their speed. Rapidly the noise increased until it assumed the volume and deafening din of a great park of artillery, and then, in a moment, waves from 20 feet to 30 feet high were thundering against the shore.

Kamaishi is a little seaside town, situated at the head of a rocky inlet two miles deep, and directly facing the Pacific Ocean. Behind it is a precipitous hill. The inhabitants seem to have remained until the last wholly unconscious of what was pending. Suddenly a mountain of sea was observed piling itself up at the mouth of the inlet, and in a moment, with a thunderous roar, waves 30 feet high swept over the town. Three times these avalanches of water rushed forward, the first incomparably the most terrible, and in less than two minutes the town was virtually annihilated. Out of 1,223 dwellings only 143 remained standing, and out of a population of 6,557 death had overtaken 4,700 and 500 lay wounded. In completeness of destruction this record heads the list.

There were some remarkable escapes. Men swept out to sea from one side of a bay were thrown up alive on the opposite beach, and in one case several persons were deposited on an island nearly three miles from the town whence the wave had torn them. A few saved their lives by clinging to balks of timber, and several, getting wedged among the wooden debris of wrecked buildings, were preserved until the wave receded. At an inn in O-ura a traveler, apparently the only man in the house, was grasped by four terrified women, and the combined weight of the five furnished a steady point. But such bright incidents were rare, whereas of inexpressibly sad happenings there are numbers. The parents of six children caused the little ones to throw their arms round a beam of the house. There they clung, the water reaching up to their shoulders. The smallest child, losing its hold, was swept away, and its mother, springing after it, shared its fate. Presently the father, trying to fend off some floating debris that threatened to strike the children, was carried off, and the five orphans alone remained. In another family of ten, one child of eight drifted to a rock and was saved; in another family of the same number, the father having carried a baby to a hill, and found that none of the others followed, set down the baby and ran back, only to perish with the rest. The story of a retired soldier is worth repeating. His experiences in the recent war had taught him to apprehend the raiding of Japan's coasts by a hostile fleet. Thus, when the cannon-like roar of the advancing waters and the cries of the people reached him, he threw on his tunic and ran shoreward, sword in hand. Next morning his corpse was found, much battered, but not separated from the sword.

Along the beach the timbers of wrecked houses lie piled upon each other; moss covered roofs of thatch that sheltered happy families a few days ago in quiet country nooks are strewn pell-mell on the sands; here, houses that have had their walls torn away, stand, mere skeletons; there, others have been wrenched from their foundations, telescoped into each other, tumbled upside down, or heaped together in shattered confusion. Horses and cattle lie wedged among the rocks, and men and women wander about, stupefied and helpless, looking as though their minds and energies had been numbed. Numerous corpses are still buried under the debris of ruined buildings, or under heaps of mud and sand thrown up by the waves, and often when a body is disinterred no friend or relative remains alive to identify it. The government is, of course, adopting vigorous measures of relief, and liberal subscriptions are pouring into the newspaper offices, both vernacular and foreign, for when calamity overtakes Japanese, the benevolence of the foreign community is invariably large handed.

As to the cause of the disaster opinions are still divided. At first it was supposed that the disturbance had its origin in a sudden collapse of the sides of a subterranean crater. On the other hand, considering that the advent of the great wave was immediately preceded by earthquake shocks whose vertical character precludes the hypothesis that they were due to the stupendous rolling of the wave itself, the most reasonable conclusion appears to be that a submarine volcanic eruption took place. That the water had been thrown up from great depths to swell the bulk of the colossal billow is proved by the fact that deep sea shell fish were found in the hills visited by the wave. It may be added here that since the catastrophe the fish seem to have deserted the upper waters; a few can be caught now only by using the deepest seines, the great bulk having apparently gone down to inaccessible depths.

Ever since the ninth century Japan has suffered cruelly from earthquake waves. The very district now devastated was momentarily buried under the sea in 869 A. D., and the loss of a thousand lives is recorded, a catastrophe scarcely smaller under the conditions of the time than that which has just occurred. But in no case did the destruction of life attain dimensions such as have now to be recorded.

### Big Dry Dock Settles.

The 550 foot dry dock at Erie Basin, with the Hamburg-American steamship Phœnicia in it, settled two feet August 19 from causes that have not been explained. The Phœnicia is a big twin screw freighter and immigrant carrier. She had been docked for painting and for the readjustment of her propeller blades. At 8:30 o'clock fifty machinists and helpers were at work about the stern of the ship removing one of the propellers. Without apparent cause, and without warning, the forward end of the dock gave a lurch and settled two feet. There was danger that the dock gates might give way. The accident at the Brooklyn Navy Yard was fresh in the minds of the workmen, and they fled for their lives, clambering helter skelter up the steep steplike sides of the dock. The gates creaked and groaned, but held fast.

Then the dock was flooded and the gates were opened. It was found that the Phœnicia was stuck fast. The Phœnicia was afterward floated. The dock was not materially injured.

### Headaches from Eye Strain.

Dr. S. Weir Mitchell, in Medical News, says there are many headaches which are due directly to disorders of the refractive or accommodative apparatus of the eyes. In some instances the brain symptom is often the most prominent, and sometimes the sole prominent symptom of the eye troubles, so that while there may be no pain or sense of fatigue in the eye, the strain with which it is used may be interpreted solely by occipital or frontal headache. The long continuance of eye troubles may be the unsuspected source of insomnia, vertigo, nausea, and general failure of health. In many cases the eye trouble becomes suddenly mischievous, owing to some failure of the general health, or to increased sensitiveness of the brain from moral or mental causes.