

THE
POPULAR SCIENCE
MONTHLY.

DECEMBER, 1873.

RADICALISM, CONSERVATISM, AND THE TRANSITION OF INSTITUTIONS.¹

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OF readers who have accompanied me thus far, probably some think that the contents of these papers go beyond the limits implied by their title. Under the head *Study of Sociology*, so many sociological questions have been incidentally discussed, that the science itself has been in a measure dealt with while dealing with the study of it. Admitting this criticism, my excuse must be that the fault, if it is one, has been scarcely avoidable. Nothing to much purpose can be said about the study of any science without saying a good deal about the general and special truths it includes, or what the expositor holds to be truths. To write an essay on the study of astronomy, in which there should be no direct or implied conviction respecting the Copernican theory of the solar system, nor any such recognition of the law of gravitation as involved acceptance or rejection of it, would be a task difficult to execute, and, when executed, probably of little value. Similarly with Sociology—it is next to impossible for the writer who points out the way toward its truths to exclude all tacit or avowed expressions of opinion about those truths, and, were it possible to exclude such expressions of opinion, it would be at the cost of those illustrations needed to make his exposition effective.

Such must be, in part, my defense for having set down many thoughts which the title of this work does not cover. Especially have I found myself obliged thus to transgress, by representing the study of sociology as the study of evolution in its most complex form. It is clear that, to one who considers the facts societies exhibit as having had their origin in supernatural interpositions, or in the wills of individual ruling men, the study of these facts will have an aspect wholly unlike that which it has to one who contemplates them as gen-

¹ Concluding article of the series on the "Study of Sociology."

As there is no Unconditional in subjective thought, so there is no Absolute in objective reality. There is no absolute system of coordinates in space to which the positions of bodies and their changes can be referred; and there is neither an absolute measure of quantity, nor an absolute standard of quality. *There is no physical constant.*



A POWDER-MILL EXPLOSION.

By WILLIAM AIKMAN.

I PROPOSE to have a talk about an explosion of a powder-mill. It has never been my hap to see one described, and it has seemed to me that an account of an occurrence of this sort, which does not come under common observation, might not be uninteresting.

While explosions are not the final cause of powder-works—that is, while they are not built expressly for the purpose of exploding—yet they are located with reference to it. It was the fortune of this writer to reside for a number of years within a few miles of the powder-manufactories of the Messrs. Dupont, of Delaware, and so had opportunities of observing the thing of which he speaks. These works will probably be a fair example of others.

These powder-mills, perhaps the most extensive in the country, are about three miles above the city of Wilmington, on the banks of the Brandywine River. The position was selected, some fifty or more years ago, by the father of the present proprietors. It is one of the most beautiful in this whole land. The river flows through an exquisite valley, where at every step some new beauty of wood and hill enchants the eyes.

The powder-works are placed at wide intervals for perhaps a half mile along the banks. They are so secluded and hidden that they are never seen or known to be there by an ordinary or uninformed traveler. Should you be riding along one of the hilly and beautiful roads near the mills, you would not only find nothing to suggest their proximity, but could only by inquiry discover the roads that lead to them.

The elder Dupont, father of the late illustrious Admiral Dupont, was a man of remarkable energy and business ability. In nothing did he show his character and foresight more than in the selection of the location of these mills. During the administration, or after it, of President Jefferson, Dupont came to this country from his native France with the purpose of establishing a manufactory of gunpowder in some favorable location. He found his way to Virginia, and made the acquaintance of Jefferson, who cordially welcomed him to the hospitalities of Monticello.

Anxious to promote the prosperity of that noble State, Jefferson urged upon Dupont Virginia as the place where his contemplated works should be established, and detained him with the courtesies of his home until he could exhibit to him the capabilities and attractions of the country.

Dupont accepted the invitation, and willingly and carefully examined the various places brought under his notice. After a few weeks of inspection and exploration, he reluctantly informed Jefferson that he could not see his way clear to settle in Virginia.

"Is it that the country is not favorable?" asked his entertainer.

"No," was the reply; "it is magnificent."

"Cannot favorable locations be procured? Is not water-power abundant? Cannot materials be found?"

"Yes, yes, but I do not like one thing that I find here."

"But what is that?"

"It's your institution of slavery. I cannot settle where it will be around me."

So Dupont came north, and the powder-manufactories were not established in Virginia.

The city of Paterson, near New York, was then a small village, with its glorious falls of the Passaic not utilized to death as they are to-day, and without a manufactory of any importance within its precincts. Dupont was freely offered a location there, and was strongly inclined to accept it. Every thing was favorable; the position of the land, the unbounded facilities of water-power, ease of transportation, accessibility to a large city, all pointed out the desirableness of the locality; but the sagacious man declined all offers.

"I see," said he, "that this beautiful spot will not remain many years as it is now. Before long, a city or town will grow up just here; extensive manufactories, attracted by this unlimited supply of water, with so many feet of fall, will line the banks of this river. When that time comes, the inhabitants will not brook the presence of a powder-mill, and I, after years of labor, and when all my works are established, will be compelled to move off and away. I must find some place where I can reasonably hope to remain undisturbed."

The secluded banks of the Brandywine, in Delaware, invited him, and the works were erected in its quiet valley.

The tract of land first purchased was large, occupying both banks of the river. It has, in the lapse of years, been gradually increased in size. The Duponts never sell, but are always ready to buy land which lies in their vicinity. The same policy which shaped the action of the father has been continued by the sons—to acquire a property so extensive that no neighboring proprietor can be near enough to desire the removal of their works or be injured by their proximity. This they have accomplished. The country, for perhaps a mile on either side of the Brandywine River, is in their possession, and no one

has a residence, except by their consent, within the possibility of harm from an explosion in their works.

Thus, while such explosions are more or less frequent, the detonation of one of them, if it be not of special violence, excites only the passing remark of a dweller in the neighboring city of Wilmington, and never injures any one outside the works.

Not only is the general location selected, but the various buildings of these powder-manufactories are placed, in reference to the ever-present danger of an explosion. The works are not connected with one another in one great building, or in a connected series of buildings. They are built along the river-banks for over half a mile on either side, and with so much of distance between them that an explosion in one does not ordinarily communicate itself to another, and its destructive effects do not extend beyond the immediate vicinity of the building in which it occurred.

The buildings themselves are constructed carefully with reference to these accidents. They—at least those where the process of manufacture reaches the stage of danger—are built of stone, with three massive walls of solid masonry some ten or twelve feet thick. The fourth side, that which looks toward the river, is made of light framework. The roof is constructed as simply as possible, and is laid upon the walls, and not built into them.

The design of this method of construction may be readily seen. If an explosion occurs, the boarded roof and side of the building readily yield, and are blown into the river, while the massive walls of the other three sides withstand the shock. The building is like a huge mortar. By this additional precaution, the lateral effects of the explosion are prevented, and the buildings on either side are measurably protected.

These precautionary measures, however, are not always effectual. As a general thing—for explosions of greater or less violence are not infrequent—a single dull, heavy detonation is heard, and it is almost unnoticed by those residing in the neighborhood. If slight, it may readily be taken for the noise of a blast in the quarries near by. As, in certain stages of the manufacture, the machinery is set in motion, and the workman leaves the room when the danger is most imminent, life is not necessarily lost by the accident. The only harm that has occurred is the loss of the simple machinery, the materials, and the lighter portion of the building.

Sometimes the case is very different. I have a very vivid remembrance of one. It was the first and the most severe of which I had any experience.

I was sitting with some friends in the parlor of my house, at about eleven o'clock in the morning, when there came a sudden jar and a fearful shock of some very heavy body falling, as I thought, upon the piazza, which ran along the rear of the house. I started from my

seat and toward the door, to see what had happened there, but had scarcely risen when another concussion and a mighty detonation came. I supposed that a very heavy piece of artillery had been discharged in the street, just in the rear of the house. Before I could reach the door, but a few feet away, there came another detonation and another terrific jar, which shook, as the others had done, the house to its foundations. The three reports were in such rapid succession as to be almost simultaneous, but thought was quicker than they, and leaped from supposition to supposition in an instant. The last concussion dissolved my doubts as to the origin of those that had preceded it, and I at once looked in the direction in which I knew the powder-mills to lie.

A spectacle of exquisite beauty and sublimity met my eyes, which will abide in my memory forever. I can hardly expect to convey to the reader the impression which it made upon me. Towering in the heavens, sharply defined against the deep-blue sky, was a column of dazzling white, perhaps a mile in height, and a thousand feet in diameter. Its sides were evenly cut and in perfect symmetry through the whole length of the marvelous column, till they spread out on either side at the top in a broad, palm-like canopy. The mid-day sun was shining upon it, and lighting it up with an unearthly splendor, while it seemed to stand almost over us. We gazed awe-struck and entranced upon it, and could easily think of that pillar of cloud that, in the olden time, stood in its awful majesty in front of the camp of Israel.

It was so vast that it seemed close at hand, although it was three miles away. We watched it silently till it slowly changed its form, and gradually drifted in great cumulous clouds away. It was a vision of singular and glorious beauty, such as I never expect to see again.

In this instance three buildings had been destroyed. The shock of the explosions was exceedingly marked and peculiar, different from any thing that I had previously known. It had a sort of pervasive character that suggested the cause as being immediately at hand. My first impression was not of something at a distance, but rather of the jar of a heavy body falling within four or five feet of where we were sitting, and, when it was repeated, of a cannon discharged close by the house. It seemed to be underneath and all around—to fill the very earth and air.

This pervasive character of the shock is very remarkable. It is the same in all that I have heard. It seems to be felt scarcely more violently in the immediate vicinity of the place where it occurred than miles away. In this case we were between three and four miles off, and yet the explosion could scarcely have been more startling and severely felt, or have seemed nearer, to those who were within a few rods of the place. Indeed, on certain occasions, the violence of the shock is felt much more at a distance than close at hand. In one instance that I

remember, the detonation and concussion were felt and heard distinctly and severely in Philadelphia and in Chester County, Pennsylvania, some thirty miles away, while they were scarcely noticed in Wilmington.

The sound and shock of these explosions must be strikingly similar to those of an earthquake. A few years since—it was on the very day that Chicago was burning—a severe shock of an earthquake was felt in Wilmington, Del., and its vicinity. It is described to me, by those who experienced it, as peculiarly alarming. The concussion was terrific, shaking the houses, opening doors, disturbing furniture, and the boom of the report was exceedingly loud and startling. In an instant all instinctively sprang to their western windows, and almost at once on every accessible roof spectators were gazing toward the northwest, the direction in which the Dupont powder-works are situated. The universal impression was, that there had been an explosion of unusual violence at those works. It was only when, after a time, no column of smoke was seen to rise, that any other explanation was suggested. The noise and the concussion were precisely like what had often been heard before on such an occasion.

The pervasive character of the sound and the shock in both the earthquake and the explosion of a powder-magazine are probably due to the same cause. They are propagated along the line of rocky strata. A continuous stratum of rock extends from the Brandywine to Philadelphia and its neighborhood, and this gives an obvious explanation to the fact, to which allusion has already been made, that the detonation and concussion are heard quite as distinctly as, and sometimes more so, at a distance, than, at a point nearer at hand.

I was curious to witness the effects of an explosion at the place where it occurred, so I set out at once for it. A great concourse was thronging the avenue leading toward the powder-mills, and dotting the fields which lay between them and the city. There was no time to be lost in hiring a vehicle; so, giving some specimens of tall pedestrianism, learned of yore in the streets of New York, I was soon in advance of the crowd, and, in company with a young and wiry Scotchman, whom I could not outwalk, was over the beautiful hills and through the woods which skirt the Brandywine, and at the place.

It was difficult, indeed, as I think of it now after some years, quite impossible, to realize what had taken place not an hour before. The day was at its noon, and the lovely valley was sleeping in quiet beauty. All was perfectly still, with nothing to suggest the terrible occurrence, except it might be those two or three rounded heaps yonder, over which a white canvas sheet was thrown. Under them lay the poor mutilated remains of what a little while ago were stalwart men. It was not good for loved one or stranger to look upon them now!

What struck me more than any thing else was the peculiar air of cleanliness and order that was over the place. Every thing, trees,

stones, road-bed, were all blackened, but all were smoothly swept. It seemed as if some time before there had been a fire which had blackened every thing, and that some one had gone round afterward, and, carefully gathering up and conveying away all the *débris*, had scrupulously swept the whole with brooms, leaving only the soot-stains behind.

Nothing of the sort had been done. Here was simply the result of the storm that had a little while before swept the spot. Usually, the force of the explosion is so great that no *débris* can be left behind. It is simply hurled out of existence. There are no broken boards or pieces of shingle, or bits of wood, to be found. They vanish in an instant. The ground itself has a singularly smoothed appearance, as if beaten down and rounded off.

There were few questions to be asked. On these occasions the proprietors and workmen are reticent, and information is not readily accessible. Indeed, inquiries as to the cause of the explosion are generally useless. If it has been through the agency of a careless workman, he is not there to tell the tale. The man nearest, and most acquainted with the fact, is probably the one who in an instant passes out of life, often totally vanishes from human sight, not even a fragment of his body remaining behind.

That many of these accidents are caused by the carelessness of workmen, there can be no doubt. It is needless to say that the utmost precaution is taken to guard the safety of the men and the works, such as floors flooded with water, shoes in which only copper nails are used, etc. The reader will perhaps smile when we say that *smoking* is absolutely prohibited. Yet, incredible as it may appear, the authority of the proprietors is absolutely necessary to enforce this prohibition. A proprietor of a powder-mill once said to me, that in the face of the ever-present danger, and of the most positive orders, it was impossible to prevent the men, at times, from taking their lighted pipes into the works; that he had detected the men thrusting their lighted pipes into their jacket-pockets to escape observation, as he had unexpectedly come upon them! A triumph of art—to smoke one's pipe in a powder-mill, and "the boss not find it out!"

Once in a while, on some special occasion, the pipe of some such cunning fellow goes suddenly out, and he with it. He does not linger to tell how it happened.

It might be supposed that it would be extremely difficult to find men in sufficient numbers to carry on a business so hazardous, in which the workman's life is in such constant danger. But no such difficulty is experienced. There are always more applicants than places for them to fill. As in every business, however unpleasant or unwholesome, there will always be found men who are more than ready for the work.