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DATE March 31, 1931
REVISED

THE HISTORY OF PICATINNY ARSENAL

PICATINNY ARSENAL

MAJ. F. H. PARKER
SEPT. 16, 1880

MAJ. J. P. FARLEY
APR. 21, 1883

MAJ. F. H. PHIPPS
JULY 19, 1887

MAJ. J. W. REILLY
NOV. 30, 1890

COL. J. M. WHITTEMORE
MAR. 14, 1892

COL. A. R. BUFFINGTON
APR. 6, 1897

ASSIGNMENTS
OF
COMMANDING OFFICERS

COL. L. S. BABBITT
JUNE 5, 1899

CAPT. O. B. MITCHAM
AUG. 1, 1902

MAJ. B. W. DUNN
MAR. 26, 1907

MAJ. O. C. HORNEY
JUNE 10, 1907

LT. COL. J. W. JOYES
NOV. 9, 1915

MAJ. J. C. NICHOLLS
MAY 27, 1917

LT. COL. R. L. MAXWELL
OCT. 22, 1918

LT. COL. R. W. PINGER
JAN. 5, 1919

LT. COL. F. H. MILES JR.
AUG. 22, 1919

MAJ. E. M. SHINKLE
JULY 21, 1920

MAJ. J. H. PELOT
SEPT. 2, 1921

MAJ. N. F. RAMSEY
SEPT. 18, 1922

ASSIGNMENTS
OF
COMMANDING OFFICERS

LT. COL. J. K. CRAIN
JULY 29, 1926

LT. COL. J. B. ROSE
APR. 2, 1930

FOREWORD

This folder is a compilation of matter found in the Arsenal files and in the Dover Public Library, the sources of which are listed in the table following Chapter XI, and references have been made thereto in parenthesis throughout the text.

The History thus compiled includes geographical, geological, and historical data concerning the site of the Arsenal, and carries the development of the tract from the time of its acquisition by the Government to the present date, including the recording of pertinent Legislative Acts, vital records, and copies of property maps.

To assure exactness in transcribing the vital records contained in Chapter V, they have been checked against the Arsenal records by the Engineering Staff concerned of the Plant Engineering Department of the Arsenal.

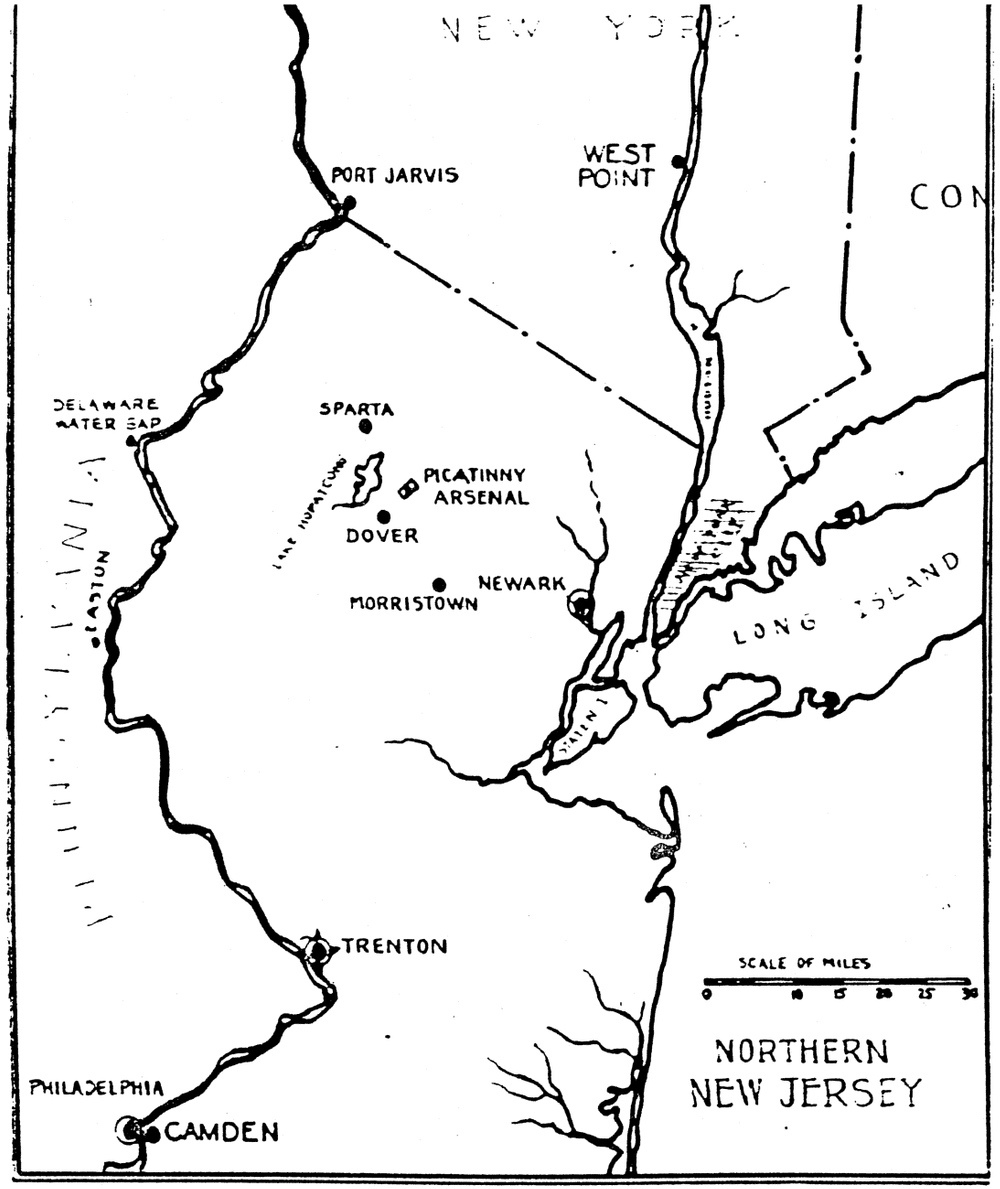
The purpose of this compilation is to place in one volume the accumulating records of years. It has not been edited with a view to printing, and it is planned, when possible, to completely review and enlarge where found desirable. It is submitted in its present form in order that it may be available for use pending elaboration, indexing, and minor improvements.

For the collection and arrangement of the matter contained herein, Captain J. A. Rogers, Jr., Ordnance Department, has been solely responsible. This duty, which has involved appreciable research, was voluntarily assumed by him in addition to his other duties.

J. B. ROSE,
Lt. Col., Ord. Dept.,
Commanding.

Picatinny Arsenal,
March 31, 1931.

CONTENTS



Location of Picatinny Arsenal

CHAPTER I
Geographical

Picatinny Arsenal reservation is in Rockaway Township, Morris County, five miles north of Dover, in the highlands of the State of New Jersey, midway between the Hudson and Delaware Rivers, in position of latitude 40 degrees 56-1/2 minutes north, longitude 74 degrees 33-1/2 minutes west, at an elevation of 710 feet above mean tide water, and lies in the valley of the Green Pond Brook, a tributary of Rockaway River. It is served by a hard surface road connecting with the excellent New Jersey state highway system, and by the Wharton and Northern Railroad. New York City is but thirty nine miles from Dover via the main line of the Lackawanna Railroad.

The reservation contains 1615 acres, the boundaries are irregular, and takes its name from Picatinny Peak, a mountain that rises abruptly from the general level of the valley, and at the foot of which lies a beautiful and picturesque lake about a mile long; both mountain and lake entirely contained by the property. Roughly the tract extends from the U. S. Naval Ammunition Depot on the northwest slope of Hickory Hill and approximately one mile from Mt. Hope on the east to the ridge of Green Pond Mountain on the west, and from the southern end of the mountain on the south to near the foot of Lake Denmark on the north. The extreme width is one mile and the extreme length is about 5-1/2 miles.

The country round about is rough and mountainous and sparsely settled giving the isolation and natural barriers ideal to the type of industry carried on at the Arsenal. (1,2,3)

CHAPTER II
Geological

The geological surveys of the section of New Jersey containing Picatinny Arsenal show that doubtless glaciers covered this territory on at least two widely separated periods and that the southern margin of the second glacier rested in these parts. It is thought that the mountain spur which probably extended from Picatinny Peak was levelled and also that the flow of Green Pond Brook was reversed during this period. The valley below Picatinny Lake is floored with the terminal moraine on the edges and stratified drift on the plateau or terraces of the valley. Contiguous to the brook itself is swamp mud which formation broadens out as one goes from the Arsenal to Spicertown. The stratified drift is composed chiefly of fragments of shale, sandstone, conglomerate, and limestone. In composition, the moraine is dependent on the character of the rock over which the ice had come, so that in this valley the moraine is exceedingly stony, fifty per cent of it being composed of bowlders. The floor of the valley is, then, marshy at the brook with natural terraces or benches beyond of gravel and sand knolls, and flats with a thin soil ending at the bottom of the mountains or hills where there is a great accumulation of bowlders and stones.

Some of the best exposures of Green Pond conglomerate are in the high cliffs above the southern end of Picatinny Lake. This conglomerate is composed of coarse silicous pebbles - ranging in diameter from one-half inch to three inches - mostly white quartz with some pink quartz, black, white, yellow, and red chert - embedded in a dark-red to chocolate-brown matrix of quartz sandstone. This material is very expensive to work because of its great hardness and the difficulty of splitting it. When used for building stone it produces attractive and artistic effects.

Kittatinny limestone, chemically magnesian limestone, fourteen to twenty-one per cent of magnesia, generally blue or bluish gray, though it may be drab, black, or even red, in beds three to four feet thick, underlies Picatinny Valley. Sheared and faulted beds of shaly limestone out-crop not far from Green Pond conglomerate. Use was made of the Picatinny deposits in the Mt. Hope furnaces of early days.

The extent of the iron ore belt in this vicinity may be seen by referring to the map of the Sharton iron ore belt shown on the next page. (3,4,5)

Picatinny Lake is an artificial body of water made by damming the brook, fed by converging streams from Green Pond and Lake Denmark, covering 109.5 acres, containing 92,500,000 gallons at its present elevation of 708.7 feet, with a flow of about 3,000 gallons per minute over the spillway at this level, giving a fall of thirteen feet. The fall from Lake Denmark to Picatinny Lake is 118 feet and from Green Pond, 354 feet. (1,6)

The valley is enclosed with mountains except at its lower end and protected from the northerly winds in winter, while the southerly winds seem to be drawn in all the seasons. The climate is characteristic of a high-lying valley in a mountainous region. The mean temperature is lower than that of Newark or New York. The frosts and snows come earlier and stay later, but the extreme of cold is but little greater than in the low country. The summers are comfortable and the nights are remarkably cool. (1)

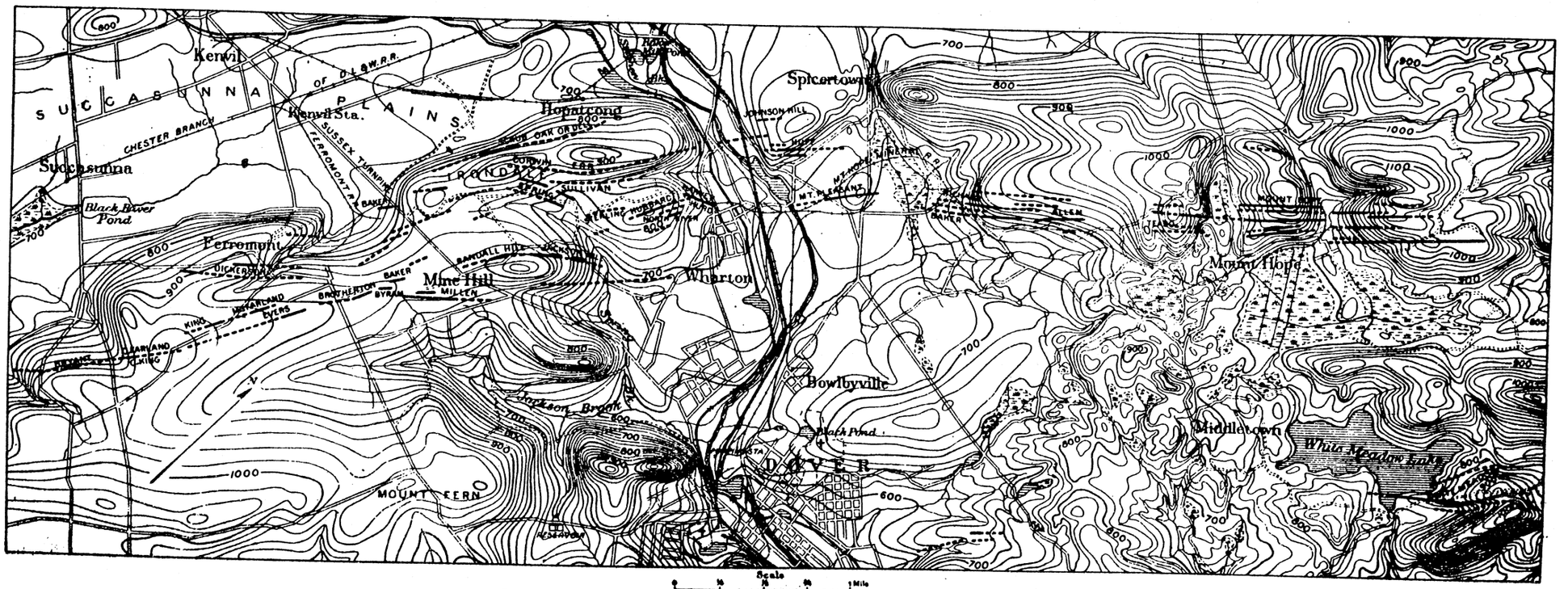
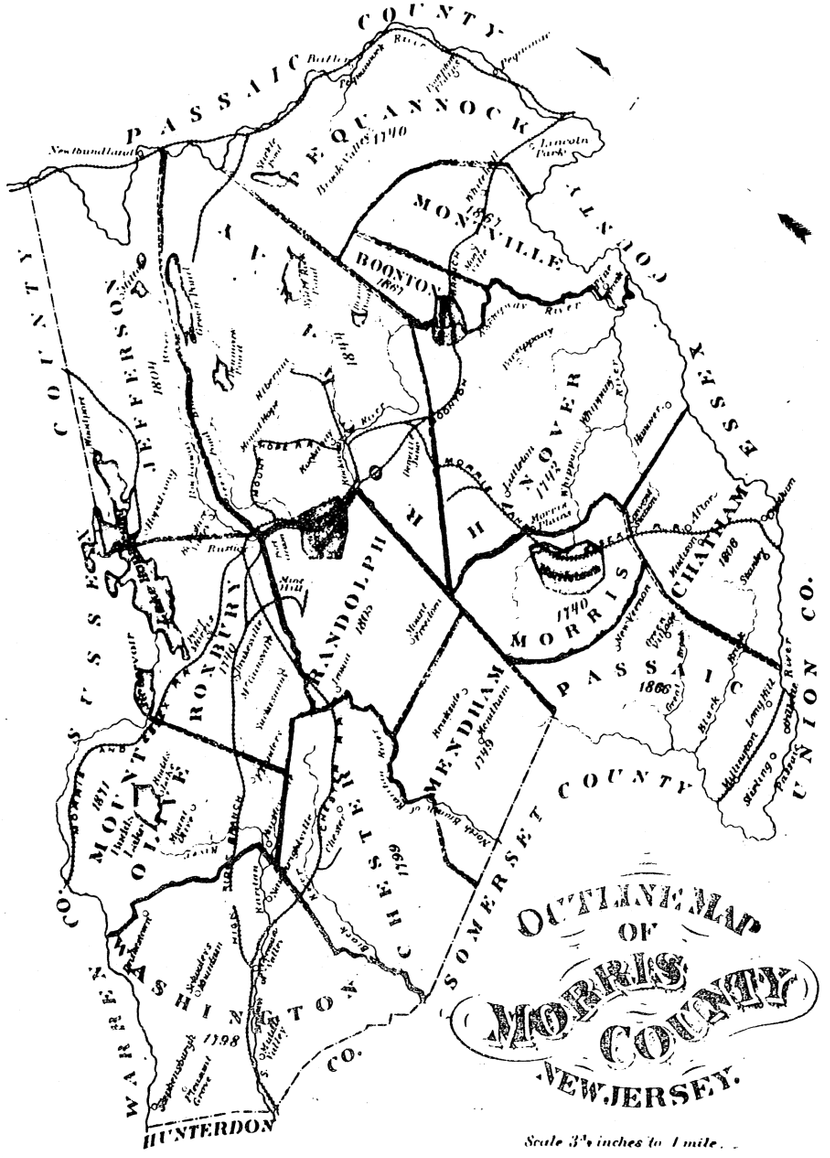


FIGURE 19.—Map of the Wharton iron-ore belt, showing the mines and ore bodies.

Mines and ore bodies by George M. Hopkins, Geology of New Jersey (atlas), 1868. Solid lines represent extent of ore bodies mined in 1868; dashed lines represent ore traced by magnetic needle but not worked in 1868.



CHAPTER III
Historical

The earliest recorded history, following the discovery of America by Columbus in 1492, shows that Henry Hudson, in the employ of the Dutch East India Company, discovered the Hudson River and viewed New Jersey in 1609, the Dutch claiming and ruling New Jersey until 1664. In 1664 the English asserted their claim and ruled, dividing New Jersey by a line running from Little Egg Harbor to the Delaware Water Gap in 1674, the Duke of York conveying east New Jersey to Sir George Carteret, who became the sole proprietor and governor, his widow becoming the lady proprietrix in 1680, and selling to twelve proprietors (one of whom was William Penn) in 1682. These men took in twelve other partners, making twenty-four proprietors. In 1687, James the Second, formerly Duke of York, compelled the East New Jersey proprietors to give up their right of jurisdiction, appointing Captain Francis Nicholson Lieutenant Governor of New Jersey. In 1693, by an Act of the Assembly, the bounds of several townships were defined, Elizabethtown taking in parts of several counties including part of Morris. At about this time there were disputes about land titles, and in a test case the Indian titles were confirmed. In 1713-14 Hunterdon County was set off and named in honor of Governor Hunterdon, who had acquired large lands there. In 1722 Jackson's Forge, now Dover, was founded by John Jackson. In 1738 the County of Morris was created out of part of Hunterdon County. In 1844 the Township of Rockaway (in Morris County) was erected by an act of the Legislature, which township has ever since included Middle Forge, now known as Picatinny Arsenal. (4)

The Indian title to all the soil of New Jersey was acquired by purchase. In all grants and concessions to the early proprietors a provision was embodied that land was to be purchased from time to time, "as there shall be occasion, by the governor and council, from the Indians, in the name of the lords proprietors, and then every individ-

ual person is to reimburse the lords proprietors at the same rate it was purchased, together with the charges." The Indians conveyed the northern part of the state in the year 1758, the southern portion having been disposed of prior to that time. This conveyance appears to be a ratification of all prior sales made by the Indians - as well to individuals as to the lords proprietors - and was executed by some of the chiefs. This deed of 1758 is dated at Eastern Pennsylvania, on the 23d day of October, and is between Egohopoun, Chief of the Minsis, Lapink, Mapkas, Mackakamee, Cookkala, Laman Lanykaman, and others, of the one part, and his excellency Captain Benard, Esq., captain-general and commander-in-chief of New Jersey, Hon. Andrew Johnson and others, commissioners, etc. (4)

The Denmark tract, containing 6,231.28 acres, was recorded in the surveyor general's office at Perth Amboy in book S 7, page 130, and returned to Cortlandt Skinner and John Johnson on the 21st day of June 1774. The northeasterly line of this survey runs through the lower end of Green Pond, including in this tract about one-quarter of the pond. The southwesterly lines of the tract extend to Washington forge and the Randolph township lines, and it includes Washington forge, Luxemburg, Mount Pleasant, the Huff, Barker, Moses Tuttle, Moses Phillips, and Spicer properties, and the Middle forge and Denmark lands. The Huff and Mt. Pleasant mines are located on this tract, and other mineral attractions indicate iron ore at various places on the property. (4)

The first of the smaller locations were choice spots - lands on a stream of water for meadow or water-power, mineral lands, good locations for forges, or valuable for wood and timber. These surveys very often had no reference to each other, lapping on former surveys or causing large strips of unsurveyed land to intervene. (4) The returns on the Arsenal tract were taken up by John Reading, one of the proprietors, in 1723. In 1749, Johnathan Osborne purchased the site at the foot of Picatinny Peak, built a dam, and erected a forge. Later when a forge was built at Lake Denmark, the Picatinny Forge was known as the Middle Forge presumably because of its location on Green Pond brook midway between Mt. Pleasant and Lake Denmark forges. Little is known of the early history of Middle Forge or its owner. Ore was transported on horseback in leather bags, and the finished bar iron in the shape of a horseshoe on pack saddles. Four hundred to five hundred pounds was considered a pack load under which horses made fifteen miles a day. From Middle Forge the route to tide water lay over Mt. Hope to Rockaway. (1,3)

In 1772, the forge was acquired by Col. Jacob Ford, builder of the historic continental powder mills at Morristown. The Forge was conveyed to Jacob Ford, Jr., in 1775, and by his executors to John Jacob Faesch in 1778. Faesch was a Swiss, naturalized by special Act of Congress. He was a master iron worker, operating a number of forges. Under his management the Middle Forges made "cannon, shot, bar iron, shovels, axes, and other iron implements for the Revolutionary Army." Copies of correspondence record that the price asked for cannon was "7d York money per pound," the Continental government furnishing the patterns for the castings. In connection with this work, General Washington visited Faesch, Esq., and arranged with him for the services of two hundred fifty Hessian prisoners for cutting wood, burning charcoal, and operating the forges. Faesch paid nothing for the services of these men, supplying them only with clothes, shelter and food. It will be recalled that the King of England hired these Hessian soldiers to fight against the colonies, agreeing to pay not only for their services, but also a per capita price on all men not returned. As many of the survivors preferred to remain in the New World, the bill to the King must have seemed unjustly high.

In 1800, General John Doughty, as Commissioner, conveyed the

Forge and a large tract to Moses Phillips, Jr., who rebuilt it and operated it as a single fire forge under the name of Aetna Forge. Early in the century, the iron industry had some lean years. On December 18, 1816, the Aetna joined with the principal other forges in Morris County in a "petition to the house of congress for the relief of persons interested in the manufacture of bar and cast iron in the U.S." In 1839, the Forge came into the possession of Jacob Righter and in 1853 of George E. Righter, who operated it for several years and then allowed it to fall into decay, selling it to the Government in 1880. (3,4)

It is believed that, in its best days, Middle Forge employed not less than sixty men, and produced ten to twenty tons per week. During its early years it shared prosperity and adversity with the industry in general. Prior to 1776, rolled bars could not be made here owing to a prohibitory act of Parliament which fixed a penalty of two hundred pounds Sterling on each rolling mill.

The trip hammer, anvil, and tools used at Middle Forge are on exhibition at the Arsenal. The anvil is about two feet square and weighs roughly four thousand pounds. The hammer has a 14-inch square face and weighs about six hundred pounds.

Anvil and tools used at Middle Forge, erected on Picatinny Lake in 1749 by Jonathan Osborne.

The charcoal production rose and fell with the iron industry. Large quantities of charcoal were consumed by each furnace. In 1777, General Washington reported the number of "iron works large and small" in Morris County at between eighty and one hundred. The history of the iron industry records instances where the consumption of charcoal was so enormous that its use was regulated by law. (3)

The presence of iron ore was known to the Indians, who made use of it as is instanced by the finding of arrowheads and utensils of various kinds in the vicinity of the village of Succasunna, where the Dickerson mine is located. The name Succasunna is of Indian origin, meaning "black stone" or "heavy stone," formerly "Suckasuna" (or, as some have it, "Sock-Soona"). (4)

Many names in the vicinity of Picatinny may be traced to Indian origin: Picatinny (Piccatinny) itself, Rockaway from the Indians who were known to the early settlers as the Rockawaks, and who had an encampment or field (rock-away) on the banks of the River Rockaway so named. (3,4)

The meaning of the name Picatinny Peak, or Pickatinny Beak as it appears on earlier maps, has been the occasion of extended and not altogether fruitful search. The interpretation, "The smaller end face of the endless hills," is partial. The name also implies locality, but just what the boundaries of this locality are has not been determined. (3)

The forge at Mt. Pleasant was taken up by Col. Jacob Ford, of Morristown, in 1750, where he located two forges. In the same year he purchased the falls on the same stream at Denmark, when the "Burnt Meadow Forge" was built. It was called "John Harriman's Iron Works" in 1764, but a few years afterward was owned by Jacob Ford, Jr. These forges on Green Pond Brook, together with that at Middle Forge, were in the hands of the Fords before the Revolutionary War. There were also forges located in the Longwood Valley (west side of Green Pond Mountain),

where at various points along the road decayed and empty houses rapidly falling into ruins are visible, and others whose foundations have even disappeared. The effect of the passing of the forges is most marked and striking in the Longwood Valley, where other industries have not replaced them as is general in the otherwise thriving County of Morris. The maximum production of a single fire in the early forge days was regarded as an average of one ton per week. The period 1804 to 1816 was one of prosperous times, the iron masters rapidly growing rich, and after a period of depression, about 1820, business again picked up. The hot blast was introduced in 1837 effecting a saving on charcoal of about one-half. The forges gradually ceased operations upon the introduction of manufacturing means by the use of stone coal. The period 1820-1830 seems to have been the most prosperous period of the forges, during which time Berkshire is said to have been the center of trade and the iron industry, doing much more business there than at Dover. (4)

The contrast between the industry of ironmasters and forgemen, as written in 1882, reads: "But as it is to-day so it was then; there existed a marked contrast between the forgemen and the ironmasters; the former were thriftless, working but for to-day and not troubled about the things of to-morrow, while the latter were exclusive, and in many instances lived in a style luxurious and elegant at home." (4)

John Faesch operated Middle Forge, from the time of its conveyance to him in 1778 until his death in 1800, in connection with mining works at Mt. Hope. The source of the limestone used in the furnaces that were operated at Mt. Hope was in two quarries on the present Picatinny location, one deposit about four hundred fifty feet long near the "forge pond" on the side next the Green Pond Mountain, and the other to the south, at the foot of the same mountain, near the place where the highway from Berkshire Valley to Mt. Hope turns to the east to cross the valley (at the corner of the road at Quarters No. 11). (4)

The early roads of the settlers were hardly other than trails over which the pack loads of finished bar iron were carried. Rockaway township lay in the track of public communication with Newark and Sussex County, and several turnpike companies were chartered to construct roads and support them by toll gates. The first turnpike within the bounds of the township was located by virtue of an act of the legislature for facilitating communication from Morristown, through Dover and Mt. Pleasant to Sparta in Sussex County, passed February 23d, 1804; this road was afterward built. Elias Ogden, Joseph Hurd, Jacob Losey, Edward Condit, and John De Camp were incorporators named in the act, and the corporate name was "The Union Turnpike Company." This road is the one that the present government road leading southwest from the Arsenal past Spicertown leads into and ends, the turnpike coming from Dover through Bowlbyville past the end of the government road and on to Sparta.

The road from Mt. Hope passing in front of the present Administration Building and turning to the left at Quarters No. 11 to go over Green Pond Mountain to Longwood Valley and thence to Berkshire Valley was to have been the route of the "Mount Hope and Longwood Turnpike," which was to start from Rockaway, running to Mount Hope and across the Green Pond Mountain till it intersected the Union Turnpike road at or near Berkshire Valley. This turnpike company originated by legislative act in 1815, the corporators to have their first meeting at the house then kept by Stephen Dickerson in Berkshire Valley. The road was not to exceed four rods in width, and by a supplementary act passed in 1820, they were empowered to limit the road bed over Green Pond Mountain to twenty feet in width. This road was constructed as far as Mount Hope, but soon fell into the hands of the town committee. Parts of the old road bed were used in the construction of this turnpike. (4). Mr. Alfred H. Fichter,* one of the older Arsenal guards, who was born at Middle Forge and has lived near-by all his life, says that the turnpike company constructed this turnpike as far as the other side of the crest of

(*See note Page 10)

Green Pond Mountain, when adverse circumstances forced them to quit. Also that the road leaving this road at the east side of the mountain and running out to the Dover-Sparta turnpike was the old road to Port Oram (Wharton) and Dover. This road is known by the oldtimers as Mud road although it is named Phippe road on the property maps. These two roads are township owned roads at the present time.

The road from Mt. Hope to Middle Forge at the time Col. Ford, John Jacob Faesch, and others were working the forges passed through the Walton Farm instead of going to the east as it now does. (4). In referring to the map following (Page 9), this road may be seen as leaving the Mt. Hope-Denmark road in a northwesterly direction at the school house, passing the Walton farm house, turning south by the buildings noted Geo. A. Righter at Middle Forge and ending in the Mt. Hope-Berkshire road near U. H. Higgins' house. Later references to the Middle Forge road refer to this road, the easterly portion of which is now nearly extinct.

In going from Middle Forge to Denmark Forge, the road led up to the head of the pond, on the southerly side, and then crossed the brook and came out below the Denmark Forge dam on the Green Pond Side.(4) This road apparently does not show on the following map.

The road from Mt. Hope to Denmark lay to the left of the present road after it had passed the house of Michael Doland, and in some places was half a mile from the road bed of 1882, the present road. (4). This is the road from which the Middle Forge road branched off at the school house.

An expensive wagon road leading from Denmark Pond up the north side of the stream to Green Pond was built about the year 1876 by the Denmark Land and Improvement Company, a New York enterprise, with the vies of laying out building lots and making improvements, spending a large amount of money, and speculating generally. Land went up to a high figure in that neighborhood during the time the company was in operation, but it proved an impracticable scheme, and was finally abandoned, and (in 1882) all the improvements were fast assuming the original wildness of the country. (4)

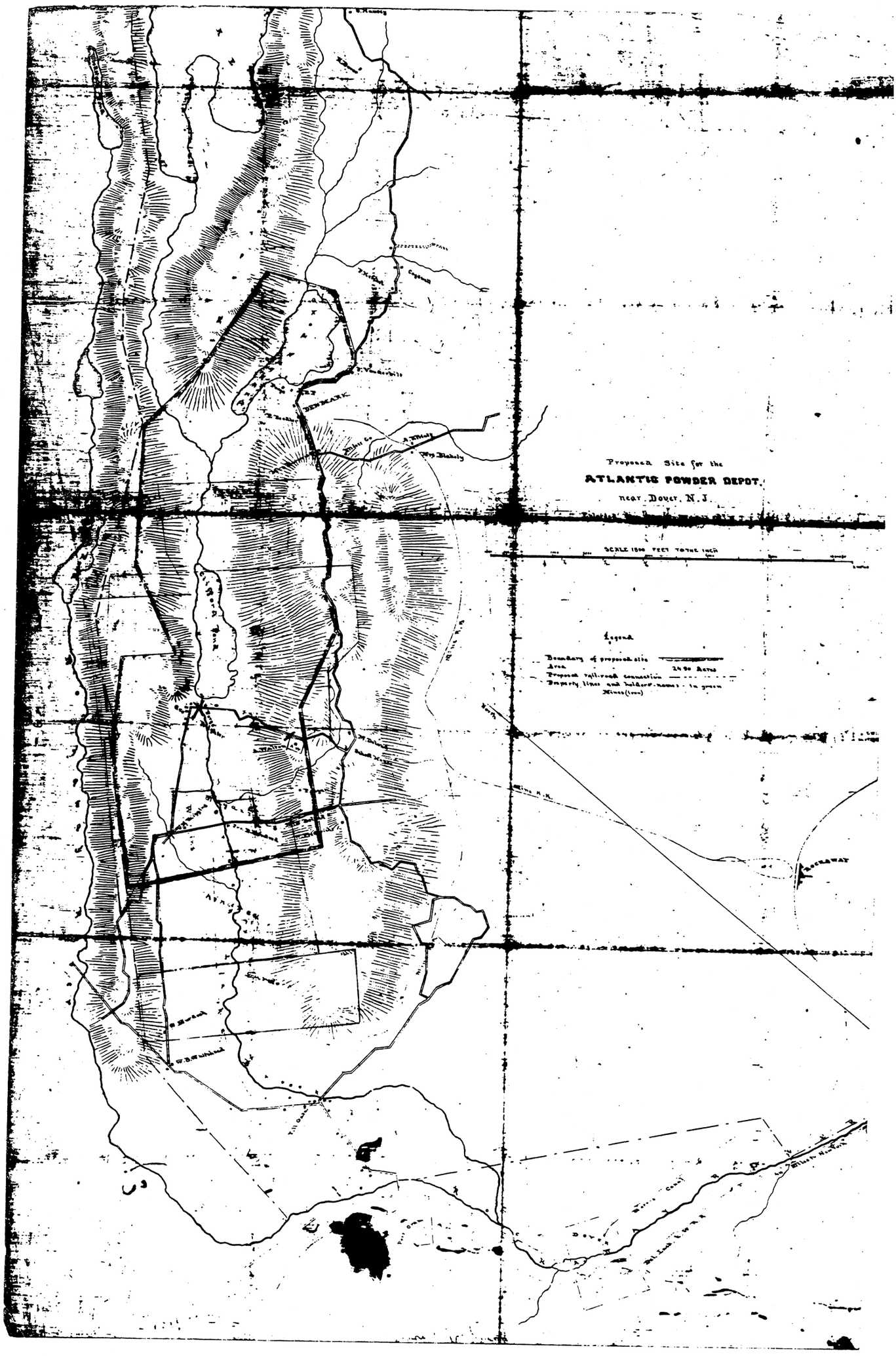
Sometime around the year 1800, there was a Baptist Church on the Mt. Hope-Denmark road between the Mt. Hope-Berkshire Valley and the Middle Forge roads, and near which is an old graveyard. The 1882 History of Morris County says that it had undoubtedly been in use for over a hundred years and was still used (in 1882) by the old families in the neighborhood. A few headstones are mentioned, the oldest one distinguishable being "John Walton, died July 30, 1787, 87 years of age." (4)

The first school house at Mt. Hope stood on the road leading to Hickory Hill, said to be built by John Faesch. After Faesch's time, a school was built near Michael Doland's on the road to Middle Forge. This was torn down and replaced on the same site about 1830 by the school building noted on the Mt. Hope-Denmark road on the map following, and at which point the Middle Forge road branched off. (4)

The position of these roads, houses, etc., at the time of purchase of the site by the Government (1880), may be seen by referring to the map following.

Under "Business Corporations," the 1882 History of Morris County carries the following paragraph concerning the "Picatinny Powder Depot:"

"It is proper to mention in this connection the recent purchases of lands at Middle Forge and Denmark by the United States government for


Proposed Site for the
ATLANTIC POWDER DEPOT.
near Dover, N.J.
SCALE 1000 FEET TO THE INCH
Legend.
Boundary of proposed site
Area 2490 Acres
Proposed railroad connection
Property lines and Subdivisions - to govern
Mines (iron)

powder works. The name of this establishment is the "Piccatinny Powder Depot," and it is about three miles from Hoskaway, in the Green Mountain or Middle Forge Valley. Here in rural seclusion, with the Green Pond Mountains on one side and the Mt. Hope and Hickory Hills on the other, it is proposed to build large magazines for storage and mills for the manufacture of gunpowder. Nearly 1,900 acres of land, mountain and valley, wooded and cultivated, were purchased of different owners in 1880 and 1881. A beautiful lake one hundred ten acres in extent occupies a central point, with Piccatinny Peak frowning down on it, and with the waters of Green Pond and Denmark Pond flowing through it.

"In 1879 searches and surveys for suitable tracts of land for the above purposes were made in different directions around New York, and, none presenting the desired facilities and advantages to the degree presented by the Middle forge surroundings, it was finally settled upon and purchase was made of several large tracts of land, including the John E. Kindred and Uhel H. Wiggins farms. Suitable buildings of brick and stone have been commenced, and as fast as the appropriations are made by Congress this picturesque place will be beautified and transformed into one of those trim military posts which are occupied as arsenals and depots of supplies of war material. About one hundred and fifty men are now employed. The whole work in all its branches is under the charge of Major F. H. Parker, Ordnance Department, United States army, who has his headquarters at Dover."

*Note: The father of the tribe of Fichters, that now stretch from ocean to ocean in this country, was Friedrick Fichter, a German forgeman, brought from an incoming ship (after a thirteen week's voyage) to his Morris County works by John Jacob Faesch. (12). Mr. Alfred Fichter is a descendant of this forgeman.

CHAPTER IV

Acquisition of Tracts by the Government

The need of a depot where powder and explosives might be stored in large quantities, and where powder mills might be erected, was seriously felt during and after the Civil War, and a Board of Officers was convened in New York City in 1865 to consider the question of establishing two such depots and to recommend suitable locations. After searches and examinations of tracts of land for the establishment of one such powder depot situated on the various railroad lines and waterways around New York had been reported on, another Board of Officers was appointed November 7, 1879 to decide on the most suitable one. Owing to delays in the time occupied in vain efforts to secure tracts on the Hudson River, the selection of the present Picatinny tract was made and approved March 16, 1880, and negotiations for its purchase immediately commenced by Major F. H. Parker, Ordnance Department. The approval of the site is of interest:

1st Endorsement
ORDNANCE OFFICE, Feb. 28, 1880.

Respy. returned to Board on Powder Depot Sites.

The geographical location near Dover is sufficiently well protected, being behind the fortifications of N. Y. Harbor, nestling high among the mountains, 45 miles distant, with a closely built and highly cultivated country, and very large population intervening. The recommendation of the Board is Approved.

S. V. BENET,
Brig.Gen., Chief of Ordnance.

Accordingly, 1,866.12 acres of land at a purchase price of $62,750.00 were acquired as follows (1,7):

DOLAND - HENRY ET AL, deed dated August 20, 1880, conveying 11 acres for a consideration of $750.00. Recorded in book M-10, page 463 etc., of the deed records of Morris County.

FIELDER- EDWARD C. ET AL, deed dated July 30, 1880, conveying 504.2 acres for a consideration of $9,126.00. Recorded in book L-10, page 315 etc., of the same records.

KINDRED- JOHN K., deed dated March 5, 1881, conveying 187.8 acres for a consideration of $8,500.00. Recorded in book M-10, page 328, etc., of the same records.

RIGHTER- GEORGE K., deed dated June 26, 1880, conveying 1,195.8 acres for a consideration of $35,874.00. Recorded in book L-10, page 16 etc., of the same records.

WIGGINS- UKL H. & WIFE, deed dated July 17, 1880, conveying 167.32 acres for a consideration of $8,500.00. Recorded in book L-10, page 22 etc., of the same records.

To shorten the distance of the drive to and from Port Oram (now Wharton) and Dover, and thus facilitate and cheapen the hauling of material into the powder depot, a strip of land fifty feet wide passing a distance of more than a mile through adjoining property on the east side of the valley to the Dover-Sparta turnpike was secured in 1881, after considerable difficulty and time, for the purpose of a road, acquired by purchase as follows (7):

SPICER - LEWIS H., and wife, deed dated May 12, 1881, conveying a strip of land 50' wide and 7,412' long, containing 8.5 acres for a consideration of $200.00. Recorded in book O-10, page 430 of the deed records of Morris County.

To protect the interests of the government, should such lands pass into the hands of other parties, the Morris County Railroad Company purchased a tract just south of the Cannon Gate, acquired by the United States Government in 1887 as follows (7,8):

MORRIS COUNTY RAILROAD COMPANY - Lease for 99 years, dated February 1, 1887, of a tract adjoining the Powder Depot for a consideration of $1.00. Recorded in book C-12, page 44 et seq., of the deed records of Morris County.

On June 9, 1891, 315 acres of the land purchased for the Powder Depot was transferred to the Navy Department for magazine purposes. Since that date the Navy Department has purchased from other persons 78-1/2 acres of adjoining property.

In 1918, to round out existing boundaries, the adjacent Robinson farm on the east side of the reservation on the road to Mt. Hope was acquired by purchase as follows (7):

ROBINSON - THOMAS & WIFE, deed dated October 29, 1917, conveying 55.92 acres for a consideration of $7,500.00. Recorded in book S 24, page 154 etc., of the deed records of Morris County.

Also, in 1918 steps were taken to secure the North (point of compass) tract on the western boundary of the Arsenal. This land is that which makes a salient into the older property on the west side of Picatinny Lake. Its continued possession by private parties permitted unrestricted approach by persons to within a few yards of certain of the high explosive magazines. It was also desired for use as a proving ground. Being unable to trace ownership, nothing further was done until 1926 when it was fenced in by the Government and thus acquired through seizure. While not included in any of the Arsenal deeds, it is carried on the Arsenal property map. No protests have been entered against the claims of the United States. (7,9)

In 1927, Congress authorized the purchase of two tracts of land - one, an area of about six acres at the southwesterly end of the reservation, and the second, an area of three hundred twenty three acres, more or less, opposite and around the northeasterly end of the reservation - required for protection and to minimize the danger from explosions. Negotiations for these purchases had not culminated in purchase at this writing. (10)

CHAPTER V

Deeds, Metes and Bounds, and Property Maps.

Description of Picatinny Arsenal by Metes and Bounds - including purchased tracts and that described by metes and bounds numbers 9 to 23 (which metes and bounds should doubtless be corrected to a line further to the north) acquired by fencing in unclaimed land, but not including the government road to Spicertown, the two tracts authorized to be purchased by Act of 1927, nor that transferred to the Navy Department in 1891. Total, 1,842.34 acres - 1,615.54 acres acquired by purchase at a cost of $70,451.00, and 226.8 acres, more or less, acquired by taking possession. (7)

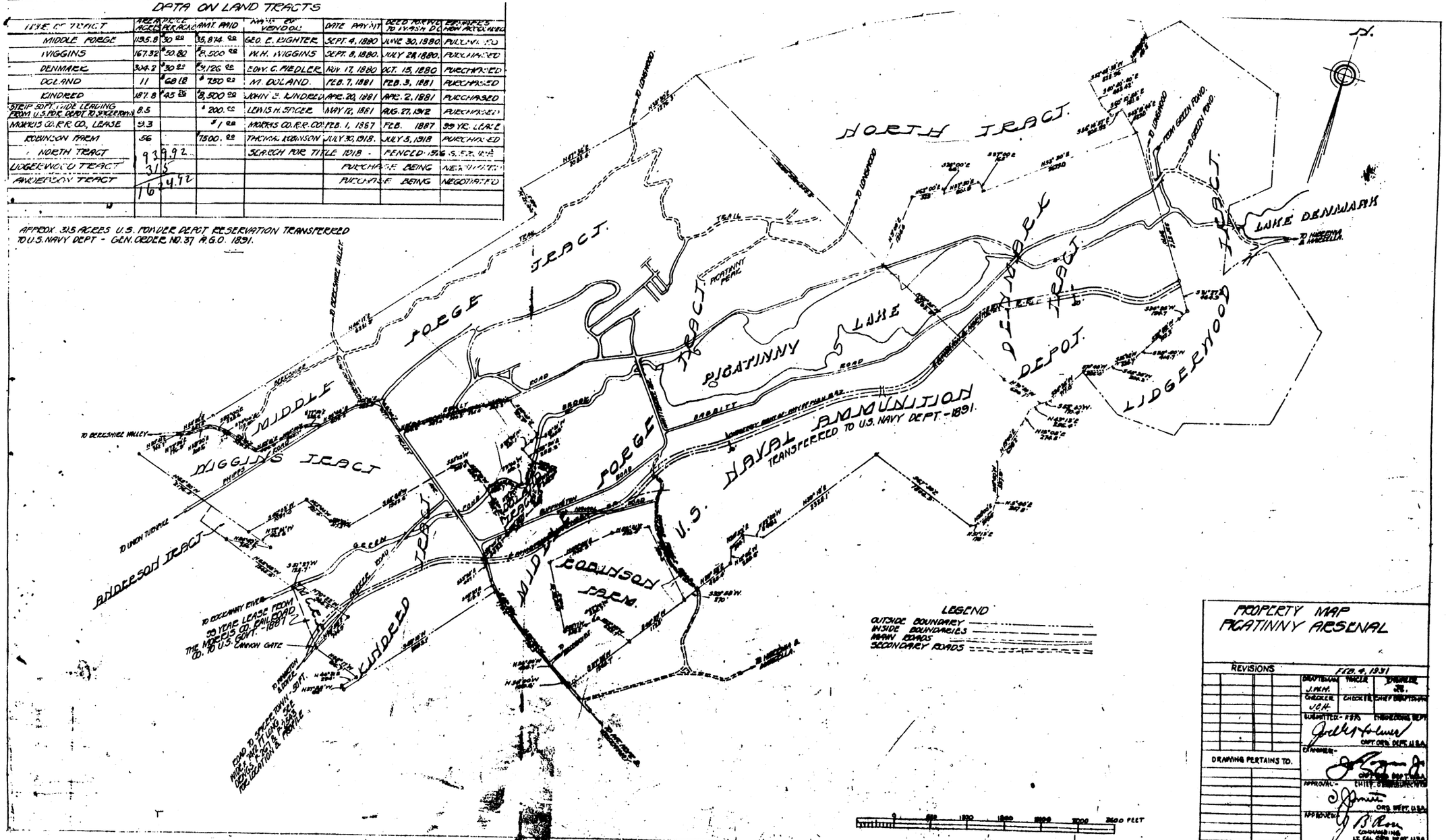
Beginning at a stone monument on the northwest side of the public road (Phipps Road) running from Union Turnpike to the U.S. Powder Depot (now known as the Picatinny Arsenal) lying along the southeasterly side and at the base of Green Pond Mountain and twenty-feet from the corner of the lands of Emil Anderson on the same line (see map on next page),

(1)	thence N. 68° 30' W.	1182.5	feet;
(2)	" N. 50° 41' E.	742.7	feet;
(3)	" N. 50° 56' E.	647.5	feet;
(4)	" N. 46° 17' E.	6231.3	feet;
(5)	" N. 41° 32' W.	481.3	feet;
(6)	" N. 47° 56' E.	2083.4	feet;
(7)	" N. 38° 20' E.	1276.3	feet;
(8)	" S. 60° 25' E.	1228.9	feet;
(9)	" N. 49° 50' 19" E.	792.0	feet;
(10)	" N. 66° 50' 05" E.	726.0	feet;
(11)	" N. 76° 49' 41" E.	1039.5	feet;
(12)	" N. 51° 30' 13" E.	290.4	feet;
(13)	" N. 66° 20' 04" E.	363.0	feet;
(14)	" N. 72° 49' 56" E.	1056.0	feet;

DATA ON LAND TRACTS

NAME OF TRACT	AREA ACRES	PRICE PER ACRE	AMT. PAID	NAME OF VENDOR	DATE PAYMENT	DEED RECORDED TO U.S. GOVT.	REMARKS HOW ACQUIRED
MIDDLE FORGE	195.8	$ 50 00	$ 5,874 00	GEO. E. LIGHTER	SEPT. 4, 1880	JUNE 30, 1880	PURCHASED
WIGGINS	167.32	$ 50.82	$ 8,500 00	W.H. WIGGINS	SEPT. 8, 1880	JULY 28, 1880	PURCHASED
DENMARK	304.2	$ 30 23	$ 9,126 00	EDW. C. FIEDLER	NOV. 17, 1880	OCT. 15, 1880	PURCHASED
DOLAND	11	$ 68 18	$ 750 00	M. DOLAND.	FEB. 7, 1881	FEB. 3, 1881	PURCHASED
KINDRED	187.8	$ 45 55	$ 8,500 00	JOHN L. KINDRED	APR. 20, 1881	APR. 2, 1881	PURCHASED
STRIP BOTH SIDE LEADING FROM U.S. PDR. DEPT. TO STICKER'S	8.5		$ 200. 00	LEWIS H. STICER	MAY 12, 1881	AUG. 27, 1912	PURCHASED
MORRIS CO. R.R. CO., LEASE	9.3		$ 1 00	MORRIS CO. R.R. CO.	FEB. 1, 1867	FEB. 1887	99 YR. LEASE
ROBINSON FARM	56		$ 7500. 00	THOMAS ROBINSON	JULY 30, 1918.	JULY 5, 1918	PURCHASED
NORTH TRACT	939.92			SCRATCH FOR TITLE 1918 -		FENCED 1916	U.S. P.D. RES.
LODGEWOOD TRACT	315				PURCHASE BEING	NEGOTIATED	
FARMERTOWN TRACT	164.72				PURCHASE BEING	NEGOTIATED	

APPROX. 315 ACRES U.S. POWDER DEPOT RESERVATION TRANSFERRED TO U.S. NAVY DEPT - GEN. ORDER NO. 37 A.G.O. 1891.



PROPERTY MAP PICATINNY ARSENAL

REVISIONS

FEB. 4, 1931

DRAFTSMAN J.W.M. | TRACER | ENGINEER

ORDERED | CHECKED | CHIEF DRAFTSMAN

SUBMITTED - FOR | ENGINEERING DEPT

DRAWING PERTAINS TO.

APPROVAL - CHIEF ENGINEERING OFFICE

APPROVED

DP- 13663

PICATINNY ARSENAL, U.S.A.

(15) thence N. 52° 48' 28" E. 2481.6 feet;
(16) " S. 31° 11' 26" E. 270.6 feet;
(17) " S. 18° 47' 02" W. 481.8 feet;
(18) " S. 52° 48' 38" W. 828.96 feet;
(19) " S. 40° 40' 40" E. 453.42 feet;
(20) " S. 60° 10' 54" E. 181.5 feet;
(21) " N. 56° 14' 57" E. 205.92 feet;
(22) " S. 43° 10' 44" E. 429.0 feet;
(23) " S. 31° 27' 00" E. 2470.0 feet to northwestern boundary of Wharton and Northern Railroad right-of-way.
(24) " Southwesterly along northwestern boundary of Wharton and Northern Railroad right-of-way approximately 9500 feet. (No definite description to be had of Wharton and Northern Railroad right-of-way).
(25) " Across Wharton and Northern Railroad right-of-way and southeasterly along center line of Middle Forge Road, approximately 2250 feet. (No definite description to be had of Middle Forge Road).
(26) " S. 39° 58' E. 270 feet;
(27) " S. 40° 37' W. 1123 feet;
(28) " S. 37° 38' W. 1268.7 feet;
(29) " N. 54° 00' W. 199.6 feet;
(30) " N. 54° 50' W. 409.7 feet;
(31) " N. 54° 00' W. 798.3 feet;
(32) " N. 48° 20' W. 778.2 feet;
(33) " S. 43° 10' W. 2983.1 feet;
(34) " N. 37° 55' W. 66.0 feet;
(35) " N. 44° 51' E. 294.0 feet;
(36) " N. 68° 17' W. 816.7 feet;
(37) thence N. 28° 58' E. 744.9 feet;
(38) " N. 70° 22' W. 966.2 feet;
(39) " S. 51° 27' W. 125.7 feet;
(40) " N. 68° 48' W. 1345.6 feet;
(41) " N. 84° 49' E. 756.7 feet;
(42) " N. 72° 01' W. 463.6 feet;
(43) " N. 68° 30' W. 994.9 feet;

To place of beginning.

ORIGINAL PURCHASES (11)

Lands Purchased for U.S. Powder Depot, Area, Price, etc.

Date of Payment	From whom Purchased	Deed fwd to Washington	Tract Purchased	Area Acres	Price per Acre	Amount Paid Dollars	Cents
1880		1880					
Sept. 4	George E. Righter	June 30	Middle Forge	1195.8	$30.00	$35,874	
" 8	Uel H. Higgins	July 28	Higgins	167.32	50.80	8,500	
Nov. 17	Edw.C.Fiedler Et Al	Oct. 15	Denmark	304.2	30.00	9,126	
1881		1881					
Feb. 7	Henry & Michael Doland	Feb. 3	Doland	11.0	68.18	750	
Apr. 20	John E. Kindred	Apr. 2	Kindred	187.8	45.26	8,500	
			Total	1866.12		$62,750	

The area of "Middle Forge Pond" included in above acres is one hundred ten acres. Its average length is one mile and the average width is 18/100 miles.

The deeds conveying the above tracts were forwarded to the Ordnance Office on the dates above given, after being duly recorded in the Office of the County Clerk of Morris County, N. J., for file in the Department of Justice. Accompanying the deeds were abstracts of search of title of each tract purchased made by A. S. Keasbey, District Attorney of the U.S. for New Jersey.

Description of the "Middle Forge" Tract
(Purchased from Geo. E. Highter)
As surveyed by the U. S.

Beginning at a corner on a hemlock ledge, about one-quarter mile east of Middle Forge Pond, said corner being marked by a tack in the top of a chestnut post 5" square and 2-1/2 feet long, placed in 1880, thence along lands of the Fiedler Estate and __ Stansberry and crossing Middle Forge Pond and Green Mountain

1st N. 60° 35' W. 6858.8 feet
to a corner established in Longwood Valley about 60 feet beyond foot of mountain, thence along foot of mountain

2d S. 38° 30' W. 1276.3 feet
to a stone heap on the west slope of Green Pond Mountain near the base, thence along base of mountain

3d S. 47° 36' W. 2063.4 feet
to a stone heap at the base of the mountain, thence up the mountain

4th S. 41° 32' E. 481.3 feet
to a corner on the west slope of the mountain, near the top, thence along crest and west slope of mountain

5th S. 46° 17' W. 6231.3 feet
to the smaller of two chestnut trees, in the fence of __ Pope, thence along land of __ Pope

6th S. 80° 56' E. 647.5 feet
to a corner on the S.E. side of the road from Berkshire Valley to Mt. Hope, thence up said road

7th N. 72° 50' E. 176.9 feet
thence along said road

8th N. 58° 30' E. 309.6 feet
thence along said road

9th S. 82° 00' E. 228.6 feet
thence along same road

10th S. 74° 00' E. 112.9 feet
thence along same road

11th S. 71° 10' E. 529.3 feet
thence along same road

12th N. 53° 10' E. 496.9 feet
thence along same road

13th N. 45° 50' E. 465.1 feet
thence along same road

14th N. 77° 50' E. 238.6 feet
thence along same road

15th N. 50° 45' E. 692.2 feet
thence along same road

16th N. 62° 50' E. 323.5 feet
thence along same road

17th S. 50° 00' E. 617.1 feet
to a corner in a triangular grass plot near a large white oak tree, thence up road leading to Middle Forge

18th N. 52° 50' E. 349.6 feet
thence up same road

19th N. 61° 15' E. 387.0 feet
thence up same road

20th N. 64° 45' E. 340.3 feet
thence up same road
21st N. 60° 15' E. 335.0 feet
thence up same road
22d N. 58° 35' E. 392.2 feet
thence along a fence the boundary of Uel H. Wiggins' farm
23d S. 58° 05' E. 725.9 feet
thence along Green Pond Brook, being boundary of said Wiggins'
24th S. 18° 31' W. 145.3 feet
thence along brook
25th S. 36° 35' W. 281.1 feet
thence along brook
26th S. 58° 20' E. 288.2 feet
thence along land of M. Doland
27th S. 85° 05' E. 429.3 feet
thence along land of M. Doland
28th S. 40° 20' W. 348.9 feet
thence along land of M. Doland
29th S. 8° 57' E. 289.5 feet
thence along land of M. Doland
30th S. 32° 38' W. 714.3 feet
Thence along land of J.E. Kindred
31st S. 35° 00' W. 547.2 feet
to a point in Berkshire Valley road; thence up said road towards Mt. Hope
32d S. 33° 25' E. 447.1 feet
thence up said road
33d S. 48° 20' E. 778.2 feet
thence up said road
34th S. 54° 00' E. 798.3 feet
thence up said road
35th S. 54° 50' E. 409.7 feet
thence up said road
36th S. 54° 00' E. 199.6 feet
to a large elm tree on the N.E. side of the road, thence along Mt. Hope property
37th N. 37° 58' E. 1268.7 feet
to a corner of the Walton property, thence along the Walton farm
38th N. 69° 39' W. 622.7 feet
to an oak stump, corner of Walton farm, thence along said farm
39th S. 47° 10' W. 235.7 feet
to a birch tree, corner of Walton farm, thence along said farm
40th S. 56° 17' W. 358.2 feet
to a black oak, corner of P. Agan, thence along land of said Agan
41st N. 28° 26' W. 1152.2 feet
to a corner of said Agan, thence along Agan's and Walton's lines
42d N. 49° 40' E. 1140.0 feet
to an oak stump corner of Walton farm thence
43d N. 59° 31' E. 526.0 feet
to a corner of Walton farm, thence
44th S. 38° 37' E. 1251.6 feet
thence along Mt. Hope Co.'s lands
45th N. 39° 58' E. 705.4 feet
thence along M. Doland's land
46th N. 12° 6' W. 259.6 feet
thence along M. Doland's land
47th N. 24° 52' E. 284.7 feet
thence along M. Doland's land

48th N. 83° 09' E. 348.1 feet
Thence along M. Doland's land
49th N. 39° 18' E. 2328.1 feet
thence along lands of M. Doland and A. Sickles
50th S. 67° 30' E. 1806.9 feet
to a stake in road from Rockaway to Denmark, near corner of Sickle's fence, thence along said road
51st N. 51° 15' E. 178.0 feet
thence along said road
52d N. 30° 00' E. 258.4 feet
thence along said road
53d N. 5° 00' E. 247.8 feet
thence along said road
54th N. 14° 40' W. 537.9 feet
thence along said road
55th N. 19° 00' E. 698.2 feet
thence along said road
56th N. 15° 05' E. 274.5 feet
thence along same road
57th N. 43° 15' E. 256.4 feet
to point in road being also in line of Denmark tract, thence along Denmark Tract
58th N. 70° 30' W. 696.1 feet
to place of beginning.

Containing 1195.8 acres

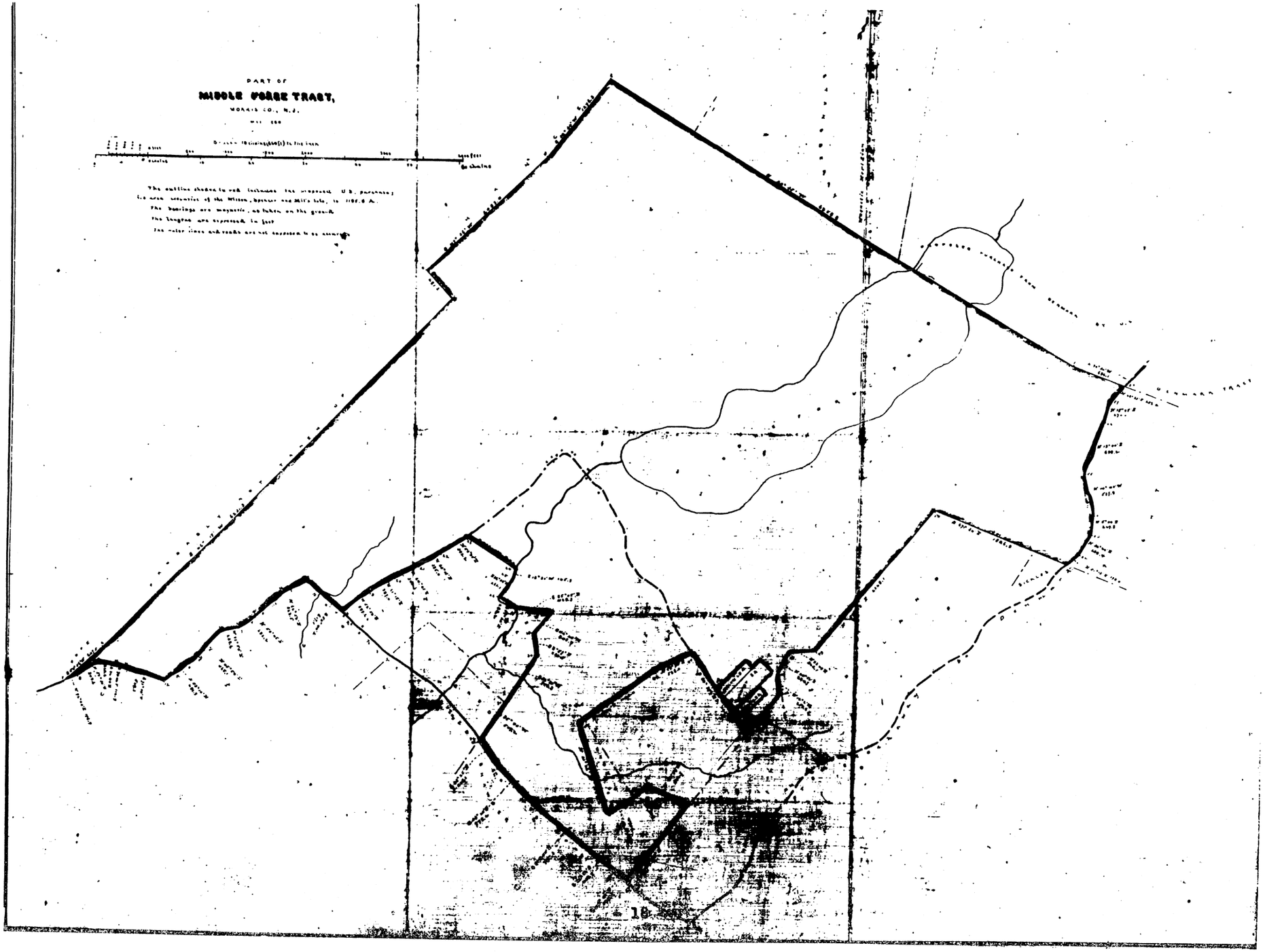
Note: Bearings are magnetic as compass reads on the ground, hence the 37th, 45th, and 49th lines which lie in the same straight line, have different bearings. This note applies to all the succeeding descriptions.

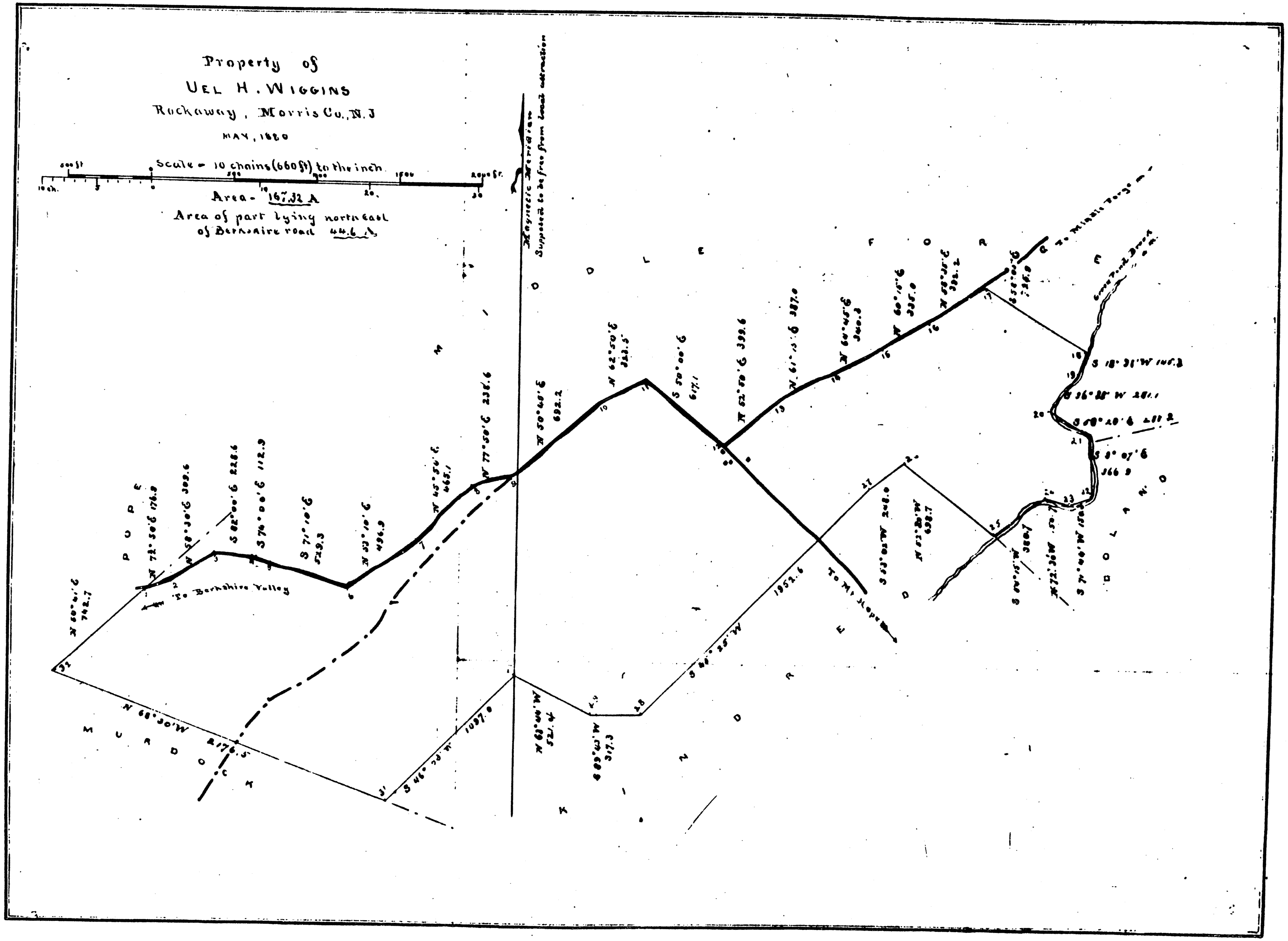
Description of Property of Uel H. Wiggins

Middle Forge Valley, Rockaway & Jefferson Townships, Morris County, N.J.
As Surveyed by the U.S. and Purchased by it.

Beginning at a corner in the road from Mt. Hope to Berkshire Valley on the west side of Green Pond Mountain, being the 7th corner of the tract purchased by the United States of Geo. E. Righter, thence along said road

1st N. 72° 50' E. 176.9 feet
thence along same road
2d N. 58° 50' E. 309.6 feet
thence along same road
3d S. 82° 00' E. 228.6 feet
thence along same road
4th S. 74° 00' E. 112.9 feet
thence along same road
5th S. 71° 10' E. 529.3 feet
thence along same road
6th N. 53° 10' E. 496.9 feet
thence along same road
7th N. 45° 50' E. 465.1 feet
thence along same road
8th N. 77° 50' E. 238.6 feet
thence along same road
9th N. 50° 45' E. 692.2 feet
thence along same road
10th N. 62° 50' E. 323.5 feet
thence along same road
11th S. 50° 00' E. 617.1 feet
thence up the road leading to Middle Forge
12th N. 52° 50' E. 399.6 feet
thence up same road


PART OF
MIDDLE FORGE TRACT,
MORRIS CO., N.J.



Property of
UEL H. WIGGINS
Rockaway, Morris Co., N.J
MAY, 1880
Scale - 10 chains (660 ft) to the inch.
Area - 167.32 A
Area of part lying northeast of Berkshire road 44.6 A
Magnetic Meridian
To Berkshire Valley

13th N. 61° 15' E. 387.0 feet
thence up same road
14th N. 64° 45' E. 340.3 feet
thence up same road
15th N. 60° 15' E. 335.0 feet
thence up same road
16th N. 58° 35' E. 392.2 feet
thence along fence
17th S. 58° 05' E. 725.9 feet
to point in Green Pond Brook, thence down brook
18th S. 18° 31' W. 145.3 feet
thence down said brook
19th S. 56° 35' W. 281.1 feet
thence down said brook
20th S. 58° 20' E. 288.2 feet
to corner of Michael Doland's land; (from the beginning to this point, the outline adjoins the Middle Forge tract) thence down said brook and adjoining Doland's meadows
21st S. 3° 07' E. 366.9 feet
thence as above
22 d S. 71° 44' W. 150.3 feet
thence as above
23d N. 72° 30' W. 150.7 feet
thence as above
24th S. 54° 15' W. 380.7 feet
thence along a ditch bordering land of J.S. Kindred
25th N. 52° 20' W. 698.7 feet
thence along land of Kindred
26th S. 53° 02' W. 248.0 feet
thence along Kindred
27th S. 45° 25' W. 1952.6 feet
to a swamp white oak tree as corner, thence along Kindred
28th S. 89° 43' W. 317.3 feet
thence along Kindred
29th N. 63° 44' W. 521.4 feet
thence along Kindred
30th S. 46° 03' W. 1097.0 feet
to a stone heap under corner of fence in swamp, thence bordering land of __ Murdock and crossing top of Green Pond Mountain
31st N. 68° 30' W. 2176.5 feet
thence along west side of mountain
32d N. 50° 41' E. 742.7 feet
to place of beginning.

Containing 167.32 acres.

Note on page 17 applies to this description.

*Description of part of the Denmark Tract
As Surveyed for Purchase by the United States,
From the Estate of Ernest Fiedler, deceased.

Beginning at a corner on a Hemlock Ledge, being the first corner of a tract bought from George E. Righter, thence along said tract and crossing Middle Forge Pond.

1st N. 60° 35' W. 2593.9 feet
to a large red oak, being a corner of lands of __ Stansberry, thence along said Stansberry

2d N. 9° 00' E. 1214.4 feet
to a corner on Green Pond Mountain, thence along said Stansberry and on top of mountain

3d N. 62° 00' E. 528.0 feet
to a corner on Green Pond Mountain, thence along said Stansberry and on top of mountain

4th S. 28° 00' E. 66.0 feet
to a corner on Green Pond Mountain, thence along said Stansberry and on top of mountain

5th N. 57° 30' E. 601.9 feet
to a corner on Green Pond Mountain, thence along said Stansberry and on top of mountain

6th S. 37° 00' E. 165.0 feet
to a corner on Green Pond Mountain, thence along said Stansberry and on top of mountain

7th N. 55° 30' E. 2673.0 feet
to a corner on Green Pond Mountain, thence along retained lands of Fiedler and crossing Green Pond Brook

8th S. 31° 27' E. 2934.9 feet
to *point in road from Rockaway to Denmark, thence along said road

9th S. 34° 25' W. 194.7 feet
to a large chestnut tree on the N.E. side of said road, being also in line of Mrs. __ Barnes land, thence along said Mrs. Barnes' land

10th S. 32° 59' W. 702.2 feet
to a point in same road, thence along road

11th S. 35° 00' W. 414.7 feet
thence along said road

12th S. 56° 02' W. 326.7 feet
thence along same road

13th S. 45° 35' W. 204.3 feet
thence along same road

14th S. 70° 45' W. 366.0 feet
thence along same road

15th S. 34° 25' W. 717.0 feet
thence along same road

16th S. 53° 30' W. 170.4 feet
to a point in road being a corner of the property bought from George E. Righter, thence along said property

17th N. 70° 30' W. 696.1 feet
to place of beginning.

Containing 304.2 acres.

* As the monument marking this point obstructed the Rockaway Denmark road, it was, in October 1889, moved N. 50° W. a distance of 9½ feet. An iron cross buried about one foot in the ground, and fastened with an iron pin about two feet long driven through the center of the cross, marks the original position of the monument.

Done by order of Major Frank H. Phipps by
Robt. N. Hughes

*Note on page 17 applies to this description.

Description of the Property of M. Doland

Middle Forge Valley, Rockaway Township, Morris County, N.J.
As Surveyed for Purchase by the United States

Beginning at a stake in Green Pond Brook, being the 27th corner in description of George E. Righter's property, and also the 21st corner in description of Uel H. Wiggins' property, thence along Righter's line

1st S. 85° 05' E. 429.3 feet
to Righter's 28th corner, thence
2d S. 40° 20' W. 348.9 feet
to Righter's 29th corner, thence
3d S. 8° 57' E. 289.5 feet
to Righter's 30th corner, thence
4th S. 82° 38' W. 714.3 feet
to Righter's 31st corner, being also the 8th corner in description of J.E. Kindred's land, thence along Kindred's line
5th N. 34° 31' W. 725.3 feet
to Kindred's 7th corner, being also the 25th corner in description of Uel H. Wiggins' land, thence along Wiggins' line
6th N. 54° 15' E. 380.7 feet
to Wiggins' 24th corner thence
7th S. 72° 30' E. 150.7 feet
to Wiggins' 23d corner, thence
8th N. 71° 44' E. 150.3 feet
to Wiggins' 22d corner, thence
9th N. 3° 07' W. 366.9 feet
to place of beginning

(The last four courses follow as nearly as may be the course of Green Pond Brook, which is Doland's west boundary.)

Containing 11.0 acres

Note on page 17 applies to this description.

Description of Property of John E. Kindred

Middle Forge Valley, Rockaway Township, Morris County, N. J.
As Surveyed for Purchase by the United States

Beginning at a corner in the corner of a fence in swamp, being the 31st corner in the description of Uel H. Wiggins' land and also in line of __ Murdock's land, thence

1st N. 46° 03' E. 1097.0 feet
to the 30th corner of Wiggins, thence
2d S. 63° 44' E. 521.4 feet
to Wiggins' 29th corner, thence
3d N. 89° 43' E. 317.3 feet
to a swamp white oak tree, Wiggins' 28th corner, thence
4th N. 45° 40' E. 1952.6 feet
to Wiggins' 27th corner, thence
5th N. 53° 02' E. 248.0 feet
to Wiggins' 26th corner, thence along a ditch
6th S. 52° 20' E. 698.7 feet
to a stake in Green Pond Brook, the 25th corner of Wiggins' land and also a corner of Doland's meadow, thence
7th S. 34° 31' E. 735.3 feet
to a corner of Doland's, being also the 31st corner

in description of Geo. E. Righter's tract, thence along Righter's

8th S. 55° 00' W. 547.2 feet
to Righter's 32d corner, in road to Mt. Hope, thence up said road

9th S. 33° 25' E. 447.1 feet
to Righter's 33d corner, thence up said road, and along Righter's line

10th S. 48° 20' E. 218.3 feet
to a point in road, being in Righter's line and a corner of lands of __ Buckley, thence along Buckley's line

11th S. 43° 10' W. 2993.1 feet
to a stone heap corner, near a large pepperidge tree, thence

12th N. 37° 55' W. 66.0 feet
to a stone heap corner under fence, thence

13th N. 44° 31' E. 294.0 feet
to a stake in swamp, thence along lands of __ Spicer

14th N. 68° 17' W. 816.7 feet
to a stone heap corner under fence corner at foot of hill, thence along Spicer's line

15th N. 28° 58' E. 744.9 feet
to a stone heap corner on hill side, thence along Spicer's line

16th N. 70° 22' W. 966.2 feet
to the middle of a fence crossing Green Pond Brook, thence down said brook

17th S. 51° 27' W. 125.7 feet
to a point in the middle of the brook opposite a stake on the west bank, thence along __ Murdock's land

16th N. 68° 48' E. 1345.6 feet
to a stake in swamp, thence through swamp and adjoining Murdock's line

19th N. 64° 49' E. 756.7 feet
to a stake in swamp, thence through swamp and along Murdock's line

20th N. 72° 01' W. 463.6 feet
to beginning.

Containing 187.8 acres.

Note on page 17 applies to this description.

Purchase of land for Government Road (11)

DEED

Lewis H. Spiser and wife to the United States of America
Dated May 2d, 1881.
Of a strip of land 50 feet in width leading from
Spicertown to the U. S. Powder Depot grounds -

Received in the Clerk's Office of the County of Morris on the 13th day of May, A.D. 1881, and recorded in Book O-10 of Deeds for said County on pages 430, etc. Melvin S. Condit, Clerk.

THIS INDENTURE made this twelfth day of May, A. D. eighteen hundred and eighty one between Lewis H. Spiser and Mary his wife of the township of Rockaway in the County of Morris and State of New Jersey of the first part and The United States of America of the second part

WITNESSETH, That the parties of the first part in consideration of the sum of two hundred (200) dollars to them in hand well and truly paid the receipt whereof is hereby acknowledged, have given, granted, bargained, sold and conveyed and by these presents do give, grant, bargain, sell and convey unto the said party of the second part, its successors and assigns for the purposes hereinafter mentioned a strip of land fifty (50) feet in width, situate in the Township of Rockaway in said County of Morris and State of New Jersey, lying on both sides of a middle line, beginning and running as follows:

BEGINNING at a point in the division line between the lands of the parties hereto, distant one hundred and seventy one feet on a course of north sixty three degrees and twenty minutes west (that is to say, measuring along said division line) from a stone heap a corner of said parties and running thence (1) south twenty two degrees and five minutes west four hundred feet; thence (2) turning three degrees and fifty minutes to the left from the prolongation of the last line - South eighteen degrees west three hundred and thirty eight feet; thence (3) turning seven degrees and twenty four minutes to the left from the prolongation of the last line - south eight degrees and thirty minutes west nine hundred and twelve feet; thence (4) turning three degrees and forty five minutes to the right from the prolongation of the last line - south thirteen degrees and forty five minutes west four hundred and twelve feet; thence (5) turning fourteen degrees and fifteen minutes to the right from the prolongation of the last line - south twenty seven degrees and fifteen minutes west one hundred and ninety four feet; thence (6) turning fourteen degrees and seventeen minutes to the right from the prolongation of the last line - south forty two degrees and fifteen minutes west two thousand five hundred and five feet, keeping parallel with and twenty five feet distant from the division line between the lands of said Lewis H. Spiser and the lands of Lewis F. Spiser; thence (7) turning twelve degrees and thirty four minutes to the right from the prolongation of the last line - south fifty four degrees and thirty minutes west nine hundred and seventy four feet to a point opposite to and twenty five feet westerly from a stone heap in the line of lands of Henry Baker and the estate of William H. Baker deceased; thence (8) turning eighteen degrees and eleven minutes to the left from the prolongation of the last line - south thirty six degrees west, keeping parallel with and twenty five feet distant from the division line between the lands of said Baker and the lands of said Lewis H. Spiser, sixteen hundred and seventy seven feet to a point in the public road leading from the school house at Mount Pleasant to the residence of said Spiser, distant thirty three feet on a course of north eleven degrees and thirty minutes west from a Hickory Tree standing in the line of said Baker's lands, said line

to be the center line of said strip of land hereby intended to be conveyed. A map of said strip of land showing also the location of the adjoining and neighboring corners and division lines of the parties hereto, is annexed hereto and reference is made to said map for a fuller description of said strip of land.

TO HAVE AND TO HOLD said land with the appurtenances thereto belonging for the purposes of a wagon road or highway, to the party of the second part its successors and assigns forever. Said party of the second part is to build a fence along the westerly side of said strip of land from its most southerly end to opposite the sixth station of said middle line, that is to say for five thousand one hundred and fifty six feet, and to do such grading and other work as it may require for its use aforesaid at its own expense. The parties of the first part reserve and except from this conveyance the minerals, if any there be, underlying the strip of land hereby conveyed but the surface of said strip of land is not to be disturbed in mining or exploring for said minerals. The parties of the first part also reserve for themselves and for persons now owning land adjoining and bordering on it, the right to use said proposed road when made.

Note Reservation of Rights.

IN WITNESS WHEREOF the parties of the first part have hereto set their hands and seals the day and year first above written.

Signed sealed and delivered)
in the presence of)
FRED. H. BEACH)

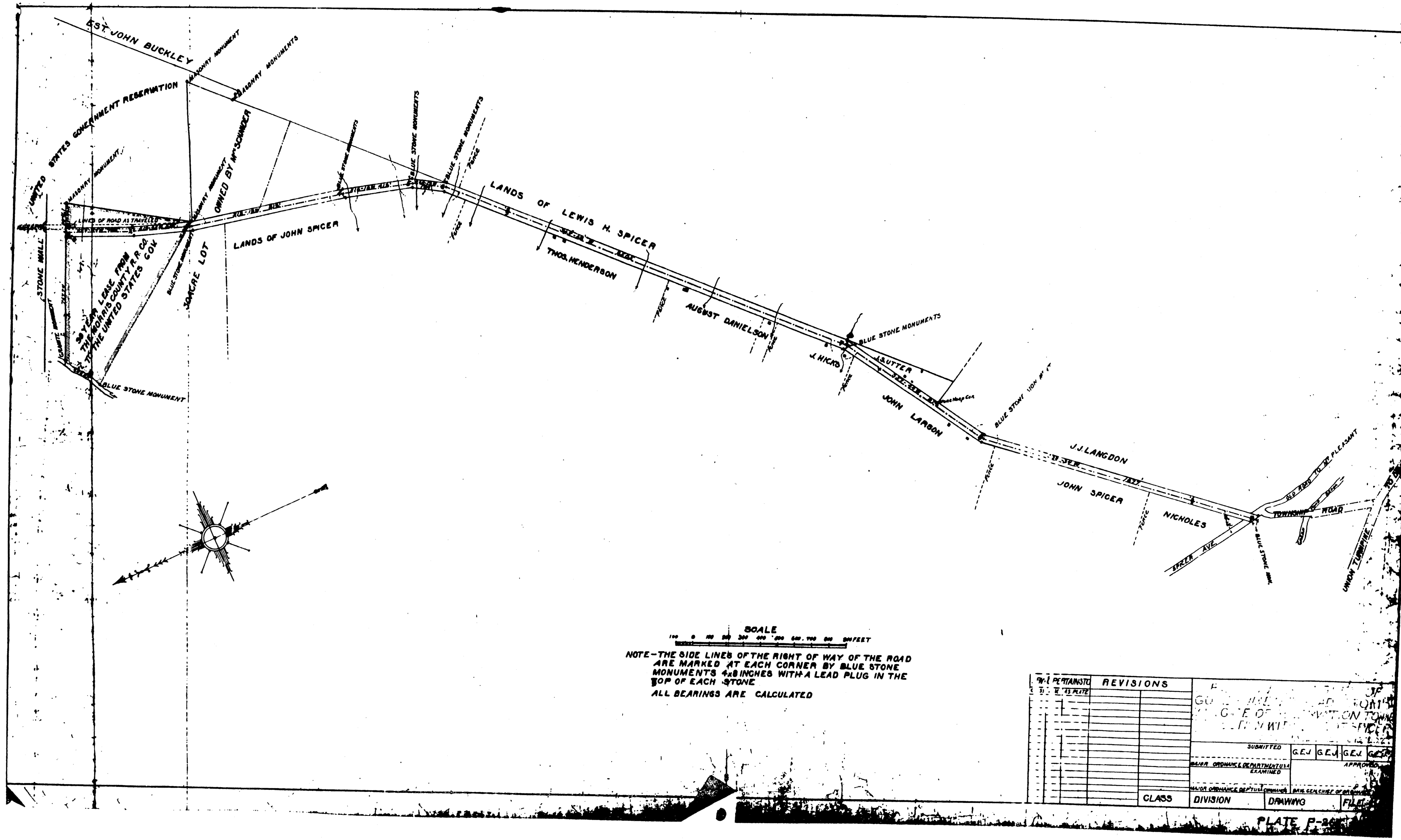
(Signed) Lewis Spiser (Seal)
(Signed) Mary Spiser (Seal)

State of New Jersey)
Morris County S. S.)

Be it remembered that on the twelfth day of May A. D. eighteen hundred and eighty before me Frederick H. Beach a Master in Chancery of New Jersey personally appeared Lewis H. Spiser and Mary Spiser his wife who I am satisfied are the grantors mentioned in the foregoing deed, to whom I first made known the contents thereof, and they acknowledged that they signed, sealed and delivered the same as their voluntary act and deed, for the uses and purposes therein expressed - and the said Mary Spiser being by me privately examined separate and apart from her said husband did further acknowledge that she signed, sealed and delivered the same fully as her voluntary act and deed, without any fear, threats or compulsion of or from her said husband.

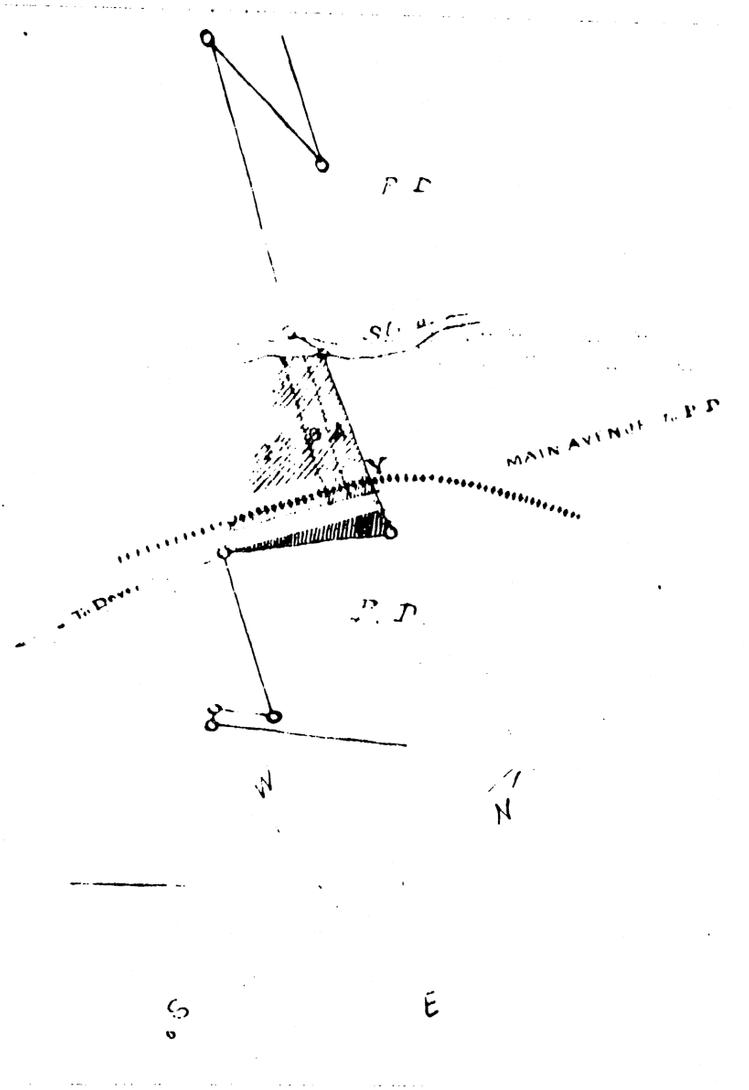
(Signed) Frederick H. Beach
Master etc.

Note: Apparently the spelling "Spiser" is the German spelling of the name "Spicer."


EST. JOHN BUCKLEY
UNITED STATES GOVERNMENT RESERVATION
MASONRY MONUMENT
MASONRY MONUMENTS
OWNED BY Mrs SCHNEIDER
LANDS OF JOHN SPICER
50 ACRE LOT
99 YEAR LEASE FROM THE MORRIS COUNTY R.R. CO. TO THE UNITED STATES GOV.
STONE WALL
BLUE STONE MONUMENT
BLUE STONE MONUMENTS
LANDS OF LEWIS H. SPICER
THOS. HENDERSON
AUGUST DANIELSON
J. HICKS
A. SUTTER
JOHN LARSON
J.J. LANGDON
JOHN SPICER
NICHOLES
SPICER AVE.
TOWNSHIP ROAD
OLD ROAD TO MT PLEASANT
UNION TURNPIKE
SCALE
NOTE - THE SIDE LINES OF THE RIGHT OF WAY OF THE ROAD ARE MARKED AT EACH CORNER BY BLUE STONE MONUMENTS 4x8 INCHES WITH A LEAD PLUG IN THE TOP OF EACH STONE
ALL BEARINGS ARE CALCULATED
REVISIONS
SUBMITTED
G.E.J.
APPROVED
MAJOR ORDNANCE DEPARTMENT U.S.A.
EXAMINED
CLASS
DIVISION
DRAWING
FILE
PLATE P-2

Lease of Tract from the Morris County Railroad Company

Letter and sketch leading to making of lease (11):



(Copy)

U.S. POWDER DEPOT
DOVER, N. J.

November 18th, 1886.

The Chief of Ordnance, U.S.A.,
Washington, D.C.

Sir:

I have the honor to report as follows:

The Morris County R.R. Co. will make its exit from the Powder Depot Tract at the point marked "Y" on the accompanying sketch. The company was constrained to purchase all the land shaded in red on either side of its line. The lands shaded in black marked A.B.C.D., the Company purchased at my request to compensate certain disadvantages to the Government should such lands pass into the hands of other parties.

The Company is inclined to informally concede the use of this land to the United States. In order, however, to protect the interest of the Government until such time as this land may be purchased by the United States, I respectfully*authority to enter into contract for the lease of this land for a period of 99 years at the nominal sum of $1.00 to be paid by the Government to establish official rights and privileges which may in the future be defended.

I enclose, herewith, a letter from the President of the Morris County R. R. Company submitted for the information of the Chief of Ordnance.

(Sgd) J. T. Farley,
Major, of Ordnance, Commanding.

(Copied from record of letters sent Sept.26th, 1884 to May 13th, 1889, serial number of letter 254).

LEASE

The Morris County Railroad Co.

To the

United States of America

Dated February 1st, 1887.

Received in the Clerk's Office of the County of Morris on the 9th day of June A.D. 1887 and recorded in Book C-12 of Deeds for said County on pages 44 etc. M. S. Condit, Clerk.

THIS INDENTURE made the first day of February in the year of our Lord eighteen hundred and eighty seven, between the Morris County Railroad Company a corporation organized under the laws of the State of New Jersey of the First Part, and the United States of America of the Second Part,

WITNESSETH that the party of the first part in consideration of the sum of one dollar of money to it paid by the party of the second part, the receipt whereof is hereby acknowledged, hath granted demised and let and doth hereby grant demise and let unto the party of the second part,

All that certain tract of land situate in the township of Rockaway in the County of Morris and State of New Jersey, butted and bounded as follows, to-wit: Beginning at a stone monument standing on the easterly side of the Main Avenue (otherwise called Mount Pleasant Avenue) which leads from the Union Turnpike Road to the United States Powder Depot, said monument being at the 15th corner of the tract of land which was conveyed by John E. Kindred to the United States of America, and from thence running (1) along the 15th course in said Kindred deed mentioned north twenty eight degrees and fifty eight minutes east seven hundred and forty four and nine tenths feet to a stone monument standing at the 16th corner in said Kindred deed mentioned; thence (2) along the 16th course in said Kindred deed mentioned north seventy degrees and twenty two minutes west nine hundred and sixty six and two tenths feet more or less to the middle of the stream; thence (3) down the middle of the stream the several courses thereof one hundred and seventy five feet more or less to the second corner of a lot of land which was conveyed to the party of the first part by John Spicer and wife by deed dated August 10th 1886 and recorded in the Morris County Records of Deeds in Book V, 11, on pages 431 etc.; thence (4) in a southeasterly direction and in a straight line a distance of nine hundred and seventy five feet more or less to the place of beginning; - excepting however that part of said tract of land which is occupied by said Main Avenue, and also such part thereof as is now or may hereafter be occupied by the railway tracts of the party of the first part or its successors or assigns,

Together with all and singular the trees, ways waters profits privileges and advantages with the appurtenances to the said demised premises belonging or in anywise appertaining,

To have and to hold all and singular the said demised premises with the appurtenances unto and to the use of the party of the second part for and during the full term and period of ninety nine (99) years from and after the date hereof, free clear and discharged of and from any rent or charge whatsoever.

IN WITNESS WHEREOF the party of the first part has hereunto caused to be set its corporate seal and the hand of Garret A. Hobart, Esq., its President, the day and year first above written.

Signed sealed and delivered in the presence of (Sgd.) Russell T. Low

The Morris County Railroad Co. per (Sgd.) Garret A. Hobart President

(Corporation Seal)

State of New Jersey)
County of Passaic, S.S.)

Be it remembered that on this eighth day of June in the year of our Lord eighteen hundred and eighty seven, before me the undersigned, one of the Masters of the Court of Chancery of said state of New Jersey, personally appeared Russell T. Low who being by me duly sworn according to law on his oath did depose and make proof to my satisfaction that he is the Secretary of the Morris County Railroad Company the party of the first part in the foregoing deed of conveyance named, and well knows the corporate seal of said Company and is well acquainted with Garret A. Hobart, Esq., who is the President of said Company; that the seal affixed to the foregoing deed is the proper corporate seal of said Company, and was so affixed by the said Garret A. Hobart then being President of said Company, who at the same time subscribed his name to said deed as such President, in the presence of this deponent; that at the time of so signing and sealing said deed the said Garret A. Hobart did acknowledge and declare in the presence and hearing of this deponent that he signed sealed and delivered the said deed as and for the voluntary act and deed of the said Morris County Railroad Company for the uses and purposes in said deed set forth by virtue of authority to him given for that purpose by the board of directors of said company; and this deponent thereupon signed said deed as a subscribing witness.

Sworn & subscribed this)
8th day of June A.D. 1887)
before me)
(Sgd.) ALEX ELLIOTT, JR.)
Master in Chancery of
New Jersey.

(Sgd.) Russell T. Low
Secretary of
The Morris County Railroad Company.

Transfer of 315 Acres of U.S. Powder Depot Reservation To the Navy Department (11)

An act making appropriations for fortifications and other works of defense, for the armament thereof, for the procurement of heavy ordnance for trial and service, and for other purposes.

* * * * * * *

SEC. 2. That the Secretary of War be, and he is hereby, authorized to transfer such portion of the site of the United States powder depot, near Dover, New Jersey, to the Navy Department for magazine purposes as in his judgment may be for the interest of the public service, and the property so transferred shall thereafter be under the exclusive jurisdiction of the Secretary of the Navy.

Approved February 24th, 1891.

WAR DEPARTMENT
Washington, D. C., April 27th, 1891.

The Honorable
The Secretary of the Navy

Sir:

In accordance with the provisions of the second section of the Act making appropriations for fortifications and other works of defense, etc., approved February 24, 1891, I have the honor to enclose herewith a topographical chart marked "Plan of United States Powder Depot near Dover, N.J. April 27th, 1891," on which the portion of the tract to be transferred to the Navy Department is shown within the boundary lines A-D, I-H, G-F, and C-A, and containing about three hundred and fifteen (315) acres more or less.

Note: For topographical chart, dated April 27, 1891, referred to just above, see second map, Chapter VIII, page 60.

The portion transferred is thus separated from the main tract by the wagon road A-D on the southwest, leading outside the United States property, and the Morris County Railroad on the northwest - the road bed to remain the property of the War Department.

It is however stipulated that the Navy Department shall not locate any of its magazines or store-houses or filling rooms for explosives nearer to the War Department magazines than are the War Department magazines to each other.

Note Limitations on Buildings to be Erected.

Very respectfully,
(Signed) REDFIELD PROCTOR
Secretary of War.

Copy respectfully referred to the Commanding Officer of the United States Powder Depot, Dover, N. J., for his information and guidance. A blue print of the topographical map dated April 27th, 1891, showing the part of the reservation assigned to the Navy Department, is also sent herewith.

By order of the Chief of Ordnance,

(Signed) D. A. HOWARD
Lieut., Ord.Dept., U.S.A.

Ord. Office
May 2d, 1891.

BUREAU OF ORDNANCE
NAVY DEPARTMENT
Washington City, June 24, 1891.

In reply refer to No. 2112

Chief of Ordnance U. S. Army,
War Department, Washington, D. C.

Sir:

The Bureau proposes, in the immediate future, to send to Dover, N. J., its agent, Commander J. B. Coghlan, U.S.N. who will have charge of the erection of the Naval magazines and other structures upon the reservation transferred by Act of Congress approved February 24, 1891 to the Navy Department.

It is requested that the Commanding Officer of the Army Post at that point may be directed to accord such facilities as may be necessary for the formal acquisition of the tract of land in question, designated by the Honorable Secretary of War in his letter of April 27th 1891.

I am, sir, your obedt. servt.

(Signed) W. M. FOLGER
Chief of Bureau.

1st Indorsement.

Ordnance Office
Washington, June 3d, 1891.

Respectfully referred to the Commanding Officer, U.S. Powder Depot for his information, in connection with instructions from this of 2d ultimo, and who will afford Commander Coghlan such facilities as may be necessary for the purpose mentioned within.

By order of the Chief of Ordnance,

(Signed) R. BIRNIE
Capt., Ord.Dept., U.S.A.

2d Indorsement.

U.S. Powder Depot, N. J.
June 9th, 1891.

Respectfully returned to the Chief of Ordnance U.S.A.

The tract referred to within was this day turned over by me to Commander J. B. Coghlan, U.S.N. in person, in accordance with the instructions contained in the previous indorsement.

(Signed) J. M. REILLY
Major of Ordnance
Comd'g.

Purchase of Robinson Farm

THIS INDENTURE, (12)
Made the Twenty-ninth day of October, in the year of our Lord One thousand Nine Hundred and Seventeen

BETWEEN

Thomas Robinson and Elizabeth Robinson, his wife of the Township of Rockaway in the County of Morris and State of New Jersey party of the first part:

AND

The United States of America

WITNESSETH, That the said party of the first part, for and in consideration of Seventy-five hundred dollars, lawful money of the United States of America, to them in hand well and truly paid by the said party of the second part, at or before the sealing and delivery of these presents, the receipt whereof is hereby acknowledged, and the said party of the first part being therewith fully satisfied, contented and paid, have given, granted, bargained, sold, aliened, released, enfeoffed, conveyed and confirmed, and by these presents do give, grant, bargain, sell, alien, release, enfeoff, convey and confirm unto the said party of the second part, and to its successors and assigns, forever, All those four tracts or parcels of land and premises, hereinafter particularly described, situate, lying and being in the Township of Rockaway in the County of Morris and State of New Jersey.

First Tract: Beginning at a stake standing six chains on a course south fifty degrees west from a sapling marked on four sides being a corner of lands laid out on the 17th day of December 1773 for Isaac Vandine and from said stake running on the same course sixteen chains to a stake for a corner, thence south forty degrees east seventeen

chains to a birch sapling marked for a corner thence north thirty degrees east eighteen chains to a stake for a corner thence north thirty nine degrees west to the place of beginning, containing twenty two acres more or less.

Second Tract: Beginning at a red oak tree the reputed beginning corner of a tract of twenty two acres of land conveyed by Mark Walton to Reuben Walton, September 23, 1793 and from said red oak tree extending (1) north forty eight degrees east eight chains to a stake and heap of stones, near the road leading from Mt. Hope to Middle Forge thence (2) south forty two degrees east eighteen chains and seventy five links to a black oak sapling marked on four sides for a corner; thence (3) south forty eight degrees west eight chains to a chestnut sapling marked on four sides thence (4) south eighty eight degrees west, ten chains to a corner in a line of said Reuben Walton's land thence (5) with his line, north thirty two degrees east seven chains and ninety links to his corner thence (6) north forty one degrees west nine chains and sixty links with his line to the beginning, containing eighteen acres of land, more or less.

Third Tract: Beginning at a course of north thirty one degrees and thirty minutes east three chains from a birch tree the third corner of twenty two acres of land formerly conveyed by Mark Walton to Reuben Walton and from thence extending (1) with a line of Moses Phillips, Jr. land south fifty seven degrees and thirty minutes east nine chains and ninety links to a line run from the division between the Middle Forge Tract and Mount Hope tract thence along said line (2) north thirty three degrees east nineteen chains and sixty links to the black oak sapling a corner of eighteen acres of land formerly sold by the said Phillips to Aaron Walton thence (3) by the same south forty eight degrees west eight chains to another corner thereof thence (4) by the same south eighty eight degrees west, ten chains to another corner thereof in a line of said Reuben Walton's twenty two acre tract thence (5) by the same south thirty one degrees and thirty minutes west six chains and thirty links to the beginning, containing ten and fifty hundredths acres, more or less.

Fourth Tract: Beginning at a Black Birch, a corner of William Waltons homestead tract, thence running (1) with said Waltons old line north forty degrees west, seventeen chains to another of said Waltons corners, thence (2) south fifty degrees west, one chain, thence (3) south twenty-five degrees east, seventeen chains and sixty links thence (4) north fifty one degrees and fifteen minutes east five chains and thirty three links to the place of beginning, containing five acres and forty two hundredths of an acre strict measure.

The first three tracts above described being the same land and premises conveyed to the said Thomas Robinson and Elizabeth, his wife, by Lewis Doland and Mary H. Doland, his wife, by deed dated February 27, 1901 and recorded in the Clerk's Office of the County of Morris on June 20, 1901 in Book [illegible]-16 of Deeds, pages 45 & c.

The fourth tract being the same land and premises conveyed to the said Thomas Robinson by Margaret A. Winterscheid & al. by deed dated July 13, 1908 and recorded on September 11, 1908 in the Clerk's Office of the County of Morris in Book M-19 of Deeds, pages 45 & c.

TOGETHER with all and singular the tenements, hereditaments and appurtenances thereunto belonging, or in anywise appertaining, and the reversion and reversions, remainder and remainders, rents, issues and profits thereof.

AND ALSO, all the estate, right, title, interest, property, possession, claim and demand whatsoever, as well in law as in equity, of the said party of the first part, of, in and to the above described premises, and every part and parcel thereof, with the appurtenances. TO HAVE AND TO HOLD, all and singular, the above mentioned premises, together with the appurtenances, unto the said party of the second part, its successors and assigns, to its own proper use, benefit and behoof forever.

AND the said parties of the first part, for themselves, their heirs, executors and administrators, do covenant, grant and agree to and with the said party of the second part, its successors and assigns, that the said Thomas Robinson and Elizabeth Robinson at the time of the sealing and delivery of these presents, were lawfully seized in of a good, absolute, and indefeasible estate of inheritance in fee simple, of and in all and singular the above granted, bargained and described premises, with the appurtenances and have good right, full power and lawful authority to grant, bargain, sell and convey the same in manner and form aforesaid.

AND that the said party of the second part, its successors and assigns, shall and may at all times hereafter, peaceably and quietly have, hold, use, occupy, possess and enjoy the above granted premises, and every part and parcel thereof, with the appurtenances, without any let, suit, trouble, molestation, eviction or disturbance of the said party of the first part, heirs or assigns or of any other person or persons lawfully claiming or to claim the same.

AND that the same now are free, clear, discharged and unencumbered of and from all former and other grants, titles, charges, estates, judgments, taxes, assessments and incumberances of what nature and kind soever.

AND ALSO, that the said party of the first part, and their heirs, and all and every other person or persons whomsoever, lawfully or equitably deriving any estate, right, title, or interest, of, in or to the hereinbefore granted premises, by, from, under or in trust for them, shall and will at any time or times hereafter, upon the reasonable request, and at the proper costs and charges in the law, of the said party of the second part, its successors and assigns, make, do, and execute, or cause or procure to be made, done or executed, all and every such further and other lawful and reasonable acts, conveyances and assurances in the law for the better and more effectually vesting and confirming the premises hereby intended to be granted in and to the said party of the second part, its successors and assigns forever, as by the said party of the second part, its successors or assigns, or its counsel learned in the law, shall be reasonably advised or required.

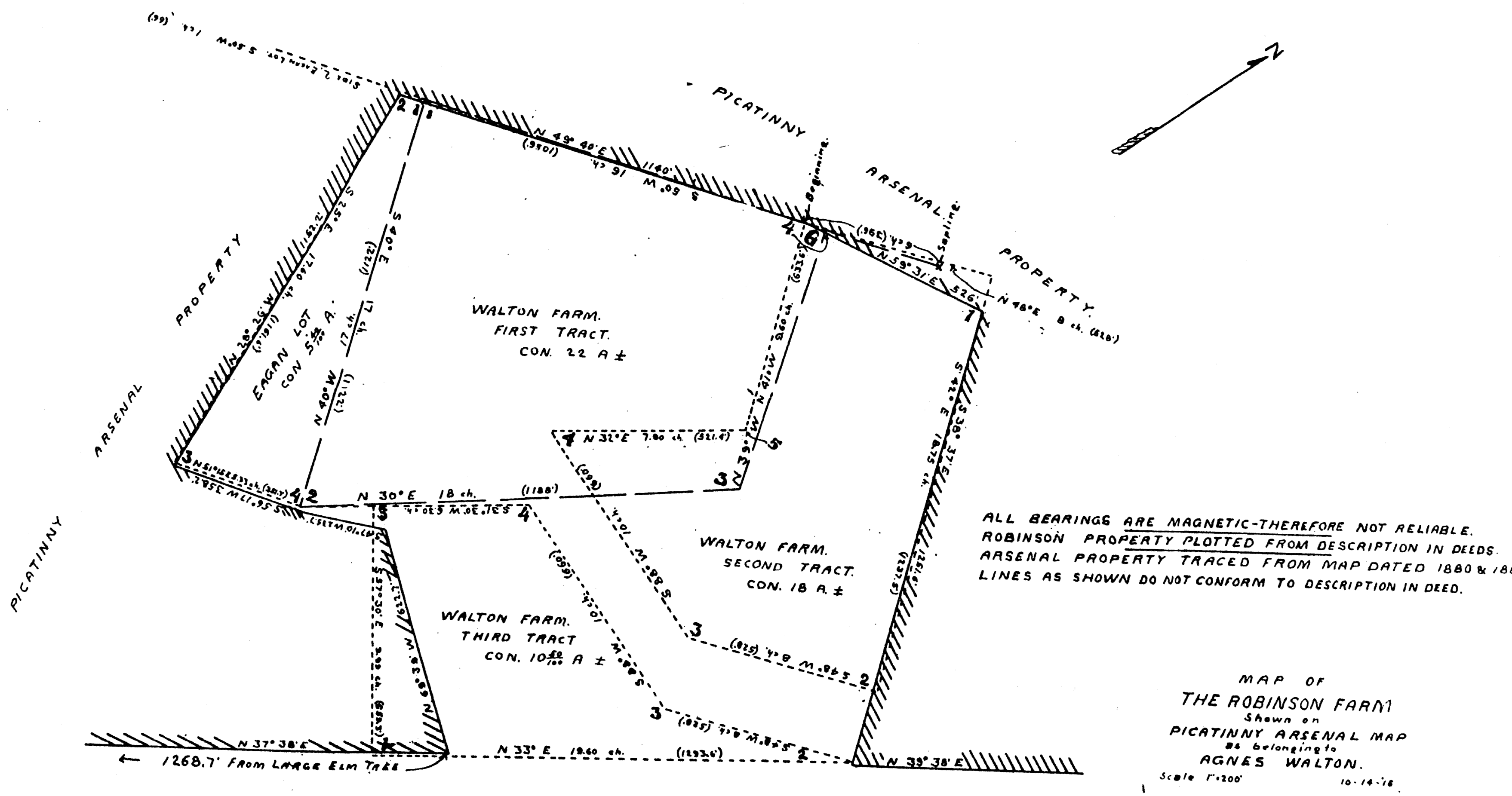
AND the said parties of the first part, their heirs, the above described and hereby granted and released premises, and every part and parcel thereof, with the appurtenances, unto the said party of the second part, its successors and assigns, against the said party of the first part, and their heirs, and against all and every person or persons whomsoever, lawfully claiming or to claim the same, SHALL AND WILL WARRANT and by these presents FOREVER DEFEND.

IN WITNESS WHEREOF, the said parties of the first part have hereunto set their hands and seals the day and year first above written.

Signed, Sealed and Delivered)
in the presence of)
E. BERTRAM MOTT.)

Thomas Robinson

Her
Elizabeth X Robinson
Mark.

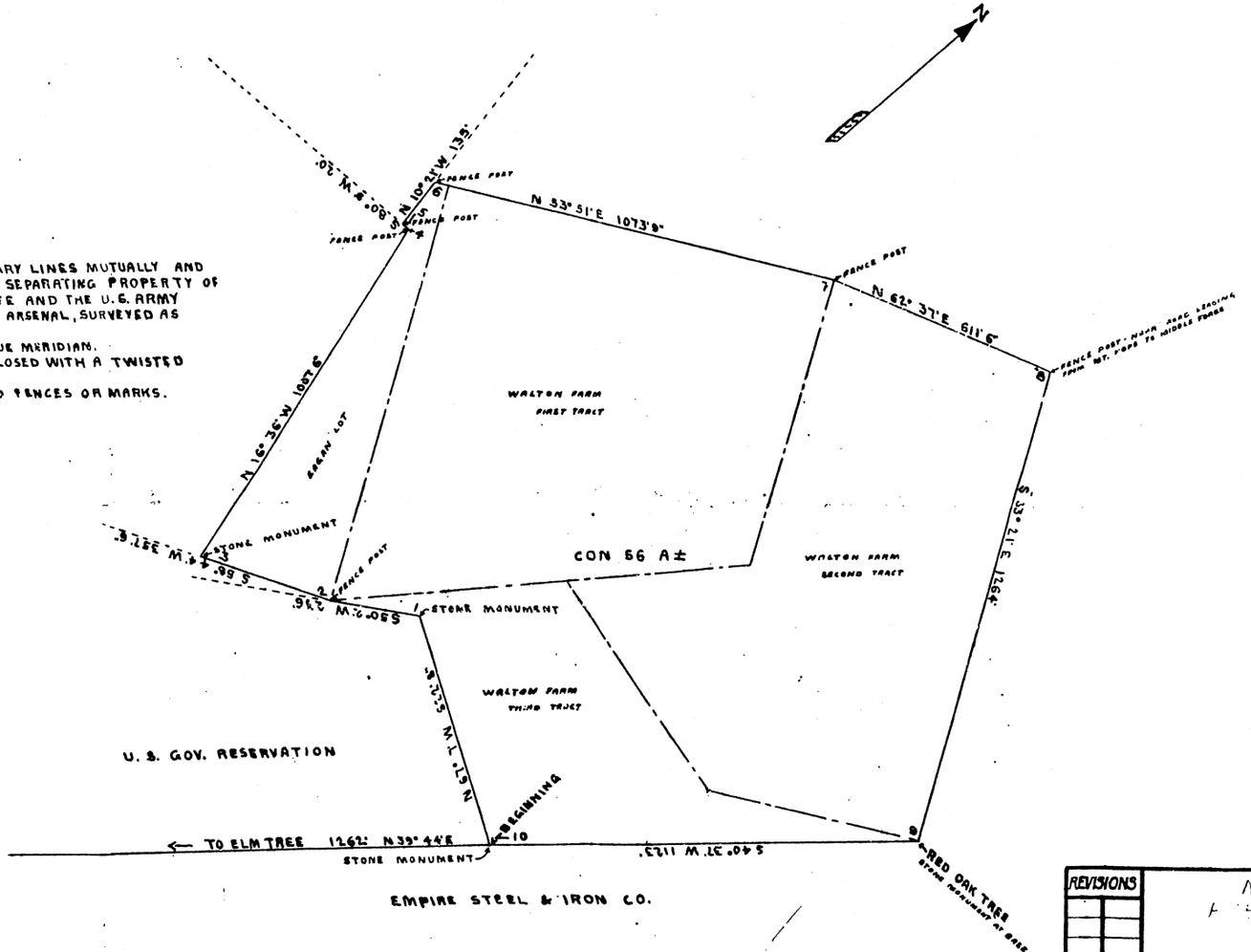

PICATINNY ARSENAL PROPERTY
WALTON FARM. FIRST TRACT. CON. 22 A ±
EAGAN LOT CON 5 A.
WALTON FARM. SECOND TRACT. CON. 18 A. ±
WALTON FARM. THIRD TRACT CON. 10 A ±
N 30° E 18 ch. (1188')
N 33° E 19.60 ch. (1293.6')
N 37° 38' E
N 39° 38' E
1268.7' From Large Elm Tree
Beginning
Sapling
N
ALL BEARINGS ARE MAGNETIC-THEREFORE NOT RELIABLE.
ROBINSON PROPERTY PLOTTED FROM DESCRIPTION IN DEEDS.
ARSENAL PROPERTY TRACED FROM MAP DATED 1880 & 188.
LINES AS SHOWN DO NOT CONFORM TO DESCRIPTION IN DEED.
MAP OF
THE ROBINSON FARM
Shown on
PICATINNY ARSENAL MAP
as belonging to
AGNES WALTON.
Scale 1"=200'
10-14-16

THIS PLAT SHOWS BOUNDARY LINES MUTUALLY AND GENERALLY RECOGNIZED AS SEPARATING PROPERTY OF THOMAS ROBINSON AND WIFE AND THE U.S. ARMY RESERVATION AT PICATINNY ARSENAL, SURVEYED AS ACCURATELY AS POSSIBLE.

BEARINGS REFER TO TRUE MERIDIAN.

SIDES 1-8 INC. ARE ENCLOSED WITH A TWISTED RIBBON WIRE FENCE.

SIDES 9 AND 10 HAVE NO FENCES OR MARKS. EXCEPT AT CORNERS.



REVISIONS	

PICATINNY ARSENAL, U.S.A.

W. O. NO.	REF. P.A.	JAN. 27-1917
SUBMITTED: ORDNANCE DEPARTMENT, U.S.A.		SCALE: 1 IN. = 200 FT.
APPROVED: LT. COL., ORD. DEPT., U.S.A. COMMANDING		A.M.J.

STATE OF NEW JERSEY,)
COUNTY OF MORRIS,) ss. BE IT REMEMBERED, That on this 29th

day of October in the year
of our Lord One Thousand Nine Hundred and seventeen , before
me the subscriber, an Attorney at Law of New Jersey

Personally appeared

Thomas Robinson and Elizabeth Robinson, his wife

who, I am satisfied, are the grantors mentioned in the within Deed, and to whom I first made known the contents thereof, and thereupon they acknowledged that they signed, sealed and delivered the same as their voluntary act and deed, for the uses and purposes therein expressed:

And the said Elizabeth Robinson, wife of the said Thomas Robinson,

being by me privately examined, separate and apart from her said husband, further acknowledged that she signed, sealed and delivered the same as her voluntary act and deed, FREELY, without any fear, threats or compulsion of her said husband.

E. BERTRAM MOTT
Attorney At Law of New Jersey.

Possession Taken of the North Tract (7)

The action leading to the taking possession of the North tract, 255 acres, was started July 17, 1918 by the then Commanding Officer, Col. J. C. Nicholls, Ordnance Department, writing (O.O. 682/210) the Supervisor of Arsenals, Washington, D. C., that consideration should be given the extension of the Arsenal reservation on the northwest. To this communication he received the following indorsement:

O.O. 682/210 3rd Ind. JCN/mk

Director of Arsenals, August 5th, 1918 - To the Commanding Officer, Picatinny Arsenal.

1. Referring to the proposed extension of reservation at your arsenal, it is requested that you get into communication with the parties owning the land in question and submit report as to availability, price, etc.

By order of Chief of Ordnance.

JNO. T. THOMPSON
Colonel, U.S.A., Ret.

Investigation of the property lines as shown on the property map, the first map this chapter, North tract, resulted in the following report:

TLK/bh

Picatinny Arsenal, Dover, N. J.
November 14, 1918.

ADMINISTRATION SECTION)
MEMORANDUM NO. 5) To: Commanding Officer.

Subject: Present Status of Search to Ascertain Party or Parties in Whom Title to 250 Acres of Land Adjoining the Arsenal to the North and Northwest, together with Methods of Procurement.

1. In 1829 the then owner, George Stickle conveyed the property to Joseph Dickerson, Jr. and Joshua Dickerson, Jr. as tenants in common. This deed is recorded in the Morris County Clerk's Office in Book X-2 of Deeds, page 137.

2. Joseph Dickerson Jr. conveyed his undivided half interests to John Hardy on Dec. 14, 1839. This conveyance is recorded in U-3 page 374, the fourth tract in said deed being the premises in question.

3. A search of the records in the name of John Hardy discloses no conveyance by him of any tract corresponding with the description of the premises as contained in the deed hereinbefore mentioned, X-2 137.

4. However, there is a sheriff's deed by which the sheriff conveys a tract in 1850, recorded in Book T-4pp. 205, where the following description appears: "The equal undivided half part of a tract of land containing 250 acres more or less in the township of Pequannock bounded by lands of John Hardy, Moses Phillips and others."

5. The above description may or may not cover the premises in question. Before this can be definitely ascertained, it would be necessary to make an exhaustive search into the records applying to adjacent lands.

6. The records show that Caleb O. Halsted of New York City bought in the land at a sheriff's sale referred to above. A search in his name shows no conveyance out of him. There are no surrogates records on file in his estate in Morris County. So that, as to one undivided half interest, as far as preliminary survey can show, title is vested either in John Hardy of the township of Pequannock, or his heirs.

7. As to the second undivided half interest, Joshua Dickerson sold it on August 23, 1866 to one William Stiles of Green County, Ohio which conveyance is recorded in Book A-8 page 169.

8. A search in the name of William Stiles discloses no conveyance of his interest to anyone. The surrogates records show the death of a William Stiles on October 18, 1873 but do not give the names of the heirs. This William Stiles left a wife, Elizabeth, who subsequently married one Robert Dodge. A search in both their names shows no conveyance of the tract in question. It does show, however, that William Stiles was probably one William H. Stiles of Mendham, N.J., who is not the party in which we are interested. As far, therefore, as a preliminary search can show, title to the other undivided half interest is vested now in William Stiles of Green County, Ohio, or his heirs.

9. In order to come to a definite conclusion therefore it would be necessary to make an exhaustive search of the surrounding territory to see if lines and corners can be tied up in later instruments, and thus perhaps discovering some reference in subsequent deeds

which would throw light on what may have been done with the property by deeds which may not be on record.

10. Such a search would entail long and tedious work and might lead to no satisfactory conclusion.

11. The property in question may be made available by anyone of the following methods:

(1) In accordance with Supply Circular #32, a communication may be addressed to the Ordnance Department to be indorsed over to the Purchase, Storage and Traffic Division of the Facilities Division, Ordnance Real Estate Section. The communication should contain a description of the property desired, the necessity for the use of same, length of time property is to be used, probable cost, maps and blue prints, and allotment against which the land in question is to be charged. A recommendation should be made that the land be either leased or purchased, as may be desired. Such a communication will lead ultimately to the procurement of the land provided funds are available and the recommendations are approved.

(2) Requisition proceedings may be instituted by addressing the communication to the Administration Division, attention of Major J.B. Orr, with the request that such proceedings be instituted together with a statement as to the necessity for securing property, the owners, if they are known, and other information as to value, funds to cover, etc., as mentioned above.

(3) Commandeering proceedings may be instituted, provided recommendations are approved, through Major A. G. Mose, Chief of the Commandeering Section. These proceedings may be begun either in our County Court or in the Federal Court. In either event the land becomes available immediately upon the institution of proceedings against the owner if known, or, as in this case, against owners unknown. Unless some owner came forward to contest the action, the government would not be called upon to prosecute the suit.

(4) The property in question may be applied to our use at once without any procedure whatsoever if immediate possession is desired. If no one appears to contest title, the property will temporarily revert to the United States by adverse possession after a period of 20 years. During this time whether the owner appears or not, condemnation proceedings as above, may be instituted, if desired. If no party appears to contest occupancy, we may simply let the proceedings rest, or else have the property condemned, its value assessed by the court, and pay into the court the value so ascertained to await proof of claim to the money by the original owners of the property.

9. Col. Sheppard approves of the appropriation of the land for our use without any other procedure whatsoever.

T. L. KIBLER,
Capt., Ord. Dept., U.S.A.

This memorandum bears the following pencil notation:

Capt. Kibler: No further action necessary at present. Be certain to have a copy of this filed for possible future use. R.L.M.

The "Status Report on Picatinny Arsenal" directed furnished by file G.M. 600.9-C-R, P.A. 682/18, June 4, 1929, and reply made

June 30, 1929, carried the following excerpts:

(Page 5) "Tract described by metes and bounds Nos. 9 to 23 was fenced in by the United States in 1926. This land while not included in any of the Arsenal deeds is carried on a property map, of which this Arsenal has a copy, as belonging to the United States. Every effort was made to find claimants without success and no protest has been entered against the claims of the United States."

(Page 11) "In 1929, an additional tract of land containing 226.8 acres (more or less) was acquired by seizure, making the grand total area of this Depot, 1,842.54 acres.

Anderson and Lidgerwood Tracts

The locations and extent of these tracts may be seen by referring to the first property map, this chapter. Negotiations for the purchase of these tracts had not culminated in ownership by the Government at this writing.

CHAPTER VI

The Constitution, Acts of Congress, Acts of the Legislature, Licenses, Right-of-way, Easements and Agreements.

Land and Jurisdiction

The Constitution of the United States, seventeenth clause of the eighth section of the first article, reads as follows:

The Congress shall have power "To exercise exclusive Legislation in all Cases whatsoever, over such District (not exceeding ten Miles square) as may, by Cession of particular States, and the Acceptance of Congress, become the Seat of the Government of the United States, and to exercise like Authority over all Places purchased by the Consent of the Legislature of the State in which the Same shall be, for the Erection of Forts, Magazines, Arsenals, dock-Yards, and other needful Buildings."

The Organic Laws of the United States of America:

Sec. 355. "No public money shall be expended upon any site or land purchased by the United States for the purposes of erecting thereon any armory, arsenal, fort, fortification, navy-yard, custom-house, light-house, or other public building, of any kind whatever, until the written opinion of the Attorney-General shall be had in favor of the validity of the title, nor until the consent of the legislature of the State in which the land or site may be, to such purchase, has been given. The district attorneys of the United States, upon the application of the Attorney-General, shall furnish any assistance or information in their power in relation to the titles of

Title to Land to be Purchased by the United States.

the public property lying within their respective districts. And the Secretaries of the Departments, upon the application of the Attorney-General, shall procure any additional evidence of title which he may deem necessary, and which may not be in the possession of the officers of the Government, and the expense of procuring it shall be paid out of the appropriations made for the contingencies of the Departments respectively."

Sec. 1838. "The President of the United States is authorized to procure the assent of the legislature of any State, within which any purchase of land has been made for the erection of forts, magazines, arsenals, dock-yards, and other needful buildings, without such consent having been obtained."

Assent of States to Purchase of Lands for Forts, etc.

Original Purchases (13)
(Made in 1880 - 1881)

An Act giving the consent of the Legislature of the State of New Jersey to the purchase by the United States of land within the state for public purposes. (See page 139 Laws of New Jersey 1880).

1. Be it enacted by the Senate and General Assembly of the State of New Jersey, That the consent of the legislature of New Jersey be, and the same is hereby given to the Purchase by the Government of the United States, or under the authority of the same, of any tract, piece or parcel of land from any individual or individuals, bodies politic or corporate, within the boundaries or limits of the state, for the purpose of erecting thereon magazines and other needful buildings to be used as a powder depot for the ordnance department of the United States Army; and all deeds, conveyances of title papers for the same shall be recorded as in other cases upon the land records of the county in which the land so conveyed may be: the consent herein and hereby given being in accordance with the seventeenth clause of the eighth section of the first article of the Constitution of the United States, and with the Acts of Congress in such cases made and provided.

Exclusive Jurisdiction

2. And be it enacted, That this act shall take effect immediately.

Approved March 10, 1880.

Robinson Farm Purchase

Excerpt of War Department Bulletin #39, dated July 7, 1917, publishing appropriations for the Military and Naval Establishments:

"The appropriation of $7,500 made in the sundry civil appropriation act, approved July first, nineteen hundred and sixteen, for the purchase of land in connection with the Picatinny Arsenal, is made available until June thirtieth, nineteen hundred and eighteen."

Chapter 112.

An Act giving the consent of the Legislature of the State of New Jersey to the purchase by the United States of lands within the State for Public purposes.

BE IT ENACTED by the Senate and General Assembly of the State of New Jersey:

That the consent of the Legislature of New Jersey be, and the same is hereby given, to the purchase by the Government of the United States, or under the authority of the same of any land or lands adjoining, adjacent or contiguous to the present United States Military Reservation of Picatinny Arsenal, situate, lying and being in the county of Morris, and State of New Jersey, and all deeds, conveyances of title and like papers for the same shall be recorded as in other cases upon the land records of the county in which the land so conveyed may be; the consent herein and hereby given being in accordance with the seventeenth clause of the eighth section of the first article of the Constitution of the United States and with the acts of Congress in such cases made and provided.

Exclusive Jurisdiction

2. All acts or parts of acts inconsistent with this act are hereby repealed.

3. This act shall take effect immediately.

Approved February 22, 1918.

State Act Ceding Jurisdiction (13)

An Act Ceding to the United States Jurisdiction over Lands acquired for public purposes within this state. (P.L. 1907, p. 43)

120. Consent to acquisition of land by United States. Sec. 1. The consent of the state of New Jersey is hereby given, pursuant to the provisions of article one, section eight, paragraph seventeen, of the constitution of the United States, to the acquisition by the United States, by purchase, condemnation or otherwise, of any land within this state, for the erection of dockyards, custom houses, court houses or post offices or other needful buildings. (P.L. 1907, p. 43).

121. Exclusive jurisdiction ceded, except as to service of process of state - Sec. 2. Exclusive jurisdiction in and over any land so acquired by the United States is hereby ceded to the United States for all purposes except the service of process issued out of any of the courts of this state in any civil or criminal proceeding, but such jurisdiction shall continue only so long as the United States shall retain ownership of said lands. (P.L. 1907, p. 43).

122. Jurisdiction not to vest until title acquired; land exempted from taxes, etc. - Sec. 3. The jurisdiction hereby ceded shall not vest until the United States shall have actually acquired ownership of said lands, and so long as said lands shall remain in the ownership of the United States the same shall be exempt from any and all taxes, assessments or other charges leviable by this state or any of its municipalities. (P.L. 1907, p. 43).

Note: The legislative acts giving consent to the original and Robinson Farm purchases, carrying as they do, consent in accordance with the seventeenth clause of the eighth section of the first article of the Constitution of the United States (See first paragraph, this chapter), abrogates that portion of paragraph numbered 121, of the 1907 Legislative Act, which excepts the service of process in any civil or criminal proceedings; on land at present comprising the purchased sections of the Reservation of Picatinny Arsenal, as is evidenced by the following communication:

O.O. 682/546 1st Ind. JGB/ghm
Picatinny Arsenal.)

Ordnance Office, Washington, February 6, 1922. To the Commanding Officer, Picatinny Arsenal.

1. Picatinny Arsenal was ceded to the United States by an Act of the State Legislature approved March 10, 1880, under Article I, Section VIII, Clause XVII of the Constitution of the United States. Under this Act the United States acquired exclusive jurisdiction, and the tax assessor of Rockaway Township can not be obligated by any laws of the State of New Jersey to function upon the area covered by the above mentioned Act.

2. If the tax assessor is still doubtful as to his obligation to obtain a statement of the valuation of the real and personal property at Picatinny Arsenal, it is suggested that he refer the matter to the Attorney General of the State of New Jersey who will, without doubt, confirm the above statement.

By order of the Chief of Ordnance:

J. G. BOOTON,
Major, Ord.Dept.

Effect of Being Stationed at a Place, within a State, over Which the United States Exercises Exclusive Jurisdiction (11)

Where exclusive jurisdiction over a military reservation or post situated within a State is vested in the United States, either by its having expressly reserved the same upon the admission of the State, or by means of the subsequent cession of its own jurisdiction by the State, (or--what is equivalent--the consent of the State to the purchase of the land by the United States) the persons stationed or commorant upon the premises become isolated, both territorially and as respects their civil relations. In a political sense, the land is no longer a part of the soil of the State, nor are the occupants inhabitants of the State. They are severed from the enjoyment of the rights, and from subjection to the liabilities, of the citizens of the State as entirely as if they were residents of a foreign country. They have no more right to vote in the State, to send their children to the public schools, to use the public libraries, to be protected by the police or fire department, etc., than have the citizens of another State. Such opportunities of this class--the use of the public schools or libraries, for example--as may be extended to them are extended as privileges, not as rights. On the other hand, they cannot legally be taxed by the State or municipality for their personal property held on the premises, or be required to perform militia duty, or to serve on juries, or to furnish labor on the roads, etc., in the State. Nor are they subject to the civil or criminal process of the local courts except in so far as the right to execute the same may legally have been reserved to the State; as where--as has been not unusual, and in order that the reservation or place may not serve as an asylum for criminals, debtors etc., the State has reserved the right to execute within the premises process issued by its courts on account of criminal offences committed or causes of action initiated without the same. In all other cases such persons are subject to the jurisdiction and processes only of the United States courts and authorities. This is the status not only of the officers and soldiers stationed at the post but of the civil employees and persons permitted to reside upon the reservation.

Where indeed the State legislature has gone further, and, in professing to surrender jurisdiction to the United States, has reserved

to itself a general concurrent jurisdiction over the premises, the grant is not one of exclusive jurisdiction within the sense or meaning of the Constitution. In such case the qualification so far nullifies the grant that the amenability of the military and other persons indicated to the local jurisdiction remains practically unchanged, and the effect above described upon their status is not produced.

The distinction, it may here be noted, has been taken by the Supreme Court, in a case decided in 1885, between the effect of a consent, such as is contemplated by the Constitution, given by a State to the purchase of land within its limits by the United States, and that of a cession of jurisdiction by the State over such land. In the former case an exclusive jurisdiction is vested in the United States absolutely and unconditionally. In the latter only such jurisdiction is vested as is granted, and the State may attach to its grant any condition "not inconsistent with the effective use of the property" by the United States; and, the grant thus qualified being accepted, the condition becomes legal and operative. Thus, in the case referred to, the State of Kansas, in ceding to the United States "exclusive jurisdiction" over the Fort Leavenworth reservation, retained for itself the right to tax the property, on the reservation, of a railroad company. The United States not dissenting from the condition, it was held by the Court that the company was liable to the State for the taxes imposed. So a State, in making such a cession, might reserve the right to tax private property held at the post. It is probable, however, that the Government would not accept a grant burdened with such a condition, but would reject it--as it has heretofore rejected grants coupled with reservations incompatible with the exercise of exclusive jurisdiction, such as the reservation of "concurrent jurisdiction," on the part of the State.

It may be noted that where the United States has not, either by an original reservation in admitting the State, or by means of a cession from the State, or a consent to purchase given by its legislature become vested with exclusive jurisdiction over a military reservation or post, such jurisdiction does not attach to it by the mere fact that it is the owner of the land, or that the same has been duly set apart as a reservation, or been occupied, (for however long a time), as a military fort or post. In the absence of exclusive jurisdiction vested as above, the land remains part of the territory of the State, and writs and processes of the State courts may be executed thereon in the same manner and with the same effect as on any other premises within the State limits. To duly vest such jurisdiction, the action of the sovereign, the State, remains essential.

Winthrop Military Law & Precedents - 1920.

Roads

Closing of Middle Forge Road (11)

In re closing of road through U.S. Powder Depot, beginning at northerly corner of Walton place and running thence northwesterly to Middle Forge, etc.

At a Court of Common Pleas held at Morristown in and for the County of Morris on Tuesday, the eighteenth day of January 1881 -

In the matter of the application of P. H. Parker and others for the vacation of a public road in the Township of Rockaway	Appointment of Surveyors

Application being made to the Court by P. H. Parker and others, ten freeholders and residents of the County of Morris that they think a public road in the township of Rockaway in said County, beginning at the

northerly corner of the Walton Place near Middle Forge and running thence northwesterly to Middle Forge and after crossing the east branch of the Rockaway River, turning southwesterly and extending to the junction of said road with the road leading from Mount Hope to Berkshire Valley to be unnecessary, and due proof being made that at least ten days previous notice was given of such intended application, and of the day on which said application was intended to be made by advertisements, under the hands of said applicants set up at three of the most public places in the township of Rockaway in which the said road is proposed to be vacated.

It is ordered that Matthias D. Kitchel and Peter Freeman of Rockaway Township, Edward Stickle and Samuel A. Timbrook of Boonton Township, and Abraham Hopper and John P. Decker of Pequannock Township, six surveyors of the highways of said County be and they are appointed accordingly, regard having been had to the appointment of the Surveyors of that township where the said road is applied for to be laid; which said Surveyors shall meet at the house of Uel H. Higgins in said township of Rockaway near Middle Forge on the eighth day of February next at the hour of ten in the forenoon.

A true copy from the minutes.

(Signed) Melvin S. Condit
Clerk.

Whereas the Court of Common Pleas of the County of Morris at a Court held at Morristown in and for the County of Morris on Tuesday the eighteenth day of January 1881 did order and appoint as follows:

In the matter of the application of P. H. Parker and others for the vacation of a public road in the Township of Rockaway.

Appointment of Surveyors.

Application being made to the Court by P. H. Parker and others, ten Freeholders and residents of the County of Morris that they think a public road in the Township of Rockaway in said County - Beginning at the northerly corner of the Walton Place near Middle Forge and running thence northwesterly to Middle Forge and after crossing the east branch of the Rockaway River turning southeasterly and extending to the junction of said road with the road leading from Mount Hope to Berkshire Valley to be unnecessary and due proof being made that at least ten days previous notice was given of such intended application and of the day on which said application was intended to be made by advertisements under the hands of said applicants set up at three of the most public places in the township of Rockaway in which the said road is proposed to be vacated -

It is ordered that Matthias D. Kitchel and Peter Freeman of Rockaway Township, Edward Stickle and Samuel A. Timbrook of Boonton Township and Abraham Hopper and John P. Decker of Pequannock Township six surveyors of the highways of said County be and they are appointed accordingly by regard having been had to the appointment of the Surveyors of that Township where the said road is applied for to be vacated which said surveyors shall meet at the house of Uel H. Higgins in said Township of Rockaway near Middle Forge on the eighth day of February next at the hour of ten in the forenoon.

Now we the Surveyors of the highways aforesaid do certify and return that Matthias D. Kitchel, Peter Freeman, Edward Stickle,

Samuel A. Timbrook, Abraham Hopper and John P. Decker all said Surveyors met at the time and place in the said order specified and due proof being made to us that the advertisements of our said meeting had been set up according to law on which we decided and having viewed the premises we whose names are hereto subscribed think and adjudge the said public road to be unnecessary and we do vacate the same, to wit, all that road beginning at the northerly corner of the Zalton Place near Middle Forge and running thence north about twenty two degrees west to Middle Forge and crossing the east branch of the Rockaway River about forty two chains thence south about fifty seven degrees west about sixty one chains to the junction of said road with the road leading from Mount Hope to Berkshire Valley, and do herewith return a map and draught of the said road with reference to the most remarkable places and improvements through which it passes.

Witness our hands this eighth day of February A. D. Eighteen hundred and eighty one.

(Signed) Matthias D. Kitchel
(Signed) Peter Freeman
(Signed) Edward Stickle
(Signed) Samuel A. Timbrook
(Signed) Abm. Hopper
(Signed) John P. Decker

State of New Jersey)
County of Morris) ss. I, Melvin S. Condit, Clerk of the

Court of Common Pleas held in and for said County do hereby certify that the foregoing is a true copy of the Return made by the Surveyors of Highways in the above stated matter as fully as the same remains in my offices.

In testimony whereof I have hereunto set my hand and affixed the seal of said Court at Morristown this 28th day of February A. D. Eighteen hundred and eighty one.

(Signed) Melvin S. Condit
Clerk

(Morris County Seal)

Note: This road is described in the 9th to 16th lines, first column, page 8.

AGREEMENT

The Union Turnpike Company
with the
United States of America (11)

Agreement made October 25th A. D. 1883, Between The Union Turnpike Company a corporation of the State of New Jersey of the first part, and the United States of America of the second part:

Whereas said Turnpike Company owns and operates a certain turnpike road in said state of New Jersey leading from the town of Dover in the County of Morris to the village of Sparta in the County of Sussex in said state, and known as the Union Turnpike Road, and said Company is in the habit of demanding and receiving tolls from such persons as may pass over said road;

And whereas the United States has constructed a new road in said County of Morris known as the Government Road leading from the village of Spicertown near said turnpike road to the United States Powder Depot, and is about to straighten and improve the old road now existing which leads from said Spicertown to said turnpike in such manner that said road as straightened shall lead into said turnpike at a point a short distance north of the intersection of said turnpike with the road leading therefrom to the village of Port Oram, and also to grade that part of the turnpike lying between the said point of intersection and the Port Oram road;

Now therefore the said Union Turnpike Company in consideration of the premises hereby covenants and agrees that at any and all times hereafter all and every the agents, servants, and employees of the United States of America, and their horses, wagons, carriages and cattle shall and may travel upon and pass over the said turnpike road at any and all points lying between Port Oram and the intersection of said straightened road with said turnpike, free of toll or other charge; and also that the United States shall and may freely transport any and all freight, baggage and supplies whatsoever over that portion of said turnpike which lies between said straightened road and said road leading to Port Oram.

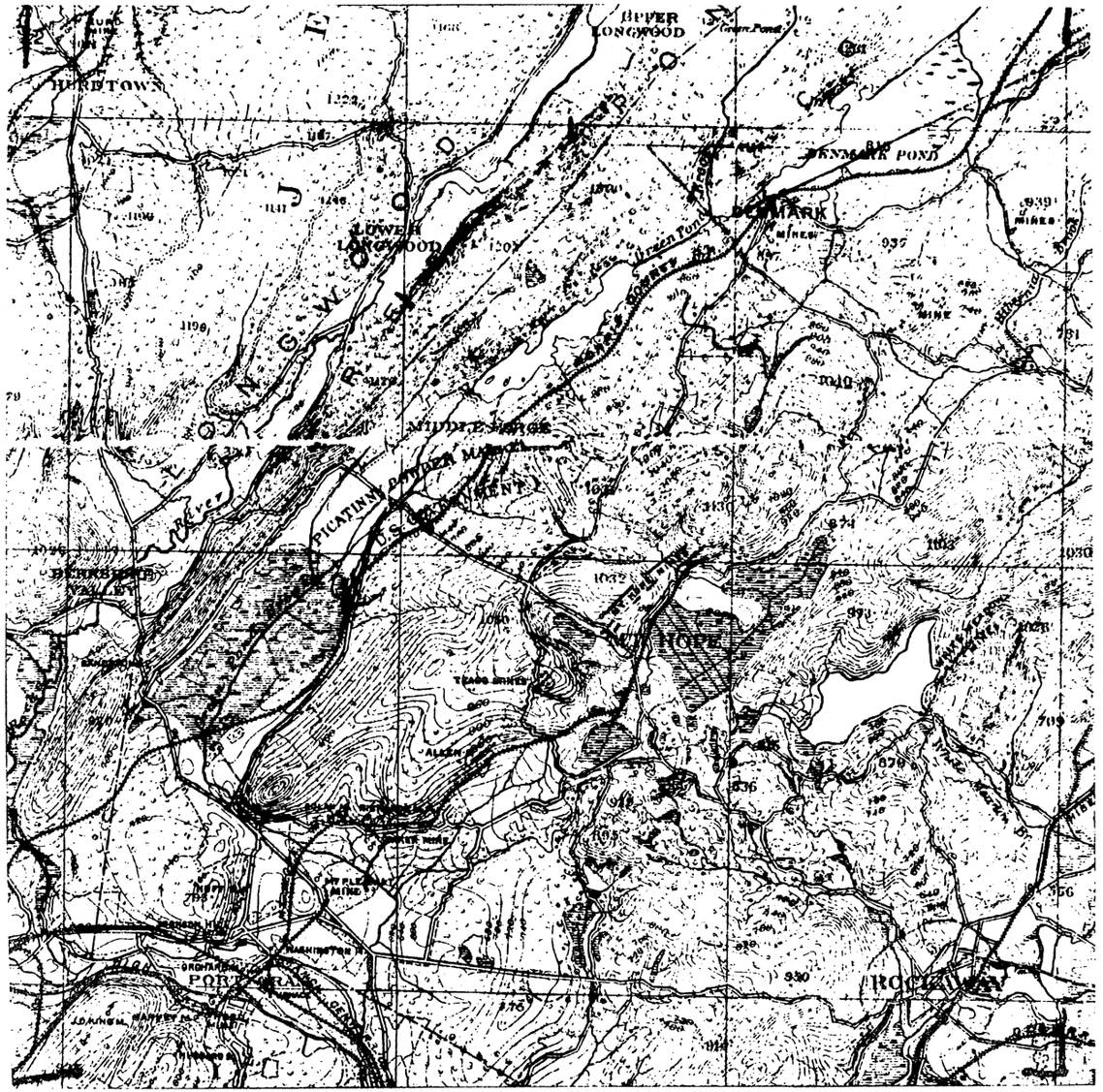
In witness whereof said Union Turnpike Company has caused to be hereunto set its corporate seal and the hand of its president, and the United States of America has caused these presents to be signed by Major Joseph P. Farley, Ordnance Department, U. S. Army, the day and year first above written.

Witness as to Major J.P. Farley
Robt. N. Hughes

(Sgd) J. P. Farley
Major, Ordnance Dept.

Witness to John Boss
Geo. N. Boss

(Sgd) John Boss
President, Turnpike Co.



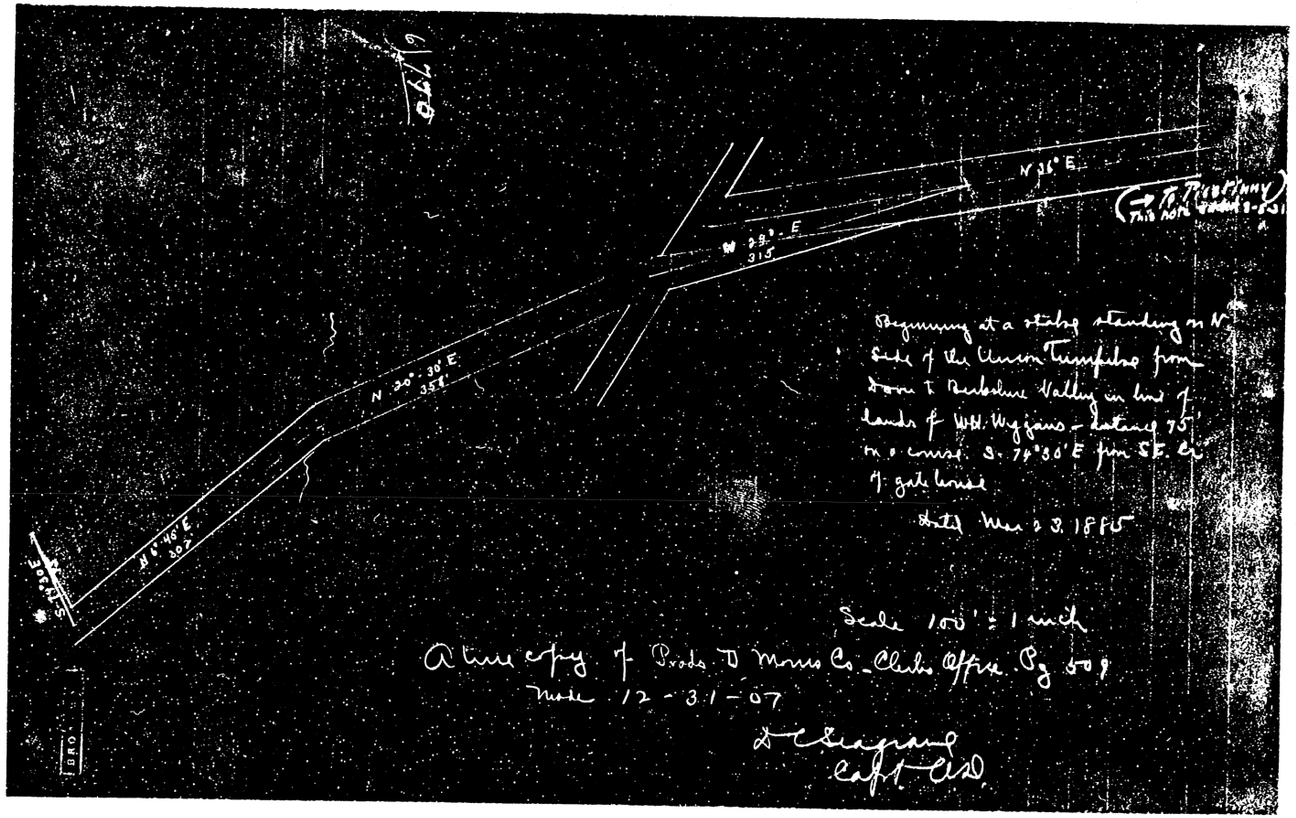
Extension of Government Road to the Dover-Sparta Turnpike

As may be seen by reference to the map on page 26, the Government Road ends at its intersection with the road to Spicertown. The map, this page, taken from a topographical map (on file in the Engineering Department) of the Central Highlands, printed in 1898, shows this road paralleling the Dover-Sparta turnpike and ending in the road leading up from Port Oram (Wharton) to Mt. Hope. This road, then, was formerly the way in to Spicertown, and trace of it may still be seen midway up the slope from the stream (Green Pond Brook). The extension of the Government Road past Spicertown is a township road, description as follows:

Description of Township Road connecting the Government Road at Spicertown with the Union Turnpike at Mount Pleasant (11)

The owners of the land having made a public dedication of a road running from a place called Spicertown to the Union Turnpike road at Mount Pleasant according to a map herewith filed and asked the Township of Rockaway to accept the same, the committee adopt said road as one of the public highways of the township and direct that it be added to District No. 1. The description of said road is as follows:

Beginning at a point on the north side of the Union Turnpike road leading from Dover to Berkshire Valley in line of lands of Uel H. Wiggins distant 75 feet in a course S 74° 30' E from the southeast corner of the toll gate house and running thence (1) N 6° 45' E 302 feet; thence (2) N 20° 30' E 358 feet; thence (3) N 29° E 315 feet, to a point from which a private road has recently been built by the United States Government to their Powder Depot.



It was further ordered that a copy of the above resolution and the map accompanying the application and showing the road so adopted be filed in the County Clerks Office.

Dated Rockaway, N.J., March 14th, 1885.

A true copy of an abstract from the minutes of the Township Committee dated March 14th 1885.

(Signed) Wm. Daddow.
Township Clerk of Rockaway Township.

Railroad

AN ACT to grant the right of way for railroad purposes through the lands of the United States powder-depot near Dover, New Jersey.

Promulgated in General Orders No. 110, A.G.O. 1882 (11)

BE IT ENACTED BY THE SENATE AND HOUSE OF REPRESENTATIVES OF THE UNITED STATES OF AMERICA IN CONGRESS ASSEMBLED, That the right of way, not exceeding one hundred feet in width, through the lands of the United States included in the Piccatinny powder-depot, near Dover, in the State of New Jersey, is hereby granted to the Central Railroad Company of New Jersey for the purpose of constructing a railroad: PROVIDED, That the said right of way, and the width and location thereof, through said lands, and the regulations for operating said railroad within the limits of the reservation so as to prevent all danger to public property, shall be submitted to and approved by the Secretary of War prior to any entry on said lands or the commencement of the construction of said works: PROVIDED ALSO, That such sidings, tracks, switches, and loading stations as may at any time be required by the Secretary of War shall be promptly provided by said railroad company; and that such stoppage of trains and generally such facilities and privileges as the United States may desire for the shipment of materials of war at any time shall be provided by said railroad company: PROVIDED ALSO, That whenever said right of way shall cease to be used for the purposes aforesaid the same shall revert to the United States: AND PROVIDED FURTHER, That the right to repeal, alter, or amend this act is reserved to Congress.

Approved July 31, 1882.

See also PA 53 1 c
66 3
for further regulations

AND whereas said Central Railroad Company have not used said grant or built or constructed said railroad, or any part thereof, but, on the contrary, have expressly waived their right to the same and to all rights which they may have acquired under said act of Congress:

AND whereas it is desirable that the said railroad should be built and it is now proposed to be built by the Morris County Railroad Company, subject only to the action of Congress in the matter; therefore,

BE IT ENACTED BY THE SENATE AND HOUSE OF REPRESENTATIVES OF THE UNITED STATES OF AMERICA IN CONGRESS ASSEMBLED, That the right of way, not exceeding one hundred feet in width, through the lands of the United States included in the Picatinny powder-depot, near Dover in the State of New Jersey, is hereby granted to the Morris County Railroad Company of New Jersey for the purpose of constructing a railroad: PROVIDED, That the said right of way, and the width and location thereof, through said lands, and the regulations for operating said railroad within the limits of the reservation so as to prevent all danger to public property, shall be submitted to and approved by the Secretary of War prior to any entry on said lands or the commencement of the construction of said works: PROVIDED ALSO, That such sidings, tracks, switches, and loading-stations as may at any time be required by the Secretary of War shall be promptly provided by said railroad company; and that such stoppage of trains and generally such facilities and privileges as the United States may desire for the shipment of materials of War, at any time, shall be provided by said railroad company: PROVIDED ALSO, That whenever said right of way shall cease to be used for the purpose aforesaid the same shall revert to the United States: AND PROVIDED FURTHER, That the right to repeal, alter or amend this act is reserved to Congress.

SEC. 2. That the authority heretofore granted to the Central Railroad of New Jersey to construct a railroad through the property of the United States used by the Government as a powder-depot, near Dover, New Jersey, be, and the same is hereby repealed.

Approved, May 6, 1886.

Authority of the War Department and conditions under which the Morris County Railroad Company may enter the Lands of the United States at the United States Powder Depot.

Whereas by an Act of Congress entitled an Act to grant the right of way for railroad purposes through the lands of the United States powder-depot near Dover, New Jersey, to the Morris County Railroad Company approved May 6th, 1886, it was enacted that the right of way, not exceeding one hundred feet in width, through the lands of the United States included in the Picatinny powder-depot, near Dover, in the State of New Jersey, is hereby granted to the Morris County Railroad Company of New Jersey for the purpose of constructing a railroad: PROVIDED, That the said right of way, and the width and location thereof, through said lands, and the regulations for operating said railroad within the limits of the reservation so as to prevent all danger to public property shall be submitted to and approved by the Secretary of War prior to any entry on said lands or the commencement of the construction of said works: PROVIDED ALSO, That such sidings, tracks, switches and loading stations as may at any time be required by the Secretary of War shall be promptly provided by said railroad company; and that such stoppage of trains and generally such facilities and privileges as the United States may desire for the shipment of materials of War at any time shall be provided by said railroad company: PROVIDED ALSO, That whenever said right of way

shall cease to be used for the purpose aforesaid the same shall revert to the United States: AND PROVIDED FURTHER, That the right to repeal, alter, or amend this act is reserved to Congress.

AND whereas, the Morris County Railroad Company aforesaid, pursuant to the provisions and requirements of the Act of Congress aforesaid, has submitted to the Secretary of War certain maps and plans showing the right of way and the width and location thereof through the lands aforesaid; and has also submitted to the Secretary of War certain regulations for operating said railroad within the limits of the reservation aforesaid so as to prevent all danger to public property; which said regulations are in the following words and figures:

1st. The locomotives shall burn coal and be equipped with the latest and most successful devices for spark arresting.

2d. The railroad company shall promptly provide such sidings, tracks, switches, and loading stations as may at any time be required by the Secretary of War.

3rd. The railroad company shall move or change the track at any point in such manner as the Secretary may direct, whenever in his opinion the safety of the government property demands it.

4th. The use of the railroad for government hand cars, tricycles, dummy engines etc., shall be permitted by the railroad company for a reasonable consideration subject to the prescribed rules of the company for safety of persons and property.

5th. A telephone or telephones shall be placed at such points as the President of the railroad company and the Commanding Officer of the United States powder depot may determine to be for the interests of all parties concerned.

6th. The railroad company shall accept at any time modifications in the rules at present established for operating the railroad within the limits of the government reservation whenever the Secretary of War shall decide such modifications to be necessary.

Now Know All Men by these Presents that I, William C. Endicott, Secretary of War, by virtue of the authority vested in me by the Act of Congress aforesaid, do hereby ratify and approve the right of way and the width and location thereof, of the Morris County Railroad Company of New Jersey, as laid down on the maps and plans submitted to me by the said Company as aforesaid; and which for more certain and particular identification are annexed to and made part of this Instrument; and all and singular the regulations for operating said railroad within the limits of the reservation aforesaid, submitted to me by the said railroad company as aforesaid, I do hereby approve and confirm.

In witness whereof I have hereunto set my hand and caused the seal of the War Department to be affixed this thirteenth day of November 1886.

(Sgd) Wm. C. Endicott
(Seal) Secretary of War.

This instrument is also executed by the Morris County Railroad Company by its President, Garret A. Hobart this fifth day of November 1886, in testimony of the acceptance by said Company of the provisions and conditions of the Act of Congress granting the right

of way to said company as aforesaid, and the acceptance by said company of the maps, plans, and regulations for operating its railroad as set forth in this Instrument.

The Morris County Railroad Co.
(Signed) Garret A. Hobart
President.

Authority for the construction and use of spur track connecting with the Navy side track to the new Picatinny Tetryl Area. (21)

DEPARTMENT OF THE NAVY
Washington, D.C. Dec. 29, 1930.

The Honorable
The Secretary of War,
Washington, D. C.

Sir:

Reference is made to your letter of November 10, 1930, transmitting a copy of Wharton and Northern Railroad drawing No. 11579 A-6, showing the main track of the said railroad and the Navy side track constructed on the Picatinny Arsenal property. Permission is requested of the Navy Department to connect to the Navy side track a proposed spur track to permit the Wharton and Northern Railroad to spot the acid and benzol cars on the proposed spur and remove supplies in connection with the operation of a new tetryl plant now being erected south of the Navy side track and west of the Naval Ammunition Depot, Lake Denmark, N. J.

I have the honor to inform you that permission is hereby granted the War Department to connect at the location shown on the aforesaid drawing, a photostat copy of which is herewith enclosed, the proposed spur track and to use the Navy side track for the purpose of permitting the Wharton and Northern Railroad to transport material to and from the new tetryl plant to be operated by the Army authorities.

The above mentioned permission is granted with the understanding that the War Department will undertake the work necessary to connect the spur track under such restrictions, if any, as the Inspector of Ordnance in Charge, Naval Ammunition Depot, may consider proper, and that the use of the Navy tracks will in no way interfere with the activities of the Naval Ammunition Depot.

Very respectfully,

W. D. DAVIS,
Secretary of the Navy.

Power, Light, and Telephone (9)

Revocable license to the New Jersey Power and Light Company, dated May 8, 1924, to construct and maintain a Power Line for transmitting Electric current at an annual rental of $1.00. (P.A. 463.1/152-5)

Revocable license to the New York Telephone Company of New York City, dated April 25, 1924 to construct and maintain a telephone line. Consideration involved, $1.00.

License to construct transmission line from Cannon Gate, dated June 18, 1927, until revoked, granted the New Jersey Power and Light Company. (P.A. 675/16-1)

Right-of-way for electric transmission line, dated January 18, 1927, until revoked, granted the New Jersey Power and Light Company. (P.A. 675/12-2)

Revocable License to install telephone, pay station, in the Post Hospital, Building No. 49, in accordance with General Order No. 4, Headquarters, 2nd Corps Area, 1922. Annual rental $1.00. (P.A. 483.2/382)

Easement dated July 17, 1931 between the Wharton & Northern Railroad Company and the United States of America for the United States to install one 30-inch cast iron casing pipe conduit across the right-of-way and under the tracks of the Wharton & Northern Railroad, near old Factory Station; the conduits to be used, etc., solely for steam, water and air pipe lines and for electric, telephone and fire alarm cables. Period - As long as Railroad Company occupies the right-of-way. Consideration - Nothing. Reference - P.A. 600.913/148-246-23-4.

License dated October 19, 1931, granting the United States permission to make wire attachments to poles forming part of an existing pole line of the New Jersey Power & Light Company on Picatinny Arsenal reservation as shown in red on P-6719 - December 14, 1926, and covered by license dated January 18, 1927, P.A. 675/12-2. Period - As long as Power Company's license remains in force. Consideration - Nothing. Reference P.A. 682.43/2-10.

Revocable License dated October 20, 1931 for New Jersey Bell Telephone Company to operate and maintain existing telephone pole line over and along government road from Spicertown, N. J., to Arsenal Reservation and through reservation to intersection of Mount Hope Avenue. For period of five (5) years from October 20, 1931. Consideration $82.00 per annum. Reference P.A. 483.2/422-7.

CHAPTER VII
Development of the Arsenal
(1,2,3,9,14.)

Designation

The depot was designated the Dover Powder Depot by Special Orders No. 189 of September 6, 1880, assigning Major F. H. Parker, Ordnance Department, to command.

Four days later, by Special Orders No. 193 of September 10, 1880, the name was changed to the Picatinny Powder Depot.

In June 1893, the name was changed to the U.S. Powder Depot, which name was retained until October 1907, when the name was changed to Picatinny Arsenal, the present designation.

Preliminary Factors

No work could be commenced until the purchase of at least a Portion of the land was fully consummated and the title vested in the United States, although the agreement to buy it was made and the searches of title required by law was in progress. It was only on the 15th of March, 1881, about a year after this tract was selected and negotiations were first opened for its purchase, that the legal formalities were terminated and the last of the purchases was pronounced ready to be completed by the payment of the Purchase money.

The survey of the tract was commenced March 30, 1880, the work of which was laborious and slow, owing to the rough and difficult character of the country over which the lines were run; steep, rocky

mountains, valleys, streams lake, thick woods, and brush intervened, and the greatest difficulty existed in finding old corners; and when they were found and agreed upon by the adjacent owners, they were accepted and run to, but where they could not be found, the lines were run by the old deeds, such allowance being made for the variation of the needle as was found to exist on those courses where the old corners were undisputed. The tract is irregular in shape; there are many sides; some of the courses are long, and the distances seldom agreed with those given in the old deeds, the surveys for which were carelessly made. Twenty-two masonry monuments, to permanently mark the boundaries of the government tract, have been built at the principal outside corners, which in some cases was a work of considerable difficulty, it being necessary to carry material on mule's backs to the points on the mountains inaccessible by other means of transportation.

The farm houses and other buildings on the place were of the poorest description, old and dilapidated; most of them were, however, repaired and put into use, as for instance, one old building was turned into a carpenter shop and lumber storehouse.

Original Purpose

The purpose for which the Post was established was for storing powder, projectiles, and explosives, both for reserve supply and for issue; also for the preparation and issue of these stores.

The original intention of erecting a black powder mill was never put into effect, and it continued as a Powder Depot until 1907, when the erection of a smokeless powder factory was begun.

Railroad

The remoteness of the powder depot tract from rail or water communication was the principal objection to its selection, and the selection was made with the understanding that we should build a branch railroad from Port Oram (Wharton), a distance of three miles to connect with the Delaware, Lackawanna & Western Railroad, the High Bridge Branch of the Central Railroad of New Jersey, and with the Morris Canal, thus giving complete rail communication in all directions for receiving and issuing all building material and powder.

During the winter of 1881, a proposition was made by responsible railroad men to build a road from Port Oram thru the powder depot land to connect with the Midland Railroad of New Jersey, and by it with other northern roads, provided some assistance would be given by the United States. It was proposed by them that one-half of the expense of building the road thru the Government land should be borne by the United States, in consideration of which they were to build and operate the road, giving the United States certain privileges. The scheme was submitted and efforts made to get the necessary appropriation from Congress, but were not attended with success.

In the year 1882, an act of Congress (See Chapter VI) was passed granting the Central Railroad Company of New Jersey the right of way, not exceeding 100 feet in width, thru the lands of the Picatinny Powder Depot for the purpose of constructing a railroad.

The central Railroad Company not having used said grant or built said railroad, and having waived their right to same, the authority granted was repealed.

During 1886, an act of Congress (See Chapter VI) was passed granting the Morris County Railroad Company of New Jersey the right to build the railroad, and it was completed in June, 1887. The road has twenty-three and one-half miles of main track, connecting with the Delaware, Lackawanna & Western Railroad and the Central Railroad of New Jersey at Wharton, and with the Erie Railroad at Green Pond Junction, enjoying an extensive cross-over business between these roads.

Development

The development of the Arsenal may be divided into phases, the 1st Phase extending to the year 1902 and being one of gradual construction, with the ultimate idea of an establishment for the storage of powder.

In 1897 the making of cartridge bags and the loading of charges for separate loading ammunition was begun at Picatinny.

Up to about 1898, the only high explosive used for projectile bursting charges was gun cotton, but other explosives began to receive attention about that time. Dr. Tuttle's Thorite was tested in 1898 and favorably reported upon. This explosive was used to a limited extent, but Maximite and Explosive "D" were soon found superior to it.

About the year 1900 the need of a storage place for Armor Piercing Projectiles and High Explosives began to receive serious attention. Six projectile sheds were erected in 1902, and in the following year the installation of a plant for filling projectiles with Explosive "D" was begun. We may term this the beginning of the 2nd Phase of development. A temporary plant, consisting of a Boiler House and Loading House, was also erected in 1903 for filling projectiles with Maximite, and the work of loading projectiles was begun in July of that year.

This temporary Maximite Loading Plant was continued in operation for some time and several thousand armor piercing projectiles of various calibers were filled; but Explosive "D" soon displaced Maximite for bursting charges, and in 1906 and 1907 the projectiles that had been filled with Maximite were unloaded.

The Plant for loading projectiles with Explosive "D" was put into operation in 1904 and was continued in operation for some time; but in 1906 the policy of loading projectiles by hand at fortifications was adopted, and the plant has been held in reserve since that time.

A power house (wheel and dynamo house) and shop building were erected in 1906, and machinery installed for the capping, grooving, tapping and banding of projectiles. A building in which to assemble fixed ammunition was also erected at this time but the plan of assembling fixed ammunition was afterwards abandoned. The building was used temporarily as a Chemical Laboratory, and later altered for the installation of a High Explosive Plant.

The 3rd Phase of development of the Arsenal began in 1906, the fortification Bill approved June 25, 1906, containing the following item:

"For the erection and equipment of a powder factory, with its necessary communications and accessory structures, upon such reservation now or that may hereafter be under the control of the War Department as may be selected by the Secretary of War, $165,000.00."

A Board of Officers consisting of Lieut. Col. Rogers Birnie and Majors Beverly W. Dunn and Odus C. Horney, Ord. Dept., U. S. A., was appointed on August 24, 1906 to select a suitable site for an Army Powder Factory.

The Board inspected the U. S. Reservation at Fort Montgomery, just below West Point, N. Y., Rock Island Arsenal, St. Louis Arsenal, and the Powder Depot these being the most promising locations under Government control, and recommended that the factory be located either at Rock Island Arsenal or at the Powder Depot. The latter was decided upon by the Secretary of War on the recommendation of the Chief of Ordnance.

The work of preparing plans for the Factory was assigned to Major Dunn, who on May 14, 1907 took command of the Powder Depot. Shortly afterwards he was assigned to duty in New York City with the American Railway Association, and Major Horney assumed command of the Depot on June 10, 1907.

The work of erecting and equipping the Powder Factory was begun in April 1907 and the manufacture of powder was begun in January 1908.

The manufacture of Small Arms powder was not at first provided for, and the daily capacity of the plant (working 24 hours per day) was 3000 pounds of Cannon powder.

Machinery for the manufacture of about 250 to 300 pounds of caliber .30 powder per day was installed in 1908.

The Sundry Civil Bill approved March 4, 1909 contained an item of $175,000 for the enlargement of the powder factory. With the funds thus made available, the capacity of the factory was increased to 9000 pounds in 24 hours, or to approximately two and three quarter millions per annum.

The Sundry Civil Bill approved March 4, 1911 appropriated $20,000 for the installation of a High Explosive Plant, the plant for the manufacture of about 1000 pounds of Explosive "D" (the authorized bursting charge for armor piercing projectiles) per diem, being erected in 1913.

A school of instruction in Chemistry, Explosives and Interior Ballistics was established in November 1911.

The investment in the powder factory and in the training of officers on powder and explosives was repaid many times during the World War when one considers the tremendous responsibilities borne by General Horney, and such officers as Cols. C. T. Harris, Jr., D. C. Seagrave, J. H. Burns, and F. H. Miles, and how much more difficult and trying such positions would have been without the training and experience gained at Picatinny.

Contemporary with the addition of factories there were added the necessary chemical and physical laboratories for the control and test of the material in the manufacturing processes, Major W.H. Tschappat, Ordnance Department (now Brig. General, Chief of Manufacture, Ordnance Department) starting this work. With the development of the work, there came demands for research, testing, and proving, for which equipment was added from time to time.

Shortly prior to the entry of the United States into the

World War the production of smokeless powder was increased, but, with the tremendous capacities developed by private manufacturers, the production of the Arsenal was only a small share of the necessary requirements. In May and June, 1917, it became apparent that considerable storage space would be required by the Ordnance Department for the storage of powder, explosives, and metal components, and Picatinny was selected as the site for a storage project. Under a contract with Stone and Webster fifty-four buildings were constructed for this purpose. Railroad tracks, roads, garage, round house, an addition to main office, power house, and other utilities for the storage project utilized accessible areas to the limit.

After the Armistice in November, 1918, when there were vast quantities of smokeless powder on hand, the manufacture of powder was stopped and Picatinny entered into its fourth phase of development, a Field Service Depot. This status existed for about a year, and then approval was finally obtained for the establishment of an experimental ammunition plant at Picatinny Arsenal. Thus the Arsenal entered into the fifth and present phase of its development, becoming in name a manufacturing arsenal under General Order #76, dated December 28, 1920.

About the middle of August, 1919, active work was begun on the establishment of a small experimental plant for the design and development of artillery ammunition. This project involved the establishment of shops for the experimental manufacture of metal components, renovation of the existing powder factory, and installation of suitable experimental plants for the study of raw materials, high explosives, military pyrotechnics, and trench warfare materials, including a loading plant to load TNT and amatol into bombs and artillery projectiles, for loading fuses, and for the assembling of complete rounds.

As far as practicable, the plants and shops were designed to fit existing structures and to utilize machinery and equipment remaining on hand at the close of the war. The power house was redesigned, equipped with a new boiler plant and an electrical generating system. New electric and steam transmission lines, and new sewer, fire and water systems, were designed and built. It was necessary to modify approximately fifty buildings, some of the work being done by the Arsenal forces but the greater part under contract. In 1921 the Arsenal took over all experimental work on fuses. The technical personnel for the development of metal components was obtained from Frankford Arsenal in 1921, while the personnel for the loading work was drawn from the vicinity or by the employment of men who had had loading experience during the World War. An organization was gradually built up, which by 1926, was able to carry out its mission of experimental and development work, and to load the various components of artillery ammunition, pyrotechnics, and trench warfare material.

The story of advance from 1926 to the present time is one of rehabilitation following the Lake Denmark explosion of that year, the present writing finding the activities of the Arsenal housed in its new and rehabilitated buildings, and the experimental ammunition plant phase of development well advanced to the point of considerable output in production orders. Picatinny is the Ammunition Arsenal of the Army for loading bombs and projectiles of all types above .50 caliber; for the manufacture and loading of all types of pyrotechnics; for the manufacture of smokeless powder, and for its loading into charges; for the assembly into complete rounds of all fixed ammunition above .50 caliber; and for performing chemical laboratory service for the Ordnance Department.

No commercial company is engaged in activities similar to its loading of ammunition. Only one commercial company makes smokeless powder for cannon, and its other functions are found in commercial circles to only a slight extent.

While the research and investigative work is carried on with a view to its adaptation to service material as occasion may warrant, preparedness for war is not lost sight of, and an endeavor is being made to assemble an organization which will form a technical center so far as ammunition is concerned. It is conceived that there would be referred to such an organization in time of war the research and development work similar to that carried on in peace time, except that it would have to be done in the greatest possible haste. It is also conceived that there should be referred to such an organization the larger questions as to whether certain materials not quite in accordance with the drawings or specifications should be accepted; in other words, the technical organization would determine whether the deficiencies were serious enough to cause the rejection of the material.

In case of an emergency, the productive capacity of the Arsenal for smokeless powder and for the loading of artillery ammunition would be relatively small when compared to the tremendous plants which would have to be brought into existence to meet the wartime demand, but in the first line of industrial defense, Picatinny Arsenal holds a prominent place. The material it produces will not only serve to meet urgent requirements of the early stages of war, but the Arsenal has the experience and the necessary equipment installed which could not be acquired readily by a commercial concern. It is, therefore, in a position to instruct and assist industry in what is required of it in an emergency, to train the ammunition inspection forces so that they will be able to perform their duties capably and with dispatch, and to train personnel to be used in government operated war loading plants.

CHAPTER VIII

Buildings, Roads, Maps, Valuation, Personnel - Showing Growth of Arsenal

The first building erected was a magazine, 200 feet by 50 feet, with a six foot basement. Work was begun September 16, 1880, and the building completed in 1881 at a cost of $51,700. It was designed to hold 10,000 barrels of black powder, the only kind of powder then in use.

After having excavated to a depth of about seven (7) feet, the question of security of the foundation arose and necessitated deeper searching into the substrata to determine their character and ability to prevent settling. Having no arrangements for boring, resource was had to digging some 20 feet to water, and until it was found that by going lower we would be no more secure, unless a false foundation of concrete and stone was laid at great expense. Moreover, it was decided that the stratum of hard gravel which had been found at a depth of seven feet, and which varied in thickness from five to eight feet, having underlying it thin strata of sand and thicker strata of gravel, would, if the foundation walls and piers were spread out, prove sufficiently stable. Therefore three feet below cellar floor on the gravel bed the subfoundation walls and piers were spread out to six feet, upon which the three feet foundation walls and piers were built.

The foundation of the building to and including the water-table is of stone quarried on the ground. Green Pond conglomerate, to be found in all sizes from small blocks to large boulders in the debris at the foot of the mountain, was thought, because of its convenience at hand, to be inexpensively adaptable for building the magazine. It was selected from a near convenient spot, and work commenced in getting out the loose stone and laying the subfoundation. But a certain amount of trimming, splitting and cutting was required, even for this rough masonry,

and it was very soon found that the attempt to work it ever so roughly was laborious and expensive, and that for any part that required regular dimensions it was entirely unsuitable. It was, therefore, necessary to prospect for an easier worked stone. It was known that granite cropped out in some few spots on the reservation, and after search a ledge of it was found on the opposite hills, which, although hard to cut, turned out to be suitable building stones. Two quarries were opened about a mile from the magazine, and roads built to them. The conglomerate was abandoned and considerable stone was taken from out these quarries, and hauled and built in the foundation, and a good deal cut for corners, sills and door jambs. The stone was laid in pure cement mortar.

The piers and foundations of this building then, are of stone quarried on the reservation, the walls of brick, and the roof of galvanized iron. The floor consists of brick arches sprung between heavy wrought iron I-beams, leveled with concrete, and covered with yellow pine flooring. The ceiling is supported by a row of iron columns down the center of the building, and consists of brick arches and wrought iron I-beams. The roof trusses are of wrought iron. The walls are lined with matched pine boards with an air space between the boards and the brick wall.

Four other magazines were subsequently erected in accordance with the same plans, except that the basement for storage of tools, powder barrels, etc., was omitted. (1)

These original magazines are now known, respectively, as buildings 20, 43, 38 (destroyed in the 1926 explosion, on the foundation of which is now building No. T-865), 30, and 27.

An approved plan of the Powder Depot dated February 3, 1885, showing existing and proposed buildings, and the plan of the Depot as of April 27, 1891 show in order on the two following pages.

Succeeding growth may be traced by reference to Arsenal maps to be found in the pocket on the back cover page; list as follows:

1. Drg. P-234 - Original location of Parley Avenue (formerly Mt. Hope Avenue; Mt. Hope-Berkshire Valley Road).

2. A, B, & C - Drgs. P-143, 144, 145 - General Plan showing location of present and proposed buildings, railroad, wagon roads, and water system, dated June 28, 1904.

3. Drg. P-250 - Map of United States Reservation, Picatinny, N.J., revision date November 20, 1906.

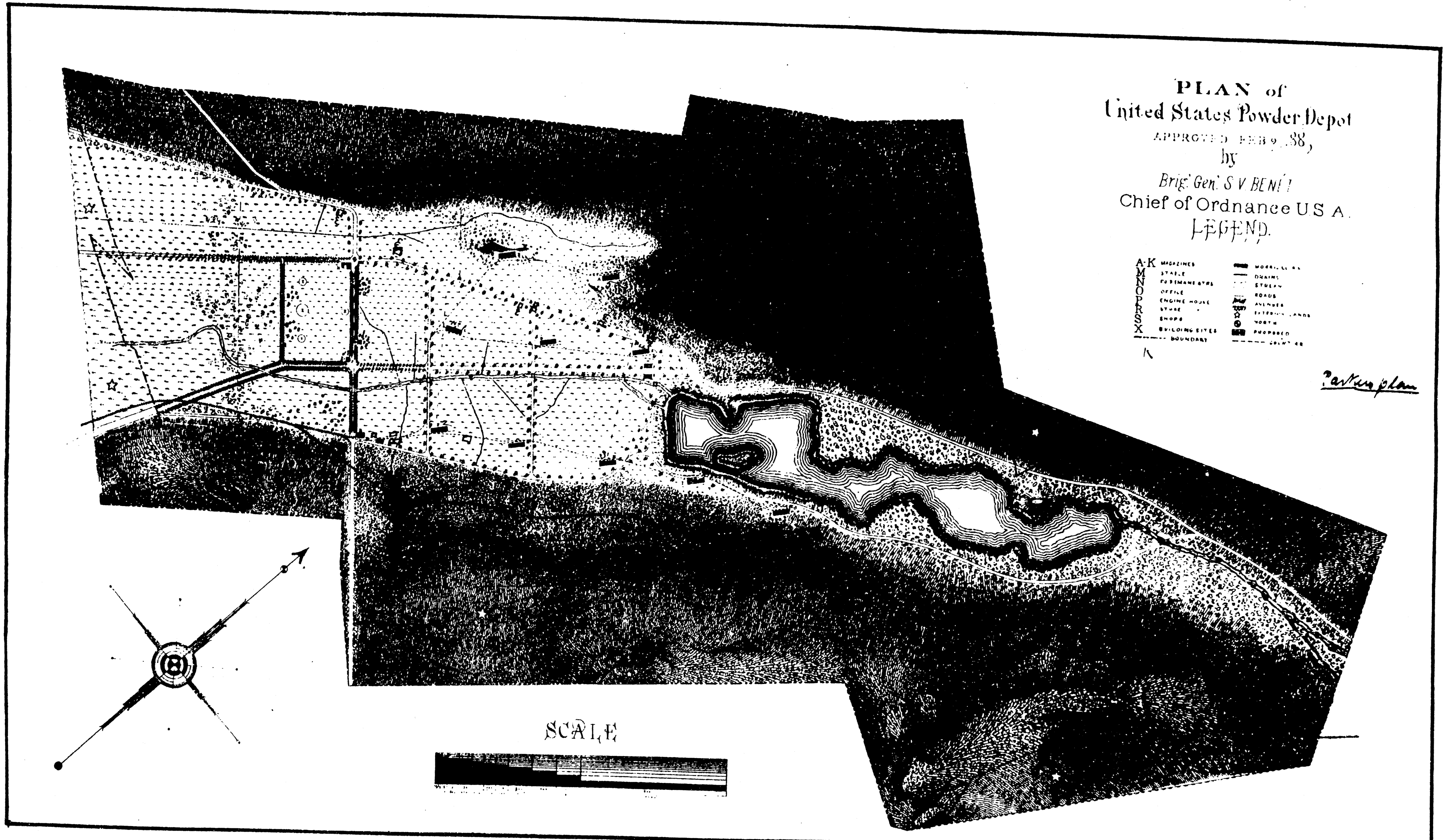
4. Drg. P-266 - Map of Army Smokeless Powder Factory, dated August 14, 1907. Note the relocation of Middle Forge Road at southern end of lake.

5. Drg. P-179 - Map of Powder Depot, Picatinny, N.J., revision date of April 24, 1914.

6. Drg. 19-12-17 - Map of United States Reservation, Picatinny, N.J., revision date April 24, 1914.

7. Drg. P-1197 - Map of Picatinny Arsenal, revision date of April 18, 1919.

8. Drg. P-2101 - Map of Picatinny Arsenal, revision date September 27, 1922.

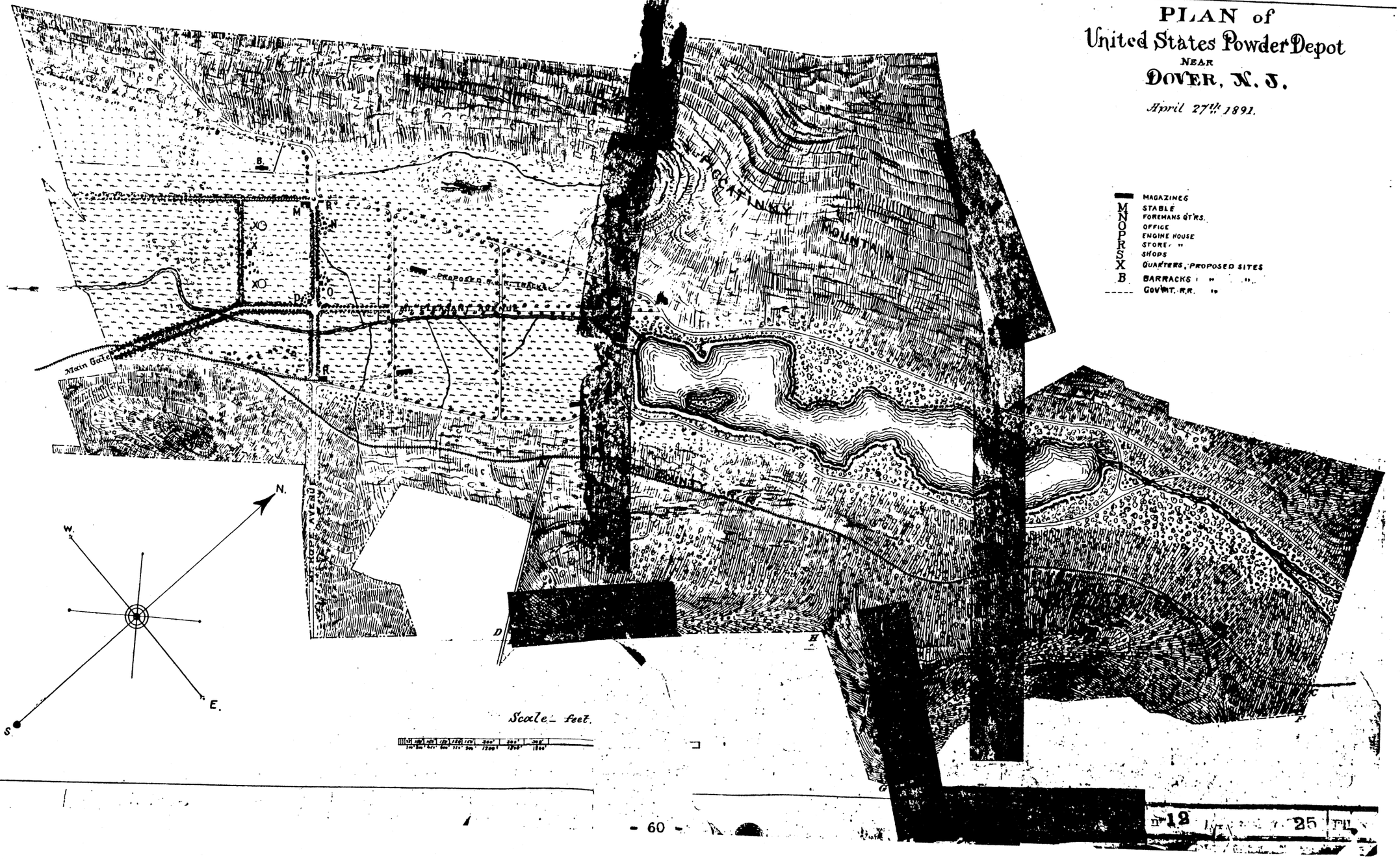


AM PHOTO-LITHO CO N.Y.

Ordnance Dep't.

PLAN of United States Powder Depot NEAR DOVER, N. J.

April 27th 1891.



9. Drg. P-1800 - Map of Picatinny Arsenal, revision date April 21, 1927. Note that this map omits showing buildings destroyed July 10, 1926.

10. Drg. P-1800 - Map of Picatinny Arsenal, revision date April 14, 1931.

The story of various buildings - their uses at various times; the change in location of certain of them; the loss of some by fires, etc., - is told by these maps. Building No. 49, being originally a shell filling house, later the Post Hospital, and in 1926, following the destruction of the office building at the time of the Lake Denmark explosion, becoming the temporary office, and in 1930, upon completion of the new administration building, becoming quarters for enlisted personnel and storage for furniture. Building No. 1, built in 1884 for a guard house, early became a fire engine house, was later used as a school house, and finally was utilized for officer's quarters, its present use. Building No. 2, built in 1888, was originally the office, being made into officer's quarters when the administration center was moved up to the southern end of the lake in 1912. Quarters Nos. 3, 11, and 15 were farm houses on their present locations at the time of purchase of the reservation in 1880. Quarters No. 3 having had an ell built on in 1882, enlarged for the Superintendent's house. Quarters Nos. 102 and 103 facing on the golf course, were built in 1909. Quarters Nos. 287, 21 and 25 were moved to their present locations about the year 1921 from points along Reilly (the west) Road, the latter two being original farm houses and the former, built in 1918, successively a guard house and paint and tool shed. Building No. 5, the main storehouse with the offices of the Stores Department located there, was, until made over after the Lake Denmark explosion of 1926, the stables of the Arsenal, built in 1885. Following the 1926 explosion, the engine house quarters were changed to the present location in the old wheel and dynamo house at the lake, building No. 14 becoming a temporary office building and later being made over for use as officer's quarters. This latter building was originally built for a storehouse, and at one time served as a school house. Similarly, other old buildings have been put to various uses, such as building No. 43, the second of the original magazines, becoming the center of the Technical buildings after the 1926 explosion, and upon these activities moving into the new laboratories in 1931, becoming a storehouse and experimental plant.

The rehabilitation of the Arsenal following the 1926 explosion, under which program the divisions of activities of the Arsenal were in part relocated, is covered separately in Chapter XI. Of the more recent acquisition of facilities under this program are the small arms powder blender, completed in 1930, the cannon powder blender, under erection at the presenttime, the new tetryl plant being erected on the side of Hickory Hill near the U.S. Naval Ammunition Depot's gate into the Arsenal, the rehabilitation of the buildings composing the smokeless powder plant, and the projected extension of the concrete road from near Quarters 15 to join the Whittemore Avenue (old Middle Forge Road) concrete road in front of the new Bag Loading Plant at the southern end of the lake on the site of the administration building destroyed in the 1926 explosion, and the possible extension of a hard road up the west side of the lake to the new Complete Rounds Loading Plant.

The evaluation of Picatinny Arsenal exclusive of stores and land as of July 10, 1926 (just prior to the explosion of that date), showing construction and facilities expenditures made prior to 1919 (when plans were put into effect for converting Picatinny Arsenal into a manufacturing arsenal) and subsequent to 1919 and prior to July 10, 1926, is shown by the following tabulation: (9)

Evaluation of Picatinny Arsenal exclusive of Stores and Land as of July 10th, 1926, showing Construction and Facilities Expenditures made prior to 1919, and subsequent to 1919 and prior to July 10th, 1926.

Activity	Value put in prior to 1919 included in value of July 10, 1926.		Cost subsequent to 1919.		Pro ration of Expenditures for Facilities						
					Fire and Water Lines	Sewage	Railroad	Steam Lines	Roads	Electric Lines	Value July 10, 1926
	Bldgs. & Facilities	Equipment	Bldgs. & Facilities	Equipment							
					Put in prior to 1919						
Facilities exclusive of Power House	$283,000.**	-------	-------	-------	$30,000.	$5,000.	$150,000.	$30,000.	$32,000.	$5,000.	$283,000.00
Melt Loading	-------	-------	$383,190.95***	-------			Put in after 1919				
Expl. Loading	40,000.	-------	182,200.00	$25,000.	44,000.	44,740.98	70,000.	60,699.95	148,750.	15,000.	
Chemical Laboratory	5,000.	-------	30,000.00	-------	2,000.	3,000.00	3,000.	4,000.00	1,000.	500.	260,700.00
Laboratory Area	85,000.	$100,000.	5,000.00	30,000.	-------	-------	-------	-------	-------	-------	85,000.00
Expt. E.E. TNT	17,000.	7,000.	3,000.00	5,000.	-------	2,000.00	-------	2,000.00	-------	-------	224,000.00
Expt. Raw Mat. D & Tetryl	-------	-------	35,000.00	2,000.	2,000.	2,000.00	-------	2,000.00	1,000.	200.	32,000.00
Neutralizing Pt.	-------	-------	178,391.76	25,000.	3,000.	2,000.00	-------	4,000.00	1,000.	300.	44,200.00
Expt. Propellant	35,000.	-------	15,000.00	-------	-------	-------	-------	1,000.00	500.	100.	211,691.76
Testing Ground	75,000.*	10,000.	25,000.00	20,000.	2,000.	2,000.00	2,000.	2,000.00	-------	500.	16,600.00
Bag Loading	50,000.	-------	10,000.00	10,000.	2,000.	-------	3,000.	3,000.00	4,000.	1,000.	88,600.00
Administration Bldg.	55,000.	20,000.	46,970.65	15,000.	2,000.	4,000.00	4,000.	4,000.00	2,000.	1,000.	118,000.00
Metal	55,000.*	15,000.	2,743.40	5,000.	-------	3,000.00	-------	2,000.00	-------	-------	128,970.65
Upper Storage	390,000.	-------	-------	135,000.	4,000.	5,000.00	10,000.	6,000.00	2,000.	1,000.	87,722.40
Lower Storage	300,000.	-------	-------	-------	-------	-------	-------	-------	-------	-------	233,000.00
Miscellaneous Storage	250,000.	5,000.	20,000.00	25,000.	-------	-------	-------	-------	-------	-------	390,000.00
Pyro Plant See Pow. Fac.	-------	-------	-------	-------	-------	-------	18,000.	-------	-------	-------	300,000.00
Power Hse. & Ed. Hse.	300,000.*	-------	357,979.56	-------	-------	-------	-------	-------	-------	-------	318,000.00
Automatic Telephone	20,000.*	-------	10,000.00	-------	-------	2,000.00	2,000.	-------	-------	2,000.	-------
Powder Factory	100,000.*	-------	269,581.03	50,000.	4,000.	3,000.00	18,000.	5,000.00	17,000.	1,000.	643,979.56
Booster	50,000.	-------	18,100.00	15,000.	2,000.	3,000.00	2,000.	3,000.00	500.	500.	30,000.00
Primer & Fuse	40,000.	-------	70,000.00	20,000.	5,000.	6,000.00	-------	6,000.00	6,000.	1,500.	467,581.03
Complete Rounds	40,000.	-------	10,000.00	5,000.	2,000.	-------	4,000.	2,000.00	1,000.	500.	94,100.00
Expl. Black Powder	-------	-------	6,000.00	3,000.	-------	-------	-------	-------	-------	-------	154,500.00
Press	5,000.	-------	224,900.09	-------	3,000.	3,000.00	4,000	3,000.00	1,000.	500.	3,000.00
Pyrotechnics	15,000.	-------	15,000.00	20,000.	-------	-------	-------	-------	-------	-------	244,400.09
Service Department	125,000.*	50,000.	-------	30,000.	-------	-------	-------	1,000.00	500.	100.	50,000.00
Fire & Water Lines	-------	-------	-------	-------	11,000.	-------	-------	-------	-------	-------	205,000.00
Sewage	-------	-------	-------	-------	-------	4,740.98	-------	-------	-------	-------	11,000.00
Steam	-------	-------	-------	-------	-------	-------	-------	11,699.95	-------	-------	4,740.98
Elec. Lines	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	11,699.95
Roads	-------	-------	-------	-------	-------	-------	-------	-------	-------	4,400.	4,400.00
Rolling Stock	25,000.	-------	125,000.00	-------	-------	-------	-------	-------	$111,750.	-------	111,750.00
Officers' Quarters	142,400.	-------	28,600.00	-------	-------	-------	-------	-------	-------	-------	150,000.00
Adm. & Safety	50,000.	5,000.	-------	10,000.	-------	-------	-------	-------	-------	-------	171,000.00
N.C.O. Quarters	-------	-------	5,200.	-------	-------	-------	-------	-------	-------	-------	65,000.00
Totals	$2,627,400.	$237,000.	$1,931,846.42	$573,000.	-------	-------	-------	-------	-------	-------	5,200.00
Grand Total	$5,369,246.42#										

(Value of Arsenal exclusive of stores - 6/10/26)

#Does not include value of land or stores.

* Machinery included.

** General facilities; not prorated below.

*** This amount is prorated under individual items below and included in their totals under value July 10, 1926. Hence, it is not extended to last column

The evaluation of the Arsenal, use of buildings by building numbers, and type of construction, as of June 30, 1930, is shown by the following tabulation (9):

1. Officers' Quarters.

Bldg. No.	Date of Erection	Designation	Type of Construction	Initial Cost	Replacement Cost
1	1864	Quarters	Brick	$ 14,031.36	($14,500.00
2	1864	"	"	17,257.32	(14,500.00
3	1882	"	Frame	2,129.12	(14,500.00
11	1902	"	"	2,006.40	(12,500.00
14	1882	"	Brick	4,560.52	(12,500.00
15	1899	"	Frame	5,382.09	*(12,500.00
21	1880	"	"	2,585.52	(12,500.00
25	Before Post Established	"	"	1,404.00	(12,500.00
102	1909	"	Stone	41,500.00	(14,500.00
103	1909	"	"	40,000.00	(14,500.00
287	1918	"	Frame	2,300.00	(12,500.00
		Total - - - - - -		$151,176.33	$147,500.00

*Construction per AR 30-1435

2. Enlisted Men's Barracks, Quarters, Mess Halls, Guard Houses, Hospitals, etc.

49	1887	Former Hospital (Originally Filling House)	Brick	$9,760.00	$24,000.00
258	1918	Quarters	Frame	2,980.80	6,500.00
		Total - - - - - - -		$12,740.80	$30,500.00

3. Permanent Buildings.

Bldg. No.	Date of Erection	Designation	Type of Construction	Initial Cost	Replacement Cost
5	1885	Storehouse	Brick	$21,062.00	$16,000.00
8	1880	Root Cellar	Stone	537.60	600.00
9	1904	Hay Barn	Frame	1,008.00	1,500.00
10	1904	Wagon Shed	"	1,262.00	1,500.00
12	1902	Barn	"	615.60	800.00
16	1899	Barn	"	492.65	600.00
19	1904	Pump House	Brick	14,535.00	40,000.00
20	1881	Storehouse	"	30,535.28	45,000.00
23	1904	(Former Cafeteria)	Frame	711.36	2,400.00
24	1904	Machine Shop	Brick	28,500.00	40,000.00
27	1892	Booster Loading	"	25,623.84	40,000.00
30	1890	Storehouse	"	24,847.36	40,000.00
31	1904	Pyrotechnic Laboratory	"	5,502.08	11,000.00
32	1904	Storehouse	Frame	188.76	300.00
39	1904	Experimental Propellant	Brick	15,390.00	22,000.00
43	1884	Chemical Laboratory	"	33,972.00	45,000.00
52	1904	Complete Round	"	24,225.00	31,000.00
53	1906	Firehouse	"	8,062.00	16,000.00
57	1906	Plating and Inspection	"	14,400.00	15,000.00
58	1906	Machine Shop	"	14,400.00	15,000.00
61	1906	Machine Shop	"	14,400.00	15,000.00
62	1906	Millwright	"	14,400.00	15,000.00
63	1906	Electrical and Pipe	"	14,400.00	15,000.00
64	1905	Boathouse	Frame	3,400.00	3,400.00
65	1905	Ice House	"	13,760.00	15,000.00
66	1905	Reservoir (132,000 gals.)	Concrete	5,529.60	6,000.00
67	1898	Reservoir (127,000 gals.)	"	4,000.00	6,000.00

Bldg. No.	Date of Erection	Designation	Type of Construction	Initial Cost	Replacement Cost
68	1907	Spring House	Brick	368.00	500.00
69	1907	Storehouse	"	19,077.12	15,000.00
71	1907	Storehouse	"	19,077.12	15,000.00
72	1907	Storehouse	"	19,077.12	15,000.00
74	1906	Power House	Brick and Tile	254,264.46	172,000.00
75	1907	Spent Acid Storage	Steel Tanks	600.00	600.00
76	1907	Cotton Dry House	Steel and Tile	9,731.00	9,731.00
55	1906	Storehouse	Brick	14,400.00	15,000.00
56	1906	Storehouse	"	14,400.00	15,000.00
59	1906	Storehouse	"	14,400.00	15,000.00
60	1906	Storehouse	"	14,400.00	15,000.00
70	1907	Storehouse	"	14,400.00	15,000.00
77	1907	Nitro Cotton Boiling House	Steel and Tile	17,515.20	17,515.20
78	1907	Acid Mixing House	Steel and Con.	1,768.00	1,768.00
87	1907	Ether and Alcohol	Steel	3,542.40	7,000.00
88	1907	Pyrotechnic Assembly	Frame	1,476.00	1,200.00
89	1907	Sorting and Graph.	Tile	9,270.50	9,270.50
90	1907	Dry House	"	1,785.14	2,500.00
94A	1920	Small Arms Blender	Concrete and Steel	24,745.00	32,000.00
94B	"	" " "	"		
94C	"	" " "	"		
96	1908	Former Ballistic Hse.	Tile	2,007.36	
97	1908	Butt	Concrete	738.00	738.00
99	1908	Service Magazine	Frame	287.00	287.00
104	1908	Ether Vault	Frame and Stone	830.00	2,600.00
105	1909	Spring House	Brick	373.50	500.00

Bldg. No.	Date of Erection	Designation	Type of Construction	Initial Cost	Replacement Cost
106	1909	Solvent Recovery	Brick and Concrete	$23,168.87	$35,000.00
109	1910	Stability Laboratory	Frame	1,276.54	1,800.00
114	1911	Powder Dry House	"	9,057.00	9,057.00
115	1911	Powder Box Testing	"	6,440.00	7,000.00
117	1912	Melt Loading Building	Tile and Concrete	351,440.00	300,000.00
119	1913	Surveillance Magazine	Brick and Concrete	15,264.00	20,000.00
120	--	Powder Dry House	Stucco	5,590.00	7,000.00
121	--	Pump House	Brick	982.98	1,400.00
122	--	Powder Dry House	Frame	7,632.00	7,632.00
125	--	Powder Dry House	"	5,700.94	7,600.00
129	--	Pump House	Brick	1,032.00	1,500.00
133	--	Dry House	Tile	18,258.66	25,000.00
130	--	Dry House	Frame	1,622.00	1,622.00
132	--	Dry House	"	847.00	847.00
138	--	Powder Rolling	"	990.72	1,750.00
142	1918	Storehouse	Tile	5,117.00	5,000.00
143	"	"	"	9,108.00	9,000.00
144	"	"	"	9,108.00	9,000.00
145	"	"	"	9,108.00	9,000.00
146	"	"	"	9,108.00	9,000.00
147	"	"	"	9,108.00	9,000.00
148	--	"	"	6,375.00	6,400.00
149	1918	"	"	6,375.00	6,400.00
150	"	"	"	6,375.00	6,400.00
151	"	"	"	6,375.00	6,400.00
152	"	"	"	6,375.00	6,400.00
153	"	"	"	6,375.00	6,400.00
154	"	"	"	6,375.00	6,400.00

Bldg. No.	Date of Erection	Designation	Type of Construction	Initial Cost	Replacement Cost
155	1918	Storehouse	Tile	$6,375.00	$6,400.00
156	"	"	"	6,375.00	6,400.00
157	"	"	"	6,375.00	6,400.00
158	"	"	"	2,741.60	2,750.00
159	"	"	"	2,741.60	2,750.00
160	"	"	"	2,741.60	2,750.00
161	"	"	"	2,741.60	2,750.00
162	"	"	"	2,741.60	2,750.00
163	"	"	"	2,741.60	2,750.00
164	"	"	"	2,741.60	2,750.00
165	"	"	"	2,741.60	2,750.00
166	"	"	"	2,741.60	2,750.00
167	"	"	"	2,741.60	2,750.00
168	"	"	"	2,741.60	2,750.00
169	"	"	"	2,741.60	2,750.00
170	"	"	"	2,741.60	2,750.00
171	"	"	"	2,741.60	2,750.00
172	"	"	"	2,741.60	2,750.00
173	"	"	"	2,741.60	2,750.00
174	"	"	"	2,741.60	2,750.00
175	"	"	"	2,741.60	2,750.00
176	"	"	"	2,741.60	2,750.00
178	"	"	"	2,741.60	2,750.00
179	"	"	"	2,741.60	2,750.00
180	"	"	"	2,741.60	2,750.00
183	"	"	"	2,741.60	2,750.00
184	"	"	"	2,741.60	2,750.00
185	"	"	"	2,741.60	2,750.00
186	"	"	"	2,741.60	2,750.00
187	"	"	"	2,741.60	2,750.00
188	"	"	"	2,741.60	2,750.00

Bldg. No.	Date of Erection	Designation	Type of Construction	Initial Cost	Replacement Cost
189	1918	Storehouse	Tile	$2,741.60	$2,750.00
190	"	"	"	2,741.60	2,750.00
191	--	Fulminate Mixing	"	2,760.00	2,750.00
192	--	Detonator Loading	"	2,760.00	2,750.00
193	--	Loading Building	"	2,741.60	2,750.00
194	--	Loading Building	"	2,741.60	2,750.00
195	--	Change House	"	2,741.60	2,750.00
196	--	Loading	"	2,741.60	2,750.00
197	--	Primer Loading	"	2,741.60	2,750.00
198	--	Loading	"	2,741.60	2,750.00
199	--	Fuze Bond House	"	2,741.60	2,750.00
200-1	1918	Fuze Loading & Assembly	"	55,200.00	50,000.00
202	"	Primer Loading	"	2,741.60	2,750.00
203	"	Primers	"	2,741.60	2,750.00
204	"	Primers	Frame	1,860.00	1,800.00
205	"	Primers	Tile	2,741.60	2,750.00
206	"	Storehouse	"	2,741.60	2,750.00
207	"	"	"	2,741.60	2,750.00
208-9	"	Grenade Loading	"	33,635.20	30,000.00
210	"	Storehouse	"	2,741.60	2,750.00
211	"	"	Galv.	360.00	750.00
212	"	"	Tile	2,741.60	2,750.00
213	"	"	Galv.	360.00	750.00
214	"	"	"	360.00	750.00
215	"	"	Tile	6,375.00	6,500.00
216	"	"	"	6,375.00	6,500.00
217	"	"	"	6,375.00	6,500.00
218	"	"	"	6,375.00	6,500.00
219	"	"	"	6,275.00	6,500.00
220	"	"	"	6,375.00	6,500.00
221	"	"	"	6,375.00	6,500.00

Bldg. No.	Date of Erection	Designation	Type of Construction	Initial Cost	Replacement Cost
222	1918	Storehouse	Tile	$17,800.00	$12,000.00
223	"	"	"	9,108.00	9,100.00
224	"	"	"	6,375.00	6,500.00
225	"	"	"	6,375.00	6,500.00
226	"	"	"	6,375.00	6,500.00
227	"	Plating Shop	"	18,500.00	12,000.00
228	"	Painting Shop	"	9,800.00	7,000.00
229	"	Storehouse	"	6,375.00	6,500.00
230	"	"	"	6,375.00	6,500.00
231	"	"	"	6,375.00	6,500.00
232	"	"	"	6,375.00	6,500.00
233	"	Stable	"	17,800.00	12,000.00
234	"	Storehouse	"	9,108.00	9,100.00
235	"	"	"	9,108.00	9,100.00
236	"	"	"	9,108.00	9,100.00
237	"	"	"	9,108.00	9,100.00
238	"	"	"	9,108.00	9,100.00
239	"	Nitrating	Conc. Steel and Slate	16,230.00	16,230.00
240	--	Fan House	A.P.M.	250.00	250.00
250	--	Surveillance Magazine	Frame	2,507.00	3,000.00
252	--	Smokeless Powder Sample	Tile	4,922.00	5,000.00
253	--	" " "	"	4,922.00	5,000.00
256	1930	Testing Laboratory	Brick	9,927.58	9,927.58
257	--	Solvent Vault	Frame (Barricaded)	1,840.00	850.00
279	--	Wash House	Frame	932.00	900.00
281	1918	Tracer Loading	"	1,104.00	1,200.00
283	--	Storehouse	"	242.88	250.00
284	--	Gate House	"	242.88	250.00
285	--	Garage	Tile	30,286.00	24,000.00
286	1930	Field Office	Tile	$7,551.55	$7,551.55
288	1930	Mixed Acid Pump House and Tanks	A.P.M.	1,088.04	1,088.04
292	--	Jolt House	Frame	2,852.00	3,500.00
296	--	Vault	Concrete	699.20	
297	1919	Vault	"	699.20	
302	--	Fuze Powder Blender	Frame	720.00	500.00
303	1929	Locomotive House	Tile	12,800.00	12,800.00
309	--	150 T Track Scales		2,722.28	2,750.00
310	1918	Surveillance Magazine	Tile	2,718.60	2,700.00
311	--	Wagon Scale		722.00	500.00
312	1930	Die Vault	Tile	1,479.95	1,479.95
315	--	Tank Shed	Frame	662.00	662.00
321	1920	Exper. Pyrotechnic Lab.	Tile	10,152.00	7,500.00
322	1920	Fulminate Dry House	"	2,632.00	2,500.00
325	"	Exp. Raw Material Bldg.	Tile	24,440.00	25,000.00
326	"	H.E. Nitration Bldg.	"	16,520.00	17,000.00
327	"	Tetryl Nit. and Pur.	"	21,040.00	17,000.00
328	"	"D" Recrystallization	"	20,106.00	20,000.00
329	"	Acid Storage	Stucco	11,280.00	6,000.00
330	"	Tetryl Dry House	Tile	3,250.00	3,000.00
334	"	Pyrotechnic Office and Test	"	7,862.00	7,500.00
335	"	Chlorate Storehouse	Frame	752.00	750.00
336	"	Nitrate Storehouse	"	752.00	750.00
337	"	Chlorate Mixing House	"	1,750.00	1,200.00
338	"	Nitrate Mixing House	"	1,214.00	1,200.00
339	"	Chlorate Hand Charge	"	808.40	800.00
340	"	Nitrate Hand Charge	"	808.40	800.00
341	"	Pyrotechnic Loading	"	808.40	800.00
342	"	Pyrotechnic Loading	"	808.40	800.00

Bldg. No.	Date of Erection	Designation	Type of Construction	Initial Cost	Replacement Cost
343	1920	Chlorate Press House	Frame	$ 808.40	$ 800.00
344	"	Nitrate Press House	"	808.40	800.00
345	"	"D" Loading	Tile	85,728.00	80,000.00
346	"	Motor House	Concrete	2,350.00	2,350.00
348	1918	Motor House	"	2,300.00	2,300.00
349	1918	Fan House	Corr. Steel	132.48	130.00
351	--	Motor House	" "	115.00	115.00
352	1918	Serv. Magazine	" "	115.00	115.00
353	"	Saw Mill		497.72	500.00
354	1928	Pump House	Corr. Steel	164.50	200.00
355	1920	Serv. Magazine	Frame	141.00	150.00
356	--	Serv. Magazine	"	18.80	25.00
358	--	Hoisting Eng.	"	1,739.00	
359	1920	Gasoline Pump House	"	61.10	75.00
360	"	Phosphorous Loading	"	876.94	1,200.00
364	"	Fan House	"	118.75	120.00
365	"	Fan House	"	1,504.00	500.00
366	"	Fan House	Tile	1,880.00	500.00
367	"	Hose House	Frame	47.50	40.00
368	1921	Hose House	"	47.50	40.00
369	"	Acid Storage	"	3,800.00	3,800.00
370	"	Serv. Magazine		365.00	365.00
371	"	Coal Crusher	Concrete	4,370.00	4,500.00
373	"	Storehouse	Steel	380.00	380.00
374	"	Pump House No. 2 Well	Tile	4,759.50	6,000.00
375	"	Acid Neutralizing	Frame	5,700.00	5,900.00
376	"	Pump House	Tile	12,942.00	13,000.00
377	1920	Pelleting House	Frame	752.60	750.00
378	"	Charging and Weighing House	"	752.60	750.00
379	"	Fan House	"	1,128.00	1,125.00
380	--	Fan House	"	1,128.00	1,125.00

Bldg. No.	Date of Erection	Designation	Type of Construction	Initial Cost	Replacement Cost
381	1920	Sedimentation Tank	Concrete	$ 5,640.00	$ 5,640.00
382	--	Storage	Frame	272.00	250.00
383	"	Heater House	Concrete	1,739.00	1,800.00
384	"	Water Tank	Wood	12,377.00	12,377.00
384A	1929	" "	Steel	2,495.00	2,495.00
384B	1929	" "	Steel	2,495.00	2,495.00
385	--	Heater House	Tile	16,425.00	16,425.00
386	1921	Office and Change House	"	7,060.00	7,000.00
387	"	Ejector Station	Frame	1,401.00	1,400.00
390	"	Clorinator Vault	Concrete	7,755.80	7,555.80
391	--	Storage	Tile	760.00	760.00
392	--	Storage	"	190.00	190.00
393	1921	Valve House	Concrete	2,660.00	2,660.00
394	"	Heater House	Steel	118.75	120.00
395	"	Fan House	Frame	118.75	120.00
397	--	Disassembly Chamber	Concrete	1,859.15	2,000.00
436	1918	Storehouse	Frame	644.00	1,200.00
453	1910	Solvent Vault	Brick	2,100.00	1,200.00
457	"	Blacksmith Shop	Frame	672.00	1,400.00
465	1922	Service Magazine	"	118.75	118.75
466	1921	Shavings Bin	Concrete	1,567.50	2,000.00
467	1922	Fulminate Storage	"	1,800.00	2,000.00
468	"	Shell Disassembly	Frame	1,536.00	1,500.00
469	"	Ejector Station	Concrete	1,728.00	1,725.00
470	"	Fulminate Dry	Tile	1,728.00	1,725.00
471	"	Dehydration	"	9,600.00	9,600.00
472	"	Block Breaker	"	2,880.00	2,900.00
473	"	Mixing	"	22,060.00	22,080.00
474	"	Press	"	17,250.00	17,250.00
475	1924	Poaching	"	36,800.00	36,800.00
476	1922	Storage	Concrete	1,440.00	1,440.00
480	1920	Paint Magazine	Steel	750.00	750.00

Bldg. No.	Date of Erection	Designation	Type of Construction	Initial Cost	Replacement Cost
481	1920	Paint Magazine	Steel	$ 750.00	$ 750.00
482	1922	Chlorate Mfg.	Tile	4,992.00	4,992.00
483	--	Paint Magazine	Steel	750.00	750.00
484	1922	Heater House	"	2,304.00	2,300.00
485	"	Motor House	Tile	1,728.00	1,725.00
486	"	Refrigeration House	"	3,360.00	3,360.00
487	1923	H.E. Magazine	Frame	368.00	368.00
488	1923	Gear House	"	2,328.00	2,325.00
489	1923	Fuse Powder Mfg. Bldg.	"	5,820.00	4,500.00
490	--	Magazine	Tile	562.00	560.00
491	1923	Painting & Marking Bldg.	"	4,850.00	5,000.00
492	1922	Mixing House	Frame	2,680.00	3,500.00
493	1923	Vacuum Pump House	Tile	2,328.00	2,500.00
494	1922	Exp. Powder Finishing	"	8,448.00	10,000.00
495	"	Heater House	Sheet Steel	768.00	775.00
498	1920	Compressor House	Tile	1,316.00	1,316.00
500	1920	Heater House	"	564.00	564.00
506	1920	Paint Magazine	Frame	235.00	235.00
507	1917	Serv. Magazine	Sheet Steel	227.00	227.00
508	1920	Paint Magazine	Frame	141.00	141.00
510	"	Safety Shed	"	235.00	235.00
511	"	Toilet	"	517.00	500.00
512	1924	Serv. Magazine	Asbestos	392.00	400.00
513	"	Serv. Magazine	"	245.00	250.00
514	"	Serv. Magazine	"	245.00	250.00
515	"	Weigh House	"	3,352.00	2,250.00
516	"	Office & Change House	"	1,560.00	1,560.00
517	"	Vault	Concrete	606.50	600.00
518	1925	Sedimentation Tank	"	4,089.00	4,089.00
519	"	Mixing	"	2,673.00	2,673.00
520	"	Exper. Loading	Tile	4,554.00	4,500.00

Bldg. No.	Date of Erection	Designation	Type of Construction	Initial Cost	Replacement Cost
521	1925	Assembly	Tile	$ 6,534.00	$ 6,500.00
522	"	Storage	Frame	146.50	75.00
525	1915	Field Office	"	186.00	186.00
526	"	Gate House	"	432.00	432.00
527	--	Vault	Concrete	465.00	465.00
528	--	Testing Laboratory	"	1,100.00	500.00
530	1916	Meter House	Frame	184.00	184.00
531	"	" "	"	184.00	184.00
532	"	" "	"	184.00	184.00
533	"	" "	"	184.00	184.00
534	"	" "	"	184.00	184.00
535	1926	Serv. Magazine	Tile	1,100.00	1,100.00
537	1917	Serv. Magazine	Frame	205.00	205.00
538	--	Serv. Magazine	"	235.00	235.00
539	--	Dry House	"	420.00	420.00
554	--	Sewage Filter		4,700.00	4,700.00
555	--	Sludge Bed		500.00	500.00
556	--	Seepage Bed		500.00	500.00
558	--	Barricade	Concrete	863.00	863.00
559	--	Alcohol Storage		1,860.00	3,800.00
560	--	Serv. Magazine	Frame	60.00	60.00
561	--	" "	"	60.00	60.00
562	--	" "	"	25.00	60.00
563	--	Bridge		260.00	260.00
565	--	Fan House	Frame & Asbestos	260.00	260.00
566	--	Serv. Magazine	Frame	60.00	60.00
567	--	" "	"	60.00	60.00
568	--	" "	"	60.00	60.00
569	--	" "	"	60.00	60.00
570	--	" "	"	60.00	60.00
571	--	" "	"	60.00	60.00

Bldg. No.	Date of Erection	Designation	Type of Construction	Initial Cost	Replacement Cost
572	--	Serv. Magazine	Frame	$ 60.00	$ 60.00
573	--	" "	"	60.00	60.00
574	--	" "	"	60.00	60.00
575	--	" "	"	60.00	60.00
576	--	Ejector Station	Tile	1,600.00	1,600.00
577	--	" "	"	1,600.00	1,600.00
578	--	Serv. Magazine	Frame	60.00	60.00
579	--	" "	"	60.00	60.00
580	--	" "	"	60.00	60.00
581	--	" "	"	60.00	60.00
582	--	" "	"	60.00	60.00
583	--	" "	"	60.00	60.00
584	--	" "	"	60.00	60.00
589	--	Meter House	"	184.00	184.00
590	--	Serv. Magazine	"	60.00	60.00
591	--	" "	"	60.00	60.00
592	--	" "	"	60.00	60.00
593	--	" "	"	60.00	60.00
594	--	Signal Stat. Booth	"	60.00	60.00
596	--	Tool House	"	45.00	250.00
821	1918	Proj. Loading	Tile	7,889.70	8,000.00
822	1928	S. A. Range	"	20,427.31	22,000.00
823	"	Serv. Magazine	A.P.M.	352.54	400.00
824	"	" "	"	352.54	400.00
825	"	" "	"	352.54	400.00
826	"	" "	"	352.54	400.00
827	"	" "	"	352.54	400.00
828	"	Gun Shed	Concrete	3,518.15	4,000.00
829	"	Fragmentation Tank	"	10,096.55	12,000.00
830	"	Ballistic Mortar	"	2,081.60	2,200.00
831	"	Simulation Set Back	Steel	500.00	500.00

Bldg. No.	Date of Erection	Designation	Type of Construction	Initial Cost	Replacement Cost
833	1928	Slug Butt	Cave	$ 6,000.00	$ 6,000.00
834	"	Sectioning Chamber	Concrete	1,360.42	1,500.00
835	"	Fragmentation Chamber	"	3,895.65	4,500.00
836	"	Const. Temp. Magazine	Tile	1,651.52	1,651.52
838	"	Control House	Concrete	1,076.21	1,200.00
839	"	Ammunition Disassembly	Tile	1,786.75	2,000.00
840	1930	Rec. and Clean.	"	25,390.00	25,390.00
841A	"	Pouring and Extruding	"	31,685.50	31,685.50
841B	"	Melting	Concrete	20,161.65	20,161.65
842	"	Drill. and Boost.	Tile	26,294.75	26,294.75
843	"	Round Assembly	"	33,375.20	33,375.20
844	"	Pack and Ship	"	13,368.00	13,368.00
845	"	Serv. Magazine	"	1,420.70	1,420.70
846	"	Amm. Mit. Drying	"	8,161.00	8,161.00
847	"	T.N.T. Screening	"	2,538.50	2,538.50
848	"	Serv. Magazine	"	1,455.70	1,455.70
849	"	" "	"	792.00	792.00
850	"	Change House	"	13,691.25	13,691.25
851	"	" "	"	15,162.99	15,162.99
852	"	Serv. Magazine	A.P.M.	302.10	302.10
854	"	" "	Tile	951.70	951.70
856	"	" "	A.P.M.	277.10	277.10
857	"	" "	Tile	745.20	745.20
858	"	Box Storage	"	3,126.90	3,126.90
861	"	Conveyor Drive	"	853.00	853.00
859) 860) 862)	"	Enclosed Ramr	A.P.M.	35,455.97	35,455.97
864	"	Drying	Tile	3,510.70	3,510.70
865	"	Cutting and Sewing	"	16,342.88	16,342.88
866	"	Igniter Loading	"	12,134.00	12,134.00

Bldg. No.	Date of Erection	Designation	Type of Construction	Initial Cost	Replacement Cost
867	1930	Serv. Magazine	Tile	$ 375.40	$ 375.40
868	"	How. Bag Loading	"	24,290.50	24,290.50
869	"	Gun Bag Loading	"	27,768.62	27,768.62
870	"	Serv. Magazine	"	1,198.80	1,198.80
871	"	Box & Crate Magazine	"	1,697.80	1,697.80
872	1928	Lumber Shed	Frame	3,565.80	3,565.80
873	"	" "	"	6,327.90	6,327.90
874	1930	Exhaust Fan House	Tile	768.60	768.60
877	"	Igniter Rest	"	825.40	825.40
878	"	Vacuum Pump House	"	424.00	424.00
879	"	Velocity Screen	Steel	1,728.00	1,728.00
881	"	Chemical Laboratory	Brick	96,561.06	96,561.06
882	"	Research Laboratory	"	50,000.00	50,000.00
883	"	Stability Laboratory	"	6,800.00	6,800.00
885	"	Serv. Magazine	Tile	3,941.25	3,941.25
886	"	" "	"	3,941.25	3,941.25
888	"	Solvent Laboratory	"	792.00	792.00
889	"	Service Magazine	A.P.M.	237.70	237.70
890	"	" "	"	237.70	237.70
891	"	" "	"	237.70	237.70
892	"	" "	"	237.70	237.70
893	"	" "	"	237.70	237.70
894	"	Cotton Storage	Tile	8,178.50	8,178.50
897	1928	Lumber Storage	Frame	1,286.00	1,286.00
899	1930	Storehouse	Tile	1,792.00	1,792.00
900	"	Headquarters Bldg.	Brick	150,000.00	150,000.00
901	"	Locomotive Charging	Tile	515.00	515.00
902	"	Machine Shop	Brick	181,666.63	181,666.63
903	"	Sawdust Chamber	Concrete	915.00	915.00
904	1928	Hay Barn	Asbestos	8,120.30	8,120.30
905	1930	Carpenter Shop	Brick	40,814.16	40,814.16
906	1930	Water Dry	Tile	$13,616.00	$13,616.00
907	"	Surface Dry	"	5,406.00	5,406.00
909	"	Service Magazine	"	1,479.60	1,479.60
910	"	C. S. Magazine	"	2,378.70	2,378.70
912	"	Recovered Alcohol	A.P.M.	474.00	474.00
913	--	Foot Bridge	Wood	2,200.00	2,200.00
920	1928	Fuse Test Tunnel	Concrete	6,000.00	6,000.00
928	1930	Oil Storage	Tile	1,200.00	1,200.00
		Total - - - -		$3,373,223.73	3,547,133.45

4. Temporary Buildings

4	1882	Golf Club House	Frame	$ 50.40
6	--	Corn Crib	"	91.84
177	--	Annex to Bldg. No. 49	"	920.00
512A	--	Field Office	"	127.88
418	--	Storage	"	8,096.00
		Total		$9,286.12

5.	Machinery and Equipment	$2,827,041.06	$2,849,369.66
6.	Railroad Trackage	481,000.00	762,000.00
7.	Docks and Wharves	-----	-----
8.	Roads and Grounds	387,000.00	510,000.00
9.	Sewer and Water Systems	516,000.00	701,000.00
10.	Heat, Light and Power Systems	324,000.00	350,000.00

SUMMARY

	Classification	Initial Cost	Replacement Cost
1.	Officers' Quarters	$151,176.33	$147,500.00
2.	Enlisted Men's Barracks, Quarters, Mess Halls, Guard Houses, Hospitals, Etc.	12,740.80	30,500.00
3.	Permanent Buildings	3,373,223.73	3,347,133.45
4.	Temporary Buildings	9,286.12	-----
5.	Machinery Equipment	2,827,041.06	2,849,369.66
6.	Railroad Trackage	481,000.00	762,000.00
7.	Docks and Wharves	-----	-----
8.	Roads and Grounds	387,000.00	510,000.00
9.	Sewer and Water Systems	516,000.00	701,000.00
10.	Heat, Light and Power Systems	324,000.00	350,000.00
	Total - - - - - - - - -	$8,061,468.04	$8,697,503.11

There are 20.4 miles of standard gauge and one (1) mile of narrow gauge government owned railroad trackage, and three and one-half miles of the privately owned Wharton and Northern Railroad (operated by the New Jersey Central Railroad since 1930), running through the reservation. (9)

There are 4.1 miles of concrete road, 8.2 miles of improved roads, and 10.9 miles of unimproved roads, government owned, besides approximately 1.8 miles of improved dirt roads and .42 miles of concrete road, Township owned, on the reservation. (9)

The number of employees at the Arsenal has fluctuated from time to time; being 150 in 1882 (4), 200 in 1915 (12), 1500 in 1918 (15), 600 to 1000 in 1919 and 1920 (15), 1470 to 680 in 1921 (15), 1000 in 1922 (3), 830 in 1926 (2); according to the amount of activities being carried on, the present figure of over 1550 being high for all time.

Likewise the number of officers and enlisted men has fluctuated; there being fourteen officers and four enlisted men stationed at the Arsenal at present. The health of the Command is taken care of by the employment of a contract surgeon (Dr. A.L.L. Baker of Dover) assisted by three enlisted men (included in the four mentioned above) of the Medical Department of the Army.

The steel flag staff, that stands in the center green in the junction of the roads in front of the Administration Building, was placed in 1910. The two 6-pdr. bronze guns with their carriages that face out from the Administration Building were secured from Rock Island Arsenal in 1910 to ornament the green by the flag staff, and from thence they were removed to their present location on completion of the Administration Building in 1930. (17)

CHAPTER IX

Safety and the Lake Denmark Explosion

As in all walks of life, industry has its accidents and disasters to contend with. That there are not more of them is due in a large measure to safety rules and their enforcement. The risk involved in the manufacture and from the handling and storing of explosives has been made a special study of by the Institute of Makers of Explosives. The American Table of Distances, a result of their studies, has been incorporated in the laws of a number of states, including California, Kentucky, Massachusetts, Montana, New Jersey, New York, and Ohio.

The activities at Picatinny have been separated to comply with safety distances and all known means employed to safeguard the workers. When accidents have occurred, it has been due to these precautions that injuries to employees and loss of material have been kept down to the record that is Picatinny's.

The story of the Lake Denmark Explosion, that levelled many buildings at Picatinny on July 10, 1926, is well told in the "History of Explosions," published under the direction of the Institute of Makers of Explosives, which reads as follows (16):

On July 10, 1926, there occurred a series of explosions on the Lake Denmark Ammunition Depot of the United States Navy (about 3-1/2 miles from Dover, N. J.). This depot comprised an area of 461 acres of land, partly overgrown by trees and brush. It included approximately 160 buildings, 44 of which were used for the storage of high explosives, smokeless powder, projectiles, black powder, the remainder being store houses, industrial buildings which did not contain explosives, and dwellings.

On the afternoon of July 10, 1926, there was a severe electrical storm at Lake Denmark. At about 5.15 P.M. lightning struck in southwest end of the depot, and almost immediately thereafter, black smoke was seen issuing from the Northeast side of Temporary Magazine No. 8. An alarm of fire was sounded and the personnel of the depot responded immediately to the fire call, and at least one stream of water was playing on the fire when at 5.20 P.M. a tremendous detonation occurred at the scene of the fire.

The first explosion occurred in Temporary Magazine No. 8, and was followed in about 5 minutes by the explosion of the contents of Temporary Store House No. 9, which was about 150 feet in the clear from No. 8. Enormous craters were made by the two explosions.

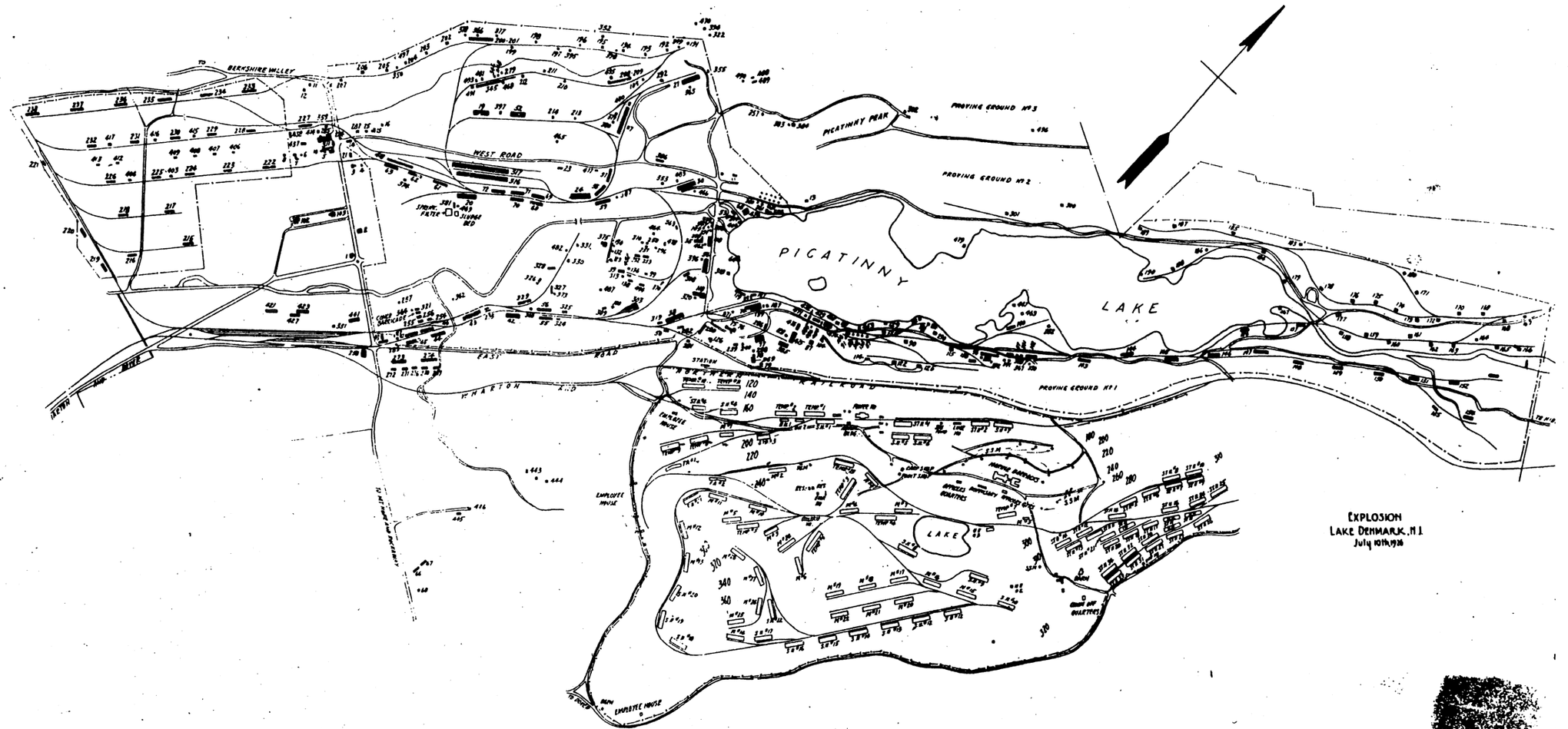
The buildings used for the storage of explosives were of fireproof construction and equipped with lightning rods of an ordinary type.

The first explosion did considerable damage to other magazines and buildings of the depot, exposing the contents of the buildings to flaming debris from the second explosion. Buildings in the immediate vicinity of Temporary Store Houses Nos. 8 and 9 were ignited by embers, missiles or direct heat from the explosions, and the fire spread rapidly to the other magazines, storehouses, and shell houses.

Temporary Store Houses Nos. 8 and 9 were one-story hollow tile, or brick and hollow tile buildings, with wooden roof boards and roof sheeting supported by steel trusses and steel purlins.

Temporary Store House No. 8 contained:

2106 - 50 lb. cast T.N.T. depth charges - north end. Detonators removed.


TO BERKSHIRE VALLEY
WEST ROAD
PICATINNY PEAK
PROVING GROUND NO 3
PROVING GROUND NO 2
PROVING GROUND NO 1
PICATINNY
LAKE
EAST ROAD
WHARTON RD
STATION
EMPLOYEE HOUSE
LAKE
EXPLOSION
LAKE DENMARK, N.J.
July 10th 1926

850 - aerial bombs T.N.T. center section.
1600 - 300 lb. depth charges T.N.T. middle door to south end. Large amount wooden dunnage - wooden boxes.
100 - 25 lb. Navy Mark I, loaded and plugged (air craft); accessories for bombs - fins, tails, etc., in wooden boxes.
The temperature in this building on Saturday ran from 22 to 27 deg. C.
Estimated total amount of explosives in this building 670,000 lbs.

Temporary Store House No. 9 contained:

1,250,000 lbs. Grade "A" flake T.N.T. in 50 lb. boxes - stored from middle door to south end of building.
350,000 lbs. Grade "A" T.N.T. stored in 100 lb. boxes north end.
Between north and south piles 150 to 160 Mark IV air craft bombs. Total weight about 500 lbs. Probably 250 lbs. T.N.T. each bomb.
Estimated total amount of explosive in building over 1,600,000 lbs. T.N.T.

A third serious explosion occurred in Shell Store House No. 22. The contents of Shell Store House No. 22 were:

40 - 14" Class "B" - loaded and fused.
80 - 14" A.P. - loaded and fused.
360 - Mark I bombs - loaded 50 lbs. T.N.T. - boxed.
1,000 - Mark II - loaded 50 lbs. T.N.T. - boxed.
300 to 400 - Mark III - loaded T.N.T.
200 - Mark IV - loaded T.N.T.
500 - Mark V - loaded T.N.T.
10,000 - 8" shell - loaded and fused.
1,000 - 5" shell - loaded and fused.

There were three distinct sub-craters in the big crater where this building was located; two of which were deep and well defined, and the third shallow but distinct.

Estimated total amount of explosives in building 180,000 lbs.

There were also a number of minor explosions.

Within 3000 ft. radius of Temporary Store Houses Nos. 8 and 9 everything on Lake Denmark Depot was wrecked, burned or otherwise destroyed, with a few exceptions that will be noted.

Beyond the 3000 ft. radius, and as far as the Navy reservation (estimated under 5600 ft.), all of the buildings were damaged in more or less degree by the explosion, but as there were no explosives or powder stored in the buildings in this area, no fires occurred. The exceptions to this general statement were a number (about 10) of sub-surface magazines varying in distance from 2200 to 4000 ft. These buildings were concrete structures about 18' x 12' buried in the hillside with a stone face retaining wall in front parallel with the road. The concrete roofs of these magazines were covered with earth probably to a thickness of two to three feet, and the sides were protected by earth embankments. Practically all of these magazines contained black powder. None of them were damaged and the contents remained intact, except sub-surface magazine located about 1200 ft. away, between Magazine No. 2 and Temporary Store No. 23, and the only damage to this particular magazine was that a few stones fell out of the front retaining wall.

In the south area, the typical and general construction of the store houses was concrete foundations, tile walls or tile and brick walls of various thicknesses, steel roof trusses either supported direct on the walls or on light steel columns in the walls; steel purlins, 1" roof sheathing covered with asbestos shingles, asbestos paper or tar roofing. In many instances all that was left of the buildings were bent and twisted structural steel members and remains of the crushed and demolished walls. Except in the buildings where explosions occurred concrete foundations and floors were almost undamaged.

There were a few buildings of steel frame construction covered with corrugated iron. The corrugated iron siding and roofing were ripped off by the explosions which probably also damaged the steel frame to some extent, which was further twisted and bent by smokeless powder fires in adjoining buildings.

The power house, distant 1650 ft., was a substantial brick building with steel roof trusses and a 4" cinder concrete roof slab covered with slate. The adjoining Administration Building, distant 1700 ft., was also a brick building. Storehouse No. 3, distant 800 ft., was a two story reinforced concrete frame building with steel roof trusses and tile curtain walls.

Shell House No. 7, distant 3200 ft., at the extreme north end of the south area was a two-story reinforced concrete frame building with concrete floors and heavy brick walls. The Carpenter Shop distant 2200 ft., was a one-story brick building. The marine barracks, distant 3200 ft., was a wooden frame building stuccoed and of large area. The two employees houses near the marine barracks, distant 2850 ft. and 3350 ft., occupied as officers' quarters, were brick buildings. The dispensary, distant 3100 ft., was a low one-story building of frame set on concrete foundations. Temporary Building No. 7, distant 3300 ft., was a brick building with steel roof trusses. The adjoining magazine No. 5, distant 3550 ft., was a brick building with steel roof trusses.

In the south area there were a number of other miscellaneous structures of varying construction. A number of employees houses were located in the extreme south section forming a semi-circle around temporary buildings Nos. 8 and 9 in which the explosions occurred. All were demolished and furniture, clothing and other contents were a mass of debris.

Observations indicated that buildings with structural steel roofs are certainly a large missile hazard. Sections of roof beams and pieces of angles and other structural steel badly twisted and bent were noticed everywhere on the depot grounds. Most of the sections that were noticed were from four to seven feet long and would have penetrated any light roof construction. The same thing, of course, applies to the numerous projectiles that were thrown in large quantities all over the depot.

Probably one of the outstanding matters of interest was that the following explosives stored did not detonate, but burned:

2,500,000 lbs. Explosives "D" stored in temporary No. 11 about 500 ft. away from the site of explosion.

500,000 lbs. of Explosives "D" and 20,000 lbs of Picrate Acid in Dry House No. 1, 750 feet away from the site of explosion.

500,000 lbs. of Explosives "D" in Dry House No. 2, 500 ft. from the site of explosion and only 50 ft. from Dry House No. 1.

510,000 lbs. of T.N.T. in bulk burned in temporary building No. 7 near the marine barracks.

Some of the brick walls in the buildings in which explosives were stored and burned were glazed showing that the heat was so intense that it melted the bricks.

The smokeless storehouses, most of them of very substantial construction, were so shattered by the first explosion and then damaged by the outburst of fire that they are almost completely wrecked. Brick walls seem to have withstood the explosions and fire much better than even substantial tile walls. The tile walls were almost invariably completely pulled down by the collapse of the trusses, while in many instances brick walls are standing up with the steel trusses collapsed in between the walls.

The power house was somewhat protected by the topography from the site of explosions but the concrete slab roof was crushed in and the fact that this roof slab crushed instead of offering resistance probably accounts for the fact that the high brick walls were still standing, although so cracked in places that they would probably have to be torn down. A brick stack in the rear of the power house was almost intact except a crack about 15 or 20 ft. deep from the top of the stack.

The fire spread out from the south end of depot gradually diminished as it reached 2000 to 2500 ft. This was also noticed at the east end in the row of shell houses, particularly S.H. No. 16, distant 2800 ft., to S.H. No. 11 distant 3200 ft. S.H. No. 16 was practically completely gutted, while S.H. No. 11 was still partly standing with the intervening buildings in various stages of destruction.

The marine barracks, distant 3175 ft., were undoubtedly somewhat wrecked by the explosion and finally caught fire and burned to the ground. This building actually collapsed on fire about 11 o'clock Sunday morning about seventeen hours after the first explosion, which would give some idea about the length of time that the fire required to reach this point. Employees houses, distant 2800 ft. and 3275 ft., in the vicinity of the marine barracks were brick buildings, the walls of which were partly wrecked, as were also the roofs. The small frame dispensary, distant 3025 ft., near the marine barracks escaped serious injury, although the interior plaster board of course fell down.

In the north area the residence, distant 4350 ft., of the officer in charge was a substantial stone building which was not seriously damaged except by falling plaster, breaking windows and doors. The same thing applies to the brick stable nearby, distant 4250 ft.

The storehouses (about 30) in the north area (beyond 4000 ft. and up to 5600 ft.) were almost entirely what is known as Austin buildings with concrete foundations, 8" tile walls with pilasters under the trusses and in some instances light steel columns on the pilasters; steel trusses or steel girders with steel rafters sheathed with roof boards and paper roofing. These buildings were in various stages of demolition and indicate clearly the lack of structural strength of tile under shock. The roofs were not so badly damaged but the tile end and side walls were crushed in with, in many instances, part of the side walls hanging to the still standing roof.

Adjoining the Lake Denmark Depot was the Picatinny Arsenal of the U.S. Army. The Picatinny Arsenal lay about 150 ft. below the point on the hillside on which was the site of the Temporary Magazines Nos. 8 and 9.

Approximately the slope of the ground on Lake Denmark Depot continued through the Picatinny Arsenal down to Picatinny Lake. Border-

ing the Lake the ground was practically level, to the west the ground rises gradually, then rises abruptly to a higher elevation than the hills east of Lake Denmark Depot.

The level land of Picatinny Arsenal was fairly well cleared, except the east end, and the west hillsides which were wooded.

Practically all of the buildings on Picatinny Arsenal were placed at a lower elevation than the buildings in which the explosions occurred, and as there were no barricades, etc., were directly exposed to the force of the explosions, except for such protection as was afforded by the trees surrounding the location.

The area occupied by Picatinny Arsenal was approximately three miles long by three-quarters of a mile wide, and scattered over were the 350 or so buildings of a miscellaneous character, which comprised the Arsenal.

When the explosions occurred in Temporary Storehouses Nos. 8 and 9, a wave of tremendous pressure was thrown over the Picatinny Area, intensified probably by the hill back of buildings 8 and 9. The wave broadened out as it proceeded until it finally struck the hills to the west, but just how it finally struck the hills to the west, and how it reacted from then on is difficult to establish, but coming or going it spread over the entire valley causing destruction or damage.

The buildings on Picatinny Arsenal were of many different kinds of construction and size, and in some instances more or less protected or screened by standing woods or by other buildings. This report in addition to describing the damage done also makes comparisons of differently constructed buildings of about similar exposure as well as to point out from a construction standpoint any special features. The report is based on what was actually observed and no attempts made to actually figure the theoretical strength of individual structures or structural members.

1000 Ft. to 2000 Ft. Zone:

The first buildings in this zone were:

Bldg. No. 281 - Guard Headquarters - frame, distant 1050 ft.
Bldg. No. 282 - Garage - frame and corrugated iron, distant 1200 ft.
Bldg. No. 280 - Searching Shed - frame, distant 1100 ft.
Bldg. No. 75 - Cotton Picker & Dry House - frame and corrugated iron, distant 1200 ft.
Bldg. No. 76 - Cotton Dry House - brick, distant 1200 ft.
Bldg. No. 126 - Stables and Sheds - frame, distant 1100 ft.
Bldg. No. 239 - N. C. Nitrating House - four story hollow tile, distant 1150 ft.
Bldg. No. 240 - N. C. Nitrating Fan & Pump House - frame, distant 1150 ft.

The above were completely demolished.

Building No. 58 - General Storehouse, distant 1250 ft., was a brick building almost entirely wrecked and on fire. After explosion and fire the end walls, including the gable ends, were still standing.

Building No. 369 - Frame Shed over Tanks, distant 1100 ft. Building completely demolished but the tanks inside as well as several tanks outside remained on their foundations.

Building No. 77 - Two-story Boiling Tub House, distant 1250 ft. Tile walls, wooden roof trusses and wooden floor beams. Building completely wrecked.

Building No. 74 - Main Power House, distant 1500 ft. Substantial brick building of considerable height with interior steel columns and steel supported floors, steel roof trusses, concrete roof slab, slag roofing. Roof almost flat. While the north and south ends

of the building are badly demolished, the center portion, including two stacks, were still standing as was also the coal conveying system on the south end and the ash skip hoist at the north end, all of which was evidence of the strength of steel construction and brick buildings well braced on the inside and with comparatively flat roofs.

Building No. 118 - Main Office, distant 1500 ft. Two story and attic main building with an ell extension towards the south, the latter used for record store. The complete wreck of the rear addition and the end of the building away from the explosion and the brick end wall and part of the other which were still standing intact, gave further evidence of the strength of a substantial and well built brick wall.

Building No. 54 - Millwright Shop, distant 1750 ft. One-story brick building, 21" brick walls with pilasters, steel roof trusses covered with 3" plank, slag roofing.

Roof completely crushed in end end of building away from explosion blown out which probably was caused by the direction in which the pressure was applied to the roof. Roof trusses twisted and distorted caused by the extreme pressure applied to the entire roof surface. Brick walls except end wall away from the explosion standing practically intact. Machinery in the building did not appear to be badly damaged.

Building No. 108 - Laboratory, distant 2050 ft. One-story and basement brick building. This building was located just outside the 2,000 ft. zone. Roof and interior of building completely demolished but the brick walls were standing practically intact, showing that the damage to this building was done by the roof crushing in.

Northwest of the Main Office, distant about 1800 to 2200 ft., there were a number of buildings, mostly small and of frame construction, which were completely wrecked. In one of these buildings, distant 2100 ft., was stored at the time of the explosion, 40 lbs. of dry guncotton which exploded, scattering the frame building over a limited area. A nearby building contained about 50 lbs. of 30% moisture guncotton. This guncotton as well as the building burned.

In this vicinity there was also located a Paste Storehouse which contained at the time of the explosion about 100 lbs. of N.G. in alcohol solution and about 15 lbs. of N.G. paste. The frame building was demolished but the contents were not damaged.

Building No. 325 - Raw Materials Storage, distant 1600 ft. - for H.E. Plant. This was a three story building with steel frame set on concrete foundations forming the first story side walls of the building. Steel columns encased in concrete. Steel floor beams with concrete floor. Reinforced concrete roof slab practically flat slag roofing, tile curtain walls.

The only real damage to this building was the collapsing of portions of the tile curtain walls. Frame, floors and roof practically intact.

This building although more exposed was in better condition than adjoining buildings which were of similar construction but not quite so well braced on the inside, showing the advantage in comparatively high buildings of well braced and tied together steel frame.

Building No. 55 - Brick Storehouse, distant 1650 ft. One-story building 18" brick walls, steel roof trusses, slate roof.

Roof trusses collapsed under pressure on the side towards the explosion completely pulling down the entire roof structure, but the

brick walls were only partly down. The roof trusses in this case appeared to be of about ordinary construction and designed to withstand ordinary wind pressure, snow loads, etc., with about one-quarter pitch, but evidently the trusses were not strong enough to withstand the tremendous pressure exerted on the roof surface and transmitted by the purlins to the trusses. This particular feature will be frequently referred to in the following and it is sufficient that the increased snow load and similar load by using a flat type roof is of no comparison whatsoever with the pressure of the explosive wave such as here occurred, and that a flat type roof is of great advantage in the vicinity of possible explosions.

Building No. 56 - Brick Storehouse, distant 1950 ft. Similar construction and damage as the building above.

Building No. 385 - Beater House, distant 1450 ft. Tile walls, wooden roof trusses. Building completely wrecked.

Building No. 475 - Poacher House, distant 1400 ft. Tile walls, steel roof trusses, corrugated iron roof with concrete partition wall. This building was completely wrecked. Concrete partition wall was still standing practically intact with only a slight tilt near the top. This concrete wall was approximately 30 ft. long and at least 36 ft. high. It is 12" wide from the foundation up. This partition wall practically faced the explosive center and the fact that it was still standing in the midst of the wrecked building is a remarkable evidence of the strength of reinforced concrete.

Building No. 476 - Guncotton Storehouse, distant 1650 ft. This was a small building with a concrete roof slab supported on reinforced side walls with tile curtain walls in the ends.

This building was protected by being placed in a hollow and furthermore by the standing concrete partition wall in No. 475 - distant 1400 ft. - and the only damage to building was that some doors were ripped off.

Building No. 87 - Ether Alcohol Building, distant 1650 ft. Comparatively high building, steel frame and corrugated iron sides and roof.

The corrugated iron was practically entirely ripped off. The steel frame was bent and twisted in places but not very badly.

Although this building appeared to be of light construction it was well braced by floors at different levels and probably the corrugated iron partly collapsed preventing a concentrated pressure on the steel frame.

Buildings Nos. 471, 472, 473, and 474. Buildings occupied by smokeless powder operation, distant 1900 ft., dehydrating, mixing and pressing. Tile buildings with steel trusses and a number of 12" concrete partition walls. The tile walls and steel trusses were completely wrecked. Concrete walls still standing and the principal equipment did not appear to be badly damaged.

Building No. 466 - Refrigerating House, distant 1750 ft. Tile walls, steel roof beams supported on pilasters, concrete roof slab.

The tile walls were partly down but the concrete roof slab was practically intact. A large section of this roof slab was actually unsupported by walls which collapsed, but the slab did not break. The equipment under this roof appeared almost undamaged.

2000 To 3000 Ft. Zone.

Included in this zone were buildings in immediate vicinity of No. 49, although some of them were located in the next zone.

Building No. 49 - Two-story Brick Hospital Building, distant 3250 ft., with slate roof. Brick walls not seriously damaged but roof partly crushed in.

Building No. 256 - Used as Quarters, distant 3450 ft. Frame building of comparatively light construction. Considerably damaged.

Buildings Nos. 44, 45, 46, and 47. Frame sheds of light construction, distant 2725 to 3000 ft. Practically entirely demolished.

Buildings Nos. 254, 255, and 256 - Bag Loading Buildings, distant 3000 ft. These buildings were constructed of frame, stuccoed, with the roofs supported on rafters.

Roofs caved in and walls distorted but mostly standing.

Building No. 321 - Igniter Building, distant 3050 ft. 8" tile walls, corrugated iron roof on steel lintels. Building divided by concrete barricade walls in several compartments. Building was also partly protected by a concrete barricade in front of building, this barricade being about 16' high, 18" wide at base and 9" wide at top. This barricade was originally erected as a protection for buildings 256 and 255 against building 321 and did not fully protect the building against explosions where they actually occurred. It gave evidence of the good effect of barricades.

The north end of the building which was not screened by the barricade was badly wrecked except the concrete partition walls, while the screened portion of the building was in fairly good shape. The building itself was, of course, in this case also braced by the interior concrete partition walls.

Building No. 45 - Bag Loading Plant, distant 2500 ft. Part of building two-story and greater portion of building one-story. 18" brick walls, steel roof trusses, corrugated iron roof laid on steel purlins. Building had false ceiling consisting of tile arches supported between steel beams running across building. The roof had the usual slope of about one quarter in one.

This building was rather badly exposed to the explosion. The steel roof trusses collapsed and penetrated the false ceiling and the brick walls were seriously damaged.

Buildings Nos. 278 - Bag Loading House, distant 2400 ft.; Store Shed No. 42, distant 2150 ft., and No. 329 - Raw Material Storage, distant 2150 ft., were frame buildings which were demolished.

Building No. 326 - T.N.T. Purification Building, distant 2200 ft., No. 327 - Tetryl Manufacturing Building, distant 2050 ft., and No. 328 Ammonium Picrate Purification Building, distant 2250 ft., were all three-story buildings with steel frame on concrete foundations, the concrete foundations partly forming the walls of the first floor. The columns encased in concrete and the buildings are practically similar to No. 325 described in previous zone. The interior bracing and floors were not quite as substantial as in Building No. 325 and consequently the damage to these buildings was slightly greater but the steel frames and roofs as well as the concrete foundations were mostly in good condition and a considerable portion of the equipment without serious damage.

Building No. 330 - Tetryl Dry House, distant 2200 ft. One-story building, tile walls, steel rafters. At the time of the explosion

this building contained 500 lbs. of tetryl in drying trays. The building was wrecked but the tetryl did not explode or burn.

Building No. 60 - Storehouse, distant 2850 ft. This storehouse was of brick construction, the lower part of the wall very heavy and finished off with concrete up to height of about 7 ft. At that level there was a stone coping running all round the building and on top of this coping the walls were lighter but provided with pilasters. On the side towards the track there were heavy concrete buttresses about 7 ft. high on each side of the three doors on the inside of the building. The building had steel roof trusses with 2" t. and g. plank sheathing and slate roof.

The roof trusses on the side towards the explosion were crushed, which in this case there was reason to believe, caused part of the side wall towards the explosion to collapse. The side wall away from the explosion and end walls were standing practically intact.

Building No. 69 - Store House, distant 2900 ft. Same construction as Store House No. 60. Brick walls practically intact, roof crushed in on the side towards explosion but still carried by the standing brick walls. The roof boards shattered in places.

Building No. 70 - Store House, distant 3000 ft. Same construction as No. 60 Store House. Side walls and north end wall collapsed down to top of the stone coping. Roof collapsed and completely down. South gable end standing intact.

Building No. 71 - Store House, distant 3050 ft. Same construction as No. 60 Store House. This building was protected from the explosion by Building No. 70. Brick walls cracked in the north end but otherwise in fair condition. Roof trusses crushed in on the side towards explosion but the 2" roof sheathing was almost intact.

Building No. 24 - Machine Shop, distant 2700 ft. 18" brick walls with pilasters, steel roof trusses and purlins. Roof sheathing consisted of 4" thick cinder concrete slab on top of the purlins. This slab covered with slate.

The effect of the explosion on this building was to almost disintegrate the concrete roof slab with the result that the immense pressure was not transmitted through the purlins to the trusses as was the case in adjoining buildings with other type of roof. Consequently, the steel trusses and purlins were still in place in almost perfect condition and the walls, not subjected to all kinds of pressure by the collapsing trusses, were practically intact.

It is interesting to note this fact and compare this building with adjoining buildings of slightly different roof construction.

Building No. 59 - Store House, distant 2600 ft. 18" brick walls with pilasters, steel roof trusses and purlins, 2" wooden roof sheathing covered with slate.

In this building the roof trusses on the side towards the explosion collapsed and the side brick wall towards the explosion were completely collapsed, while the end walls and the side wall away from the explosion remained intact.

This building was of practically the same exposure as the adjoining building No. 24 - Machine Shop, previously commented on. In this case the pressure exerted on the total area of the roof towards the explosion was transmitted through the 2" roof sheathing to the purlins which, together with the sheathing, held, transmitting the entire

pressure to the roof trusses that collapsed and undoubtedly in collapsing kicked out one side wall in the building.

Building No. 57 - Plating Shop, distant 2800 ft. 18" brick walls with pilasters, steel roof trusses and purlins, 2" wooden roof sheathing covered with slate. On the north side the roof was caved in, the steel trusses on this side badly distorted, but the 2" roof sheathing only broken in places. The outside brick walls were only slightly damaged but an interior 8" tile partition wall collapsed.

Building No. 58 - Component Parts Shops, distant 2700 ft. Practically same construction as No. 57.

Building was originally a storehouse and the roof trusses were of the usual design, supposedly only strong enough to withstand ordinary snow load and wind pressure. In installing the equipment in this shop the transmission was not carried on the trusses which were probably too light for the purpose, but heavy iron beams were placed at intervals across the building and anchored in the brick walls and the shafting hung from these beams. This additional bracing held the building walls in perfect alignment and to put this building in operation, only a very small amount of work was necessary in lining up the shafting.

The roof on the other hand was in the usual condition with the roof trusses crushed in on the side towards the explosion, but as usual the 2" roof sheathing held almost intact.

Building No. 30 - Carpenter Shop, distant 2600 ft. Brick walls, steel trusses and purlins with corrugated iron roofing. This building had a false ceiling consisting of tile arches supported on I beams running across the building. These I beams also supported on one row of columns in the center of the building.

This building was in a rather exposed position but the principal damage was to the roof which was crushed in on the side towards the explosion causing the trusses to collapse, but the ceiling I beams braced the walls from the inside and the brick walls were practically intact. The collapsing trusses in a few places penetrated the tile ceiling but did not cause any damage except at the point of penetration and most of the ceiling was in perfect condition.

It can be concluded from the effects on this building as well as by similar effect on other similar buildings, that the pressure exerted on the corrugated iron roofing, which was only supported on the purlins with no sheathing between, was transmitted to the purlins which held and further to the trusses which collapsed.

Building No. 586 - Change House, distant 2700 ft. This was a tile building, which was practically wrecked.

Building No. 65 - Ice House, distant 2450 ft. Frame Building. Wrecked. In this vicinity were located the pyrotechnic buildings, mostly small buildings of frame construction, which were more or less wrecked.

Building No. 106 - Solvent Recovery House, distant 2000 ft. One story brick building with brick partition walls, 1-1/2" t. and g. roofing boards on wooden rafters, corrugated iron roof. The roof was shattered, but brick walls only cracked in places.

Building No. 512 - Solvent Recovery Office, distant 2100 ft. Frame and corrugated iron building, completely wrecked.

Building No. 114 - Tray Dry House, distant 2050 ft. Frame building covered with corrugated iron, lined inside.

Building was wrecked but not entirely demolished, the interior partitions bracing the building.

Building No. 122 - Powder Dry House, distant 2300 ft. Same construction as building No. 114 but a larger area and less protected by trees.

Building wrecked to a greater degree than building No. 114.

Building No. 125 - Powder Dry House, distant 2550 ft. Same construction as No. 114. Damaged the same as 122.

Building No. 90 - Powder Dry House, distant 2550 ft. Same construction as building No. 114. Building badly distorted but not entirely wrecked.

Building No. 120 - Small Arms Powder Dry House, distant 2350 ft. Tile walls, stuccoed, tile partition walls, corrugated iron roof on steel purlins. Roof demolished, walls partly collapsed.

Buildings Nos. 290 and 291 - Blending Houses, distant 2750 ft. Frame covered with corrugated iron. Corrugated iron partly torn off and framework was badly twisted.

Building No. 115 - Vapor Dry House, distant 2850 ft. Frame and corrugated iron construction. Very light frame. Roof crushed in and parts of walls down.

3000 Ft. to 4000 Ft. Zone

Building No. 72 - Storehouse, distant 3200 ft. Same construction as building No. 60 described in previous zone. Side walls and north end wall collapsed down to top of coping. Roof collapsed and completely down. South gable end standing intact.

Building No. 20 - Shop Building, distant 3300 ft. Brick walls, steel roof trusses and purlins, corrugated iron roof. Building had a false ceiling of tile arches supported on I beams running across the building.

Walls were practically intact, being held together by the cross I beams supporting the tile ceiling. Roof was caved in on the side towards explosion. Roof trusses collapsed and partly penetrated the tile ceiling which, except for these penetrations, remained in good condition.

Building No. 469 - Pump House, distant 4375 ft. Small reinforced concrete building, practically undamaged.

Building No. 381 - Frame Shed over Sewage Disposal Plant, distant 3400 ft. Wooden frame shed completely wrecked.

Building No. 61 - Shell Machine Shop, distant 3800 ft. 18" brick walls and pilasters, steel roof trusses and purlins, 2" wooden roof sheathing covered with slate. Walls intact, roof trusses only slightly bent, roof sheathing good except opened up at ridge. The slight damage to the roof could be explained by the fact that this building did not face squarely against the site of explosion.

Buildings Nos. 62 and 63 - Shops, distant 3850 ft. and 4100 ft. Same construction and, if anything, less damaged than building No. 61.

Building No. 418 - Frame Shed, distant 4000 ft. Of light construction, completely wrecked.

Buildings Nos. 316 and 317 - Large light steel frame buildings,

distant 3300 ft. With steel sheathing. Both buildings were almost completely wrecked.

Building No. 19 - Hydraulic Pumping Station, distant 4000 ft. This was a brick building which evidently at one time was divided by a number of brick partition walls with steel purlins extending between partition walls carrying a corrugated iron roof. Later these partition walls were torn down up to the square of the building and heavy cross I beams carried the still remaining upper portion of the brick walls in which the purlins rest with a row of columns in the center of the building supporting the cross I beams. Except for some slight bulges in the roof building was practically undamaged.

Building No. 52 - Ammunition Assembly Building, distant 3725 ft. Brick walls, steel roof trusses and purlins, slate roof on planks. Roof trusses distorted and roof settled down on site towards explosion. Otherwise building was not damaged.

Building No. 117 - T.N.T. Casting Building, distant 2500 ft. This large building was constructed with a concrete frame and numerous concrete partitions. Tile walls stuccoed, steel roof trusses and purlins, asbestos protected corrugated roofing.

Outside of broken glass and some of the roofing ripped off, this building was in very good condition, undoubtedly due to the reinforced concrete frame and partition walls.

Building No. 27 - Booster Building, distant 3750 ft. Brick walls, steel roof trusses and purlins with corrugated iron roof supported on I beams running across the building, which I beams were supported on a center row of columns.

The roof crushed in places, trusses distorted and in some places penetrating the tile ceiling which, however, was not seriously damaged. Building walls were in good condition.

Buildings Nos. 208 and 209 - Explosives Dry Houses, distant 3500 ft. Tile buildings with steel girders carried on the tile walls, steel purlins, corrugated iron roof. Wall towards explosion blown in and building wrecked.

In this zone east of Picatinny Lake the following buildings are worth commenting on:

Building No. 96 - Testing Galleries, distant 3200 ft., Building No. 298 - Photographers building, distant 3200 ft., Building No. 140 - Store House, distant 3450 ft., Building No. 142 - Ballistic Laboratory, distant 3650 ft. All tile buildings with corrugated iron roof on wooden rafters, 8" tile walls. All of these buildings collapsed completely.

Building No. 133 - N. C. Dry House, distant 2100 ft. Two-story building, hollow tile walls, stuccoed, interior partition, wooden rafters, corrugated iron roof.

The roof was crushed in but the walls were almost intact. The light damage was probably due to topography and trees screening this building.

Outside of 4000 Ft. Zone

Substantial buildings in this zone such as officer's quarters, No. 102, distant 4600 ft., No. 103, distant 4300 ft., and No. 2, distant 4000 ft., and a barn, No. 5, distant 4875 ft., suffered practically no damage except broken windows, plaster, etc. The Garage, No. 285, distant 4800 ft., was a large one-story building with steel frame supported on interior steel columns, tile walls and a flat roof carried on steel

purlins. This building was also practically intact due to the strengthening steel frame construction and flat type of roof.

Among other buildings in the extreme south area were about twenty-five tile storehouses, distant 5100 ft. to 7500 ft., with 8" tile walls, the roof supported on wooden rafters. Almost without exception these buildings were damaged to the extent of sloping roofs being bulged in on the side towards the explosion and frequently some portion of the tile walls collapsing.

The same thing applies to about 50 buildings, distant 3650 ft. to 8700 ft., in the extreme western portion of the arsenal. These are mostly small buildings about 30' x 50' constructed of 8" tile walls with corrugated iron roof laid on wooden rafters extending the length of the building. All roofs were bulged in on the side towards the explosion sometimes completely collapsing and portions of the tile walls were down. A few of these buildings that were used for manufacturing purposes were provided with interior partitions and in such cases the building withstood the shock much better.

The structural damage done in the various buildings of Picatinny Arsenal depended upon:

The distance from the site of the explosions.
The structural strength of the building itself.
The extent to which the individual buildings were screened or otherwise protected from the effects of the explosion.

The buildings of Picatinny Arsenal were in a general way, of a good and substantial construction. The first buildings were erected about the year 1883 and erection of buildings had been more or less continuous.

The effects of the explosion showed positively that the peaked type of roof was the weakest part of the buildings. The principal buildings located within the inner zones with peaked roofs were almost entirely constructed with steel roof trusses and purlins and roof covering of various kinds.

While no actual dimensions were taken of the roof trusses, they appeared to be of the ordinary strength and spacing, probably designed to withstand a maximum wind velocity of 100 miles per hour, which with most of the roofs having 1/4 pitch would be equivalent to a perpendicular pressure of about 24 lbs. per sq. ft. This would apply to a wind storm where it can be assumed that the force is exerted in a practically horizontal plane. This was not the case with the explosive wave in this instance. The exploding magazines were located above the zone of principal damage. The explosive wave that struck the buildings was therefore not horizontal but approached at a right angle to the sloping roof. The wave velocity varied but in some areas undoubtedly exceeded 100 miles per hour. Even a 100 mile per hour gale striking the roof in the direction it did would have created a pressure of 50 to 60 lbs. per square foot.

Many of the buildings gave evidence that, even with a roof truss that could not withstand the pressure and collapsed, the building walls were immensely strengthened by having substantial beams running across the building from wall to wall. This construction in many instances saved the walls of buildings in which the roof trusses collapsed. The steel frame flat roof buildings such as 325, 326, 327 and 328, showed remarkable strength, particularly when the interior was well braced by beams, supporting floors and to a noticeable extent, by concrete floors at the different levels as compared with wooden floors laid on steel girders.

The strength of reinforced concrete to resist such shock and

pressure as here occurred was shown as remarkable. The flat concrete roof of the power house, building No. 514, undoubtedly saved a large portion of the walls in this building from collapse. The high concrete partition wall in building No. 475 has already been commented on as has the concrete building No. 476 and the concrete partition walls in buildings 472, 473, 474 as well as the concrete roof in building 486. All of these buildings were in comparative vicinity of the explosions.

For structural strength substantial brick walls appear to be the choice next to reinforced concrete. Many of these walls that were still standing had been subjected to tremendous shock and pressure. They have been referred to in the detailed description and here will only be mentioned buildings 118, 54 and 108 which were directly exposed and in comparatively close vicinity to the explosions. All of the roofs of these buildings were down and the walls of No. 118 - Main Office Building - were completely down on the side towards the explosion, but the three story gable end wall away from the explosion was still standing, as were also almost intact, walls of buildings 54 and 108.

Building No. 88 which was not only greatly exposed to the explosion, but caught on fire, still had one gable end wall standing and portions of the other walls.

Light structural steel buildings of the unit knock-down type, such as buildings 516 and 517, were absolutely valueless under shock and pressure as here occurred.

A great number of tile buildings existed at Picatinny as well as in the Naval Department; most of them built of 8" tile, many with wooden rafters carried on the tile walls. (This construction applied mostly to Picatinny). Others with steel girder roof construction supported on pilasters. (This occurred mostly in the Naval Depot). The light tile walls did not have sufficient structural strength to withstand the shock and the action of the collapsing roof. On the other hand, the tile ceiling arches in some of the buildings at Picatinny showed excellent results, being strengthened by the steel beams carrying the arches spaced comparatively close together. For the purpose of curtain walls or similar walls in a substantial structural steel or reinforced concrete frame building, tile may be used but it should not be placed in long or high span walls and never be depended upon in those circumstances for structural strength.

Damage to Outside Property

On the road from the entrance into Picatinny Arsenal (Cannon Gate) to Spicertown, there were 14 or more small frame houses, spread out for a distance of about one mile; the first being about 1-1/2 miles from the scene of the explosions. None of these houses suffered any damage, other than the knocking down of plaster, the breaking of a few windows, and a door or two pulled out. In Spicertown, a distance of about 2-1/2 miles, and Wharton, about 3 miles away, there was practically no damage at all; in fact, in this direction (SW) there was no damage outside of an occasional pane of glass being broken.

Located in a corner of the Lake Denmark Depot were three frame houses and some frame out-buildings - distant about 2500 to 2700 ft. - all of which had roofs stove in, and those of flimsy construction collapsing.

Further along the road were five or six fairly well constructed frame residences and bungalows. All of these had upper portions of the houses pulled out and roof supports damaged.

Near the crossroad (distant about 3500 feet) were a few more frame dwellings and a small frame church. The dwellings had the roofs

damaged and some siding pulled loose. The church did not suffer any marked external damage but was considerably ripped to pieces inside.

On the road from Picatinny to Mt. Hope (between Picatinny and the crossroad) there were two or three frame farm houses and barns, also a few dwellings and a collection of bungalows. All of these had the roofs seriously damaged, porches pulled loose and sidings damaged. Some of the flimsy structures were about wrecked. The above were about 3000 feet away from the explosions.

Beyond the crossroad and into Mt. Hope, there were a collection of cheap frame dwellings (distant about 4500 feet) more or less sheltered by a hill. A few broken rafters, windows and doors pulled loose, was the extent of the damage suffered.

On the crest of the hill above Mt. Hope, about 5800 ft. distant, there were three or four frame dwellings, one of which in a more exposed position had the roof supports and coverings damaged to the extent that renewal was necessary. The others were not damaged except plaster knocked down and windows and doors pulled loose.

Down the hill, and at the foot of the hill, lay Mt. Hope (distant about 6000 feet), a small village containing a store, garage, and collection of frame dwellings, also a well built stone residence. No damage of moment occurred here. Damage to plaster and glass breakage was slight.

In the town of Rockaway, a distance of about 3-1/2 miles, the glass breakage was quite general. Practically all plate glass windows in the business section were broken, considerable of the window panes in residences were broken, and two or three churches nearly all windows were broken and the frames in some instances pulled out.

There was a row of cheap frame houses in the lower end of the town, probably 4 miles away from the explosion, which had the roofs slightly damaged and some chimneys knocked down. Some of the windows were ripped out.

Beach Glen (distant about 3-3/4 miles). This village consisted of a small group of frame houses and barns. The damage consisted of plaster knocked down and some breakage of glass.

Hibernia (distant about 3-1/4). This village consisted of a group of cheap frame structures, with a few better grade frame residences and a frame church. The damage consisted principally of some plaster knocked down and the breakage of glass. In one end of the settlement, nearest to the point of explosion, the damage to plaster was fairly general, and some doors and windows pulled out. Quite a number of people were slightly cut by flying glass, and one child injured by bricks from a falling chimney. This section was evacuated after the first and second explosions.

On the road from Hibernia to Lake Denmark (1-3/4 miles) there were a few frame dwellings and barns, all of which had plaster damaged and windows and doors ripped out. One house, a cheap two-story frame, which was in plain sight of the water tower on the northeast section of the Lake Denmark Reservation, had plaster knocked down and doors and windows ripped out. The people residing in the house were not injured. A ramshackle frame barn located on the same property had the sides pulled loose.

Further up this road, at the corner of the Naval Reservation was a frame two-story house, old and in poor repair. This house had plaster knocked down and some of the windows and doors pulled loose.

At Denmark (about 2 miles away) there was a collection of four or five houses, the principal one a two-story frame residence comparatively new and good type of construction. The windows and doors were pulled out, some damage done to plaster, and one chimney top knocked down.

Across a valley to the northeast, situated on the crest of a hill about 2-1/4 miles away, in plain view of the water tower on the Navy Reservation, there were scattered groups of houses, mostly frame bungalows. Some damage of a minor nature was experienced by most of these houses. A two-story frame cottage was badly wrenched and the sides of the house being seperated from the floors; roof rafters were cracked, chimney knocked down, some of the doors and windows pulled loose. There were two people in the house at the time of the first explosion; the woman received a few slight scratches from flying glass. One bungalow in this community was slightly shifted on the foundation. In this vicinity it was reported that there were a number of persons who received cuts from flying glass.

Killed and Injured

Nineteen casualties were caused by the detonations. The greatest loss of life occurred in the fire fighting parties in the vicinity of Temporary Storehouses Nos. 8 and 9. Eleven marines and one enlisted man of the Navy, and four commissioned officers, (three of the Navy and one of the Marine Corps attached at the station) were killed at this point. Most of the men killed were in the first fire-fighting party to arrive at the scene, and were probably all within 300 to 500 feet of the explosion.

Thirty-eight officers and privates in the Navy Marine Corps were injured (34 lacerations and bruises, 1 sprained back and shock, 1 wounded by shell fragment, 1 fractured skull, 1 shock).

Of the 38 injured, about 25 were with the second fire-fighting party which, with a hose cart, had reached a point near Store House No. 1 (within 1000 ft. from Temporary Store House No. 8, when the first explosion occurred; the force of the explosion disorganized the party, and by the time they got started again with the hose cart, the second explosion occurred. (Orders were then given to abandon the post.)

The body of a woman was found under the ruins of the two-story stucco dwelling which stood about 300 ft. from Temporary Store Houses Nos. 8 and 9. The body was in the basement under a mound of ashes and debris, and apparently she had survived the first explosion and had taken refuge in the basement when the second explosion occurred, which completely demolished the building.

Having been warned by the fire, the wives and families of the Lake Denmark Depot employees (who resided in dwellings near to Temporary Store Houses Nos. 8 and 9), together with some visitors (in all 1 man, 3 or 4 women, and 2 children - one a baby 18 months old), hastened down the road in the direction of Picatinny Arsenal, and were a short distance outside of the Lake Denmark gate (about 750 ft. from Temporary Store House No. 8 and 600 ft. from Temporary Store House No. 9) when the first explosion occurred. An automobile, with 4 men passengers, passing about this time, stopped and took aboard the women with the baby, and the second explosion immediately followed. The people on foot were knocked down by the explosion and all received injuries, principally laceration of faces and arms. The passengers in the automobile, which was wrecked, were thrown out and one woman was so badly injured by flying debris that she died in the hospital later. The baby received lacerations of the scalp, two of the men lacerations and cuts on the face, one lacerations about the arms, and the other slight injuries.

The Commander of the Arsenal and a private were at Temporary Store House No. 3 about 600 ft. from Temporary Magazine No. 8) at the

time of the first explosion. Both were badly shocked and injured by flying debris, but managed to remain on duty in the upper end of the Lake Denmark Depot most of the night following the disaster. A civilian employee was in contact with the Commander of the Depot during the disaster, and received quite serious injuries from flying debris, etc.

An officer, a member of the Picatinny Arsenal Staff, was killed in the Boater House on Picatinny Arsenal by being crushed when the building collapsed. This house was located about 1500 ft. away from the first explosion and it seems logical to assume that the collapse of the building was due to the first explosion, since otherwise he would have left the building before the second explosion.

The Gatekeeper, or Guard, stationed in the Time Office on Picatinny Arsenal, a little over 2100 ft. from Temporary Store Houses Nos. 8 and 9, had some ribs broken and suffered other injuries. The watchman, or Guard, in the Main Office on Picatinny Arsenal (distant about 1500 ft. from Temporary Store Houses Nos. 8 and 9) was caught under falling debris, caused by the first explosion, but managed to free himself, climb out a window, and had run down the road about 500 ft. to a point opposite the Millwright Shop, when the second explosion occurred, by which he was knocked down and rolled. His injuries consisted of only cuts and bruises.

There were men on duty in both the Power House on Lake Denmark Depot and also the Power House on Picatinny Arsenal. These men remained on duty until after the second explosion, when they left the buildings to seek a place of safety. None of them received injuries of any moment.

Some of the personnel and members of families on Picatinny Arsenal received slight injuries, principally from flying glass. Two or three who were in the vicinity of the Main Office in an automobile were struck by missiles (stones) thrown by the first two explosions. The hits were not direct, but by ricochetting stones which had struck the road and ground between them and the scene of the explosion.

A couple of employees of the Lake Denmark Depot resided in small frame dwellings in the south end of the Reservation. These houses were about 2000 ft. from Shell House No. 22 and 2700 ft. from Temporary Store Houses Nos. 8 and 9. The adults and children, some 7 or 8 in all, received slight injuries principally from the shattering and collapsing of the dwellings.

Missiles

The ground between Temporary Magazines Nos. 8 and 9, to a point beyond the Main Office of Picatinny Arsenal, was covered with boulders and rocks, the limits of this zone reaching 2000 ft.

Scattered over the reservation could be found pieces of the trusses and girders which supported the roofs of Temporary Store Houses Nos. 8 and 9, and Shell Store House No. 22. These fragments, deeply pitted, were scattered in many directions, a large number being found on the top of the hill in the vicinity of the Commander's Residence on Lake Denmark Depot. Some few pieces were found on Picatinny Arsenal. These pieces varied in weight from a few pounds up to more than 100 pounds, and were thrown about 3000 to 4000 feet.

Strewn over the area in the vicinity of Shell Store House No. 22 were many shell of various calibers, a few of which had exploded with a low order of detonation. There were shell fragments found in the vicinity of No. 77 Boiling Tub House on Picatinny Arsenal, and also of 96 Testing Gallery, Picatinny Arsenal (thrown about a mile).

There were a few unexploded shell found as far away as 3/4 of a mile.

There was a crater from the explosion of a 5" shell in the Parade Ground of Picatinny Arsenal (about one mile from Shell House No. 22). There was also a crater from an exploded shell alongside the road from Picatinny Arsenal to Mt. Hope (3000 ft. away), and undoubtedly many similar instances would have been disclosed by close search of the adjacent country.

Many shells were found in quite badly damaged condition, and it was surprising that they had not exploded. The tabulation shown below summarizes the results of this explosion:

	Totally Demolished or Collapsed	Partly Demolished or Collapsed	Substantial Structural Damage	Minor Structural Damage
Buildings				
Substantial Construction	1500 ft.	3000 ft.	4000 ft.	-----
Hollow Tile	4000 ft.	5000 ft.	7000 ft.	8000 ft.
Frame	3000 ft.	-----	4800 ft.	-----
Dwellings				
Substantial Construction	-----	-----	4000 ft.	4500 ft.
Stucco-Frame, etc.	-----	3000 ft.	4500 ft.	*2½ miles

*Some small frame houses on exposed hilltop - the damage verging on substantial structural.

Note: Plaster knocked down, doors and windows damaged, up to about 3 to 4 miles.

Glass Breakage	General	Slight
Plate	Up to 3-1/2 miles	Up to 5 miles
Window	Up to 3-1/2 miles	Up to 5 miles

Killed and Injured	Killed	Injured	Escaped
In buildings	1500 ft.	**3 miles	Within 1500 ft.
In open	***600-750 ft.	***750-1500 ft.	Within 750 ft.

**Cuts from glass.
***Struck by missiles.

The American Table of Distance has only been detailed or charted up to a quantity of 1,000,000 pounds. To make comparison with the damage resulting from this explosion, it is necessary for an amount of 1,600,000 pounds to extend the table by calculation. The barricaded and unbarricaded distances would be approximately as follows:

1,600,000 Pounds	Barricaded	Unbarricaded
To nearest inhabited dwellings	4100 ft.	8200 ft.
To nearest public railroad	2350 ft.	4700 ft.
To nearest public highway	1200 ft.	2400 ft.

It will be noted that 8200 feet for an unbarricaded magazine would have been ample protection for buildings of any construction, even though there was a weakening effect on structures by the first explosion of 670,000 pounds. The trees surrounding Temporary Store Houses Nos. 8 and 9, might be considered as constituting a barricade, but the explosion in No. 8 building practically removed it, leaving the explosion in No. 9 a clean sweep.

Undoubtedly 4700 feet would have been ample protection for a

railroad, and from the experience of persons in the open, 2400 feet was more than sufficient protection for a highway.

Citations for bravery were awarded certain personnel of Picatinny Arsenal for their heroism at the time of the Lake Denmark disaster, the seven officers and enlisted men included receiving the Soldier's Medal for heroism. The citations accompanying the awards to Major Herman H. Zornig, Captain Joel C. Holmes, Captain John P. Harris, Technical Sergeant Christian J. Vogt, all of the Ordnance Department - and then stationed at the Arsenal - and to Messrs. E. Williams, I. Yamin, and T. E. James, civilian employees of the Arsenal, read similar to that awarded Major E. P. Ramsey, Ordnance Department, Commanding Officer at Picatinny Arsenal at the time of the disaster, reading as follows (18 & 19):

To Major Ramsey:

"For heroism on July 11, 1926, during the explosions at the Lake Denmark Naval Ammunition Depot, near Dover, New Jersey. Major Ramsey, in charge of a party of eight men, entered the burning area at 6:30 A.M. to search for First Lieutenant George W. Bott, Jr., United States Army, who was known to have been in the powder factory at the time of the first explosions late the preceding afternoon. Throughout the search they were in close proximity to burning magazines, and exposed to frequent explosions of large caliber shells and small arms ammunition. While there was still possibility of more serious detonations and at the risk of their lives they located the body of Lieutenant Bott, and with great difficulty succeeded in removing it from the wreckage to a point outside the danger zone."

The citations awarded Major Augustus L.L. Baker, M. C. Res., of Dover, N. J., contract surgeon at Picatinny, and Staff Sergeant Arlie L. Downey, Finance Department, read as follows:

To Major Baker:

"For heroism on July 10, 1926, during the explosions at the Lake Denmark Naval Ammunition Depot, near Dover, New Jersey. Doctor Baker, the contract surgeon for Picatinny Arsenal, was in his office in Dover, N. J., when he felt the concussion of the first explosion and immediately left for the arsenal. Upon learning that an injured woman was lying in the road near the point where the two heaviest explosions had occurred, Doctor Baker, accompanied by two other men, proceeded toward that point. While there was probability of other serious detonations, they reached the injured woman, rendered first aid, and dispatched the patient to the hospital. The rescue was made at a time when there was a continuous roar of exploding magazines and when the air was filled with flying shells, stones and fragments of buildings, and was effected shortly before the third heavy explosion occurred."

To Sergeant Downey:

"For heroism on July 10, 1926, during the explosions at the Lake Denmark Naval Ammunition Depot, near Dover, New Jersey. Sergeant Downey upon learning that an injured woman was lying in the road near the point where the two heaviest explosions occurred, accompanied by two other men, proceeded toward the point. While there was probability of other serious detonations they reached the injured woman, secured a litter and dispatched the patient to the hospital. The rescue was made at a time when there was a continuous roar of exploding magazines and when the air was filled with flying shells, stones and fragments of buildings, and was effected shortly before the third heavy explosion occurred.

CHAPTER X

Recreational and Interest Building Activities

Associated with the industry at Picatinny are its recreational and interest building activities. It's setting provides many opportunities for sports; its publication, the "Barrage," disseminates its news to all employees; and its Benefit Association offers insurance to those employed at the Arsenal.

The lake, within the boundaries of the reservation, provides excellent fishing, swimming, boating, and skating in season, which are taken advantage of by the residents of the reservation and their guests. The woods and streams are inhabited with deer, muskrats, rabbits, hedgehogs, and mink, thus providing hunting and trapping in season.

These facts especially surprise the new-comer, who hardly expects to find such conditions but forty miles away from metropolitan New York. Old timers recalled the killing of a bobcat some years ago, when, on March 9, 1931, one was killed by stoning on Buffington (the East) Road.

The Arsenal can well boast of its excellent nine hold golf course which is kept up and financed through a membership of over two hundred (limited) members, and on which many interesting tournaments and plays may be seen taking place throughout the golf season. Play on a fine tennis court, supported by a club composed of Arsenal employees, is enjoyed throughout the playing year. For the winter months, providing indoor sports, the Arsenal boasts of two fine bowling alleys, and a handball court. Much rivalry exists in the Picatinny Arsenal Bowling League, a league of twelve teams representing the various departments of the Arsenal. Games are played throughout the winter season, each team meeting each of the others twice during the year. This league originated in 1926, the league averages steadily improving so that the percentage of increase for 1929 over 1926 was 10.3%. Dancing is made possible at the Arsenal by clearing the floor of the conference room in the Administration Building, where once a month the officer personnel of the Arsenal and their guests enjoy dance programs and where also the Arsenal employees, groups such as the tennis club, arrange entertainments. Aside from these sports and entertainments, the officer personnel, their families, and guests, have their afternoon and evening bridge clubs, dinners, and contacts, that, all told, make service at Picatinny most attractive.

Insurance against accidents and sickness is provided employees through voluntary membership in the Picatinny Benefit Association at nominal cost. The Post Restaurant in the Administration Building is an institution where noon meals and much table talk are enjoyed by those employed and visiting at the Arsenal. Once a month each employee receives a copy of the Picatinny Arsenal "Barrage," an unofficial publication that serves to acquaint its readers with the news of the Arsenal, each department having a column of personals, as well as sport news, items of general interest, and well written editorials. This paper serves a definite purpose in interest building at the Arsenal and is sought by past members of the garrison, several of them being on its mailing list, the paper being sent as far off as our Philippine Island possessions.

It is these factors that season the industry at Picatinny to make service and employment thereat sought after. They have not a little to do with the truly wonderful morale to be found in all the departments of the Arsenal.

CHAPTER XI
The New Picatinny

Immediately after the Lake Denmark catastrophe, which did terrific damage to the Arsenal July 10, 1926, no building escaping entirely and some being completely destroyed, the Chief of Ordnance, then Major General C. C. Williams, appointed a Board of Officers, of which Brigadier General Wm. H. Tschappat, Ordnance Department (then Colonel, Ordnance Department), was president, to appraise the damage and to make recommendations as to action that should be taken. This board recommended not only that the arsenal be rebuilt, but that additional land be purchased to enlarge and improve certain portions of it. The body of Congress in session in the fall of 1926 approved the rebuilding of the arsenal and in December 1927 Congress appropriated $2,200,000 for the rehabilitation of the ammunition arsenal. Appropriation authorized in HR 17111 - March 1927

The rehabilitation of the Arsenal came under the direction of Lt. Col. J. K. Crain, Ordnance Department (then Major, Ordnance Department), a member of the board who was ordered to take command of Picatinny Arsenal shortly after the board had completed its work, being relieved in April 1930 by Lt. Col. J. D. Rose, Ordnance Department. At the time of this change in command, the major part of the work of rehabilitation had been completed and the new testing station and administration building occupied. The transferring of activities then progressed in steps as the new facilities became available, the move to the new bag loading plant taking place over the period May to November 1930, the new metal shops were occupied in September 1930, the move to the new melt loading plant taking place November 1930 to March 1931, and the move to the new laboratories taking place in February 1931. The remaining rehabilitation work, such as on the Powder Factory, was also being carried to completion during this latter period.

The "Old Picatinny" had been a gradual development of many years. Expediency and the desire to make available funds cover as many facilities as possible played a large part in the layout of the plant. The Tschappat Board made the following statements in one of its reports: "During its inspection of damage to the Arsenal, the board considered the rearrangement of certain facilities with a view to greater safety and economy of operation. In a plant of this kind, handling explosives or inflammables in most of the manufacturing buildings, safety and economy of operation are in many respects diametrically opposed to each other.**** The board believes that facilities not involving explosives or unusual hazards should be separated from facilities involving such hazards by as great distances as practicable, when such separation can be effected without undue increased cost of operation of the plant as a whole."

This principle was followed in laying out the "New Picatinny." The reservation was divided into geographical areas, into which were placed the various activities depending upon their character. That this rearrangement could be effected readily demonstrates that the builders of the "Old Picatinny" endeavored to follow the same plan within the limitations imposed upon them.

The new arrangement led to a separation into three great divisions: 1st. The manufacturing activities in which powders and explosives are handled; 2nd. The storage areas in which powders and explosives are housed; 3rd. The manufacturing activities where non-hazardous materials are handled, and where the administrative and engineering functions are carried on.

In general, the central section of the reservation is used for powder and explosive manufacturing. The principal changes over the old arrangement are: (a) A new melt-loading plant located along the west shore of Picatinny Lake; (b) A new bag-loading plant located along the south shore of the lake; (c) The removal of the testing station to a plateau west of Picatinny Peak, and about 150 feet above the level of the lake; (d) The use of greater distances between buildings of the powder factory; (e) The establishment of a small high explosives plant on the eastern slopes of the reservation. The New Jersey State law

governing commercial plants was followed in the rearrangement of these units.

The melt-loading plant comprises four main buildings, well separated from each other, to accomplish the work done in one building (No. 117) in the old plant. The four buildings are connected by a covered run-way, along which ammunition can be moved either on lift-trucks or by roller conveyors. The buildings are also connected by railway.

The bag-loading plant for the first time in its history is housed in buildings designed for that purpose, and not merely adaptations from storehouses or other expediencies. The new testing station is a great advance over the old one in the character of its structures. The new powder factory stretches out to meet the new safety distances that have been adopted since it was first built. The new high explosive area is so located that any mishap there will not prove serious to any other area. This was not previously the case. The storage areas for powders and high explosives remain unchanged. Congress authorized the purchase of additional land, and negotiations are under way to increase the safety zone around these areas.

The third grand division referred to above is located in a belt extending across the reservation from east to west and near its southern end. Here are located: (a) A fine new administration building. (b) A main chemical laboratory with auxiliary buildings to remove operations embracing fire hazards to a safe distance. This group of buildings will afford our chemists proper facilities for carrying on the work so important to every group in the arsenal. The demands made upon the chemists and chemical engineers of the Nation by ordnance ammunition activities are many, and in time of war will be tremendous. Picatinny Arsenal is the chemical center for ammunition, and every effort is being made to properly equip the arsenal laboratory to fill its mission. (c) The shop area contains a new wood-working shop and a new metal shop, the latter a one-story structure, well lighted by ample windows and skylights.

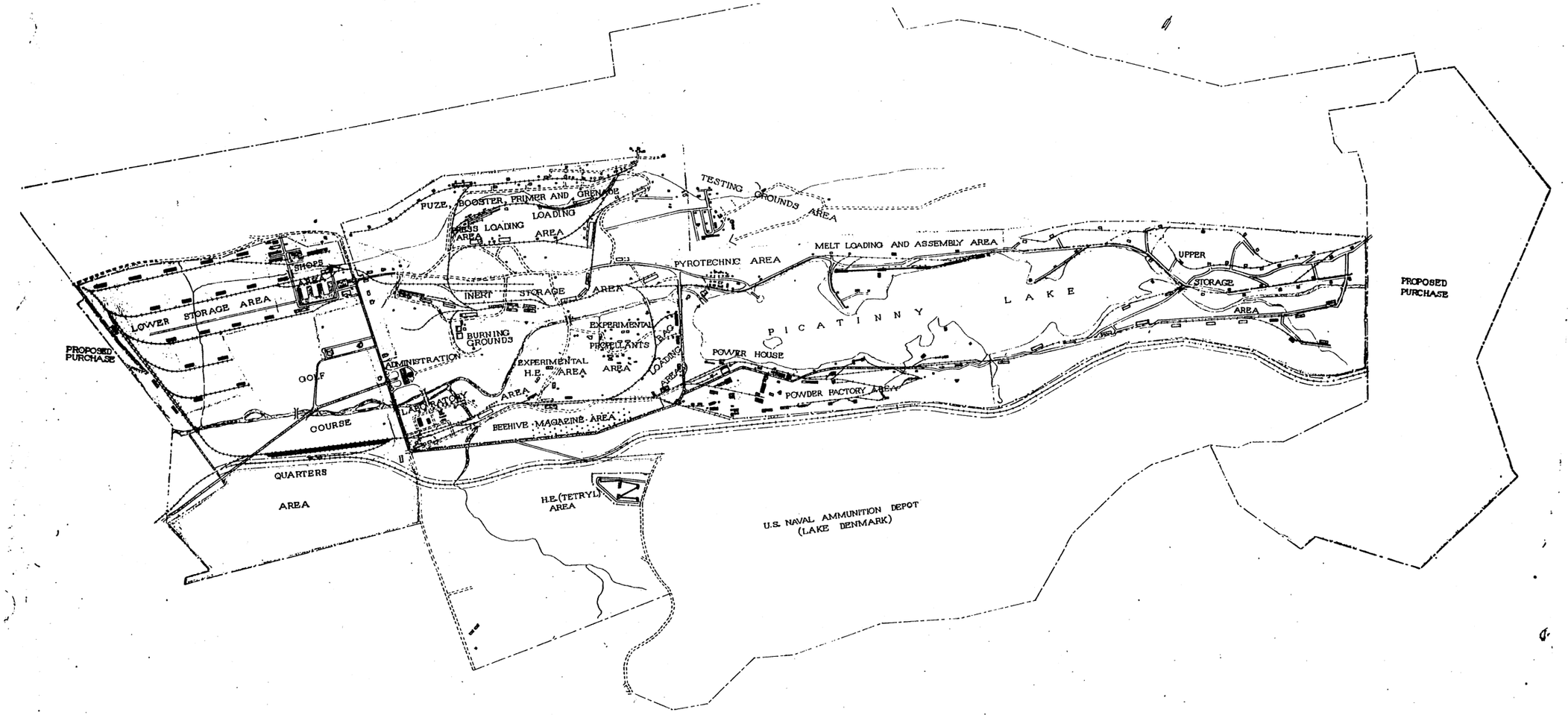
A new plant storehouse in the shop area was provided by remodeling the old stable (Building No. 5). In turn, the animals were cared for by converting a powder magazine into a stable.

The former metal and wood-working shops have reverted to storehouse use. This will begin their second cycle as such, for they were originally built as storehouses and later metamorphosed into shop buildings.

The map following shows the "New Picatinny" as it is today.

There are two factors that make up Picatinny: the personnel, comprising the organization; and the material, which constitutes the plant. The individuals of the organization - military and civilian - have always been of the highest character, loyal and devoted to their work, and to the interests of the Government. They had met and conquered every vicissitude in the life of the Arsenal, including the difficult period of the World War. The terrific damage of July 10, 1926, did not appall them. In a remarkably short time the plant was in operation, and in a few months "business as usual" was an accomplished fact. The organization that patched up the wrecks, and at the same time turned out ammunition from the wreckage, is still here.

Picatinny is not just another Army post, nor is it simply another explosives plant that has gotten back onto its feet after a blow. It is both these and more because it is the very essence of our entire national defense scheme. It is the Ammunition Arsenal of the nation, the design and development of artillery ammunition for the Army being the responsibility of Picatinny. (19)



LEGEND

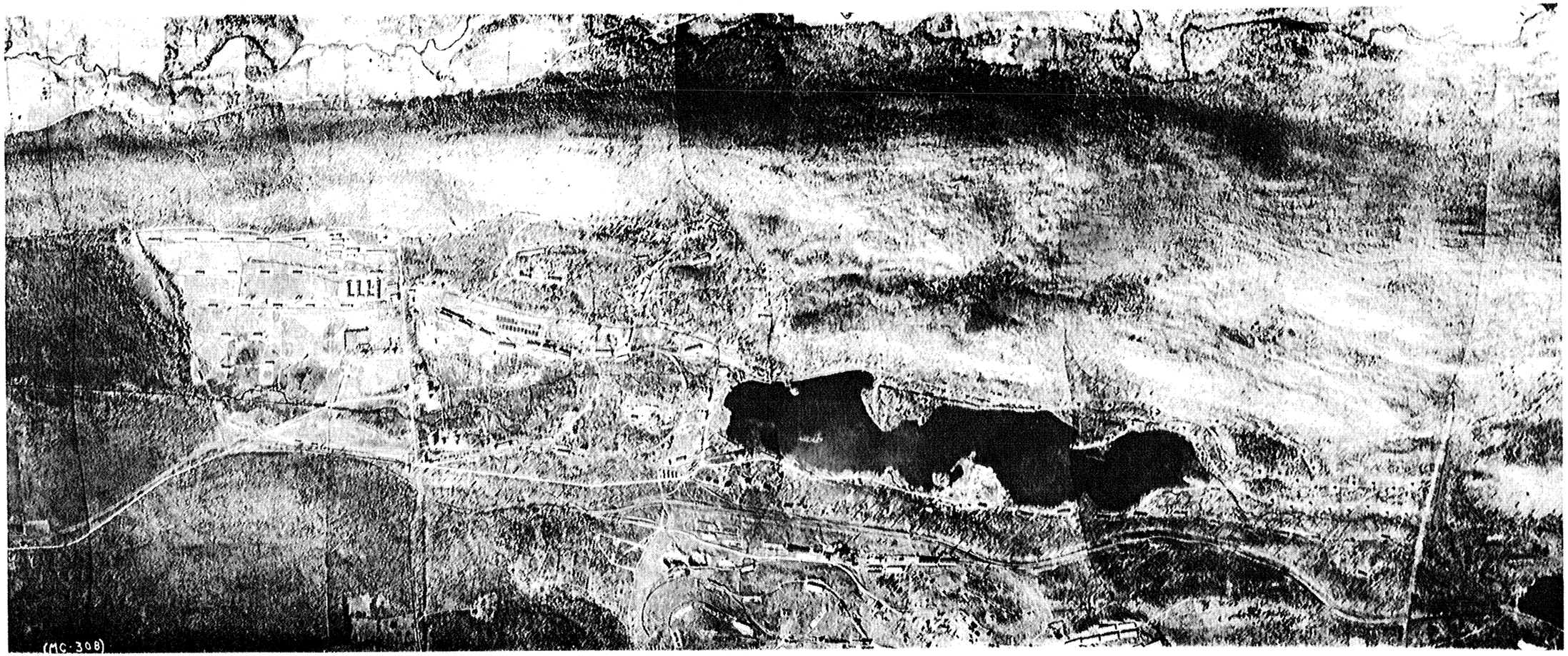
- CONCRETE ROADS
- CINDER ROADS
- DIRT ROADS
- BOUNDARY LINE
- FENCE
- NEW BUILDINGS
- REHABILITATED BUILDINGS

MAP OF PICATINNY ARSENAL

DOVER, N.J.

SCALE 0 1000 2000 3000 FEET

JAN. 31, 1931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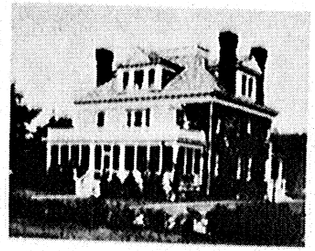
VIEWS OF PICATINNY ARSENAL

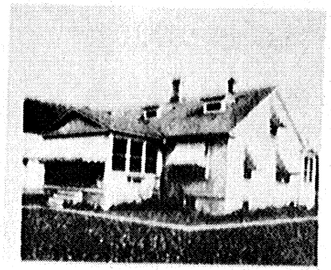
OFFICER'S QUARTERS

COMMANDING OFFICER'S QUARTERS

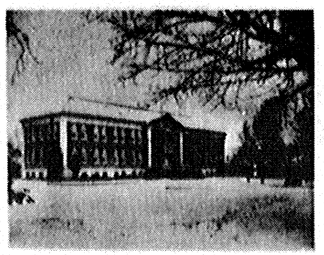
GATEWAY TO ARSENAL



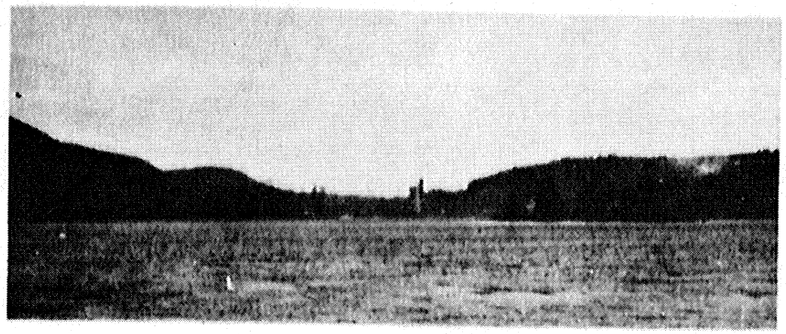
OFFICER'S QUARTERS



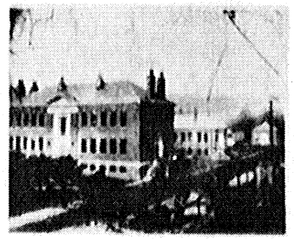
OFFICER'S QUARTERS



ADMINISTRATION BUILDING



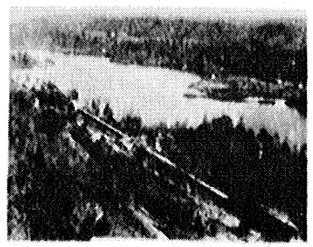
PICATINNY LAKE



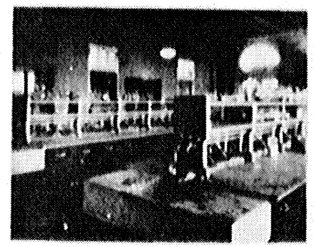
PICATINNY LABORATORIES

GREEN POND BROOK

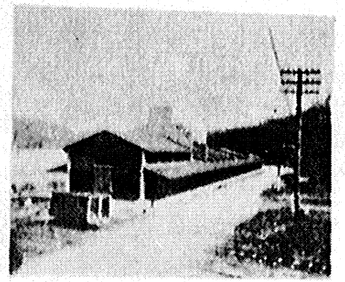
PICATINNY PEAK



NEW MELT LOADING PLANT AND LAKE

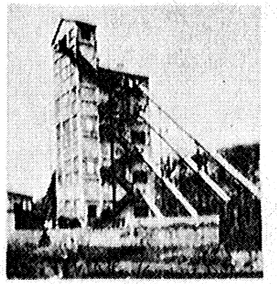


ANALYTICAL LABORATORY

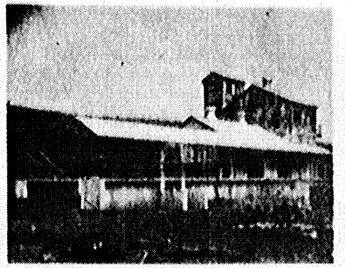


POWDER FACTORY

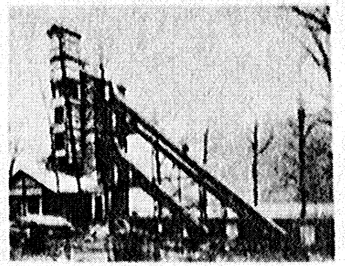
BAG LOADING



CANNON BLENDER

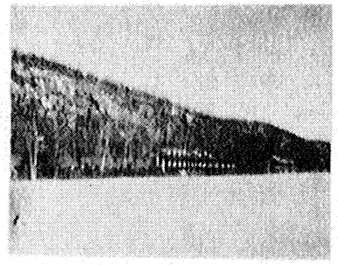


PACKING HOUSE

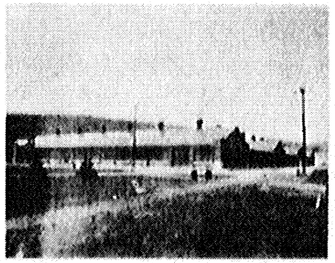


SMALL ARMS
POWDER BLENDER

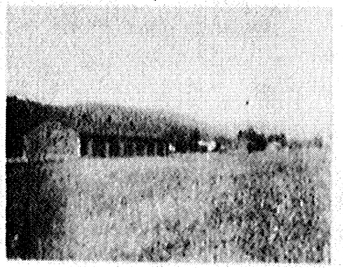
FOREGROUND - TESTING AREA
MIDDLE DISTANCE - PRIMER &
FUZE LOADING AREA



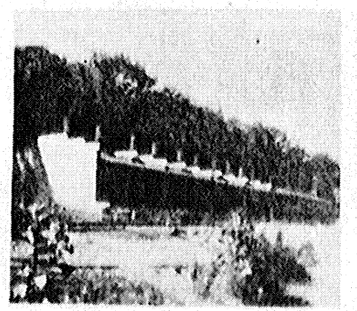
NEW MELT LOADING PLANT



MACHINE SHOPS

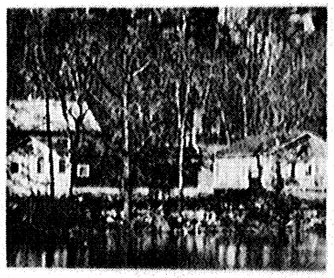


LOWER MAGAZINE AREA

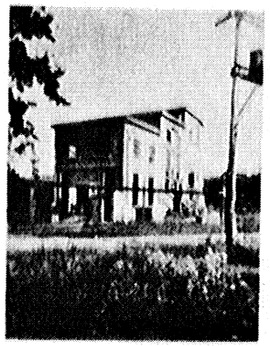


SOLVENT RECOVERY BUILDING

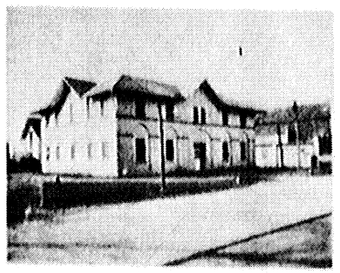
HIGH EXPLOSIVES EXPERIMENTAL
PLANT



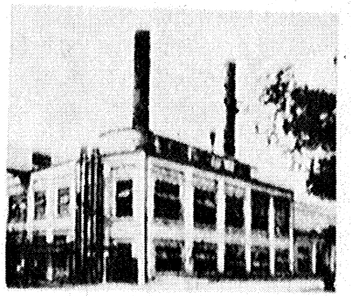
PYROTECHNIC AREA



PRESENT TETRYL PLANT



STOREHOUSE NO. 5



POWER PLANT

REFERENCES

Maps and Sketches

First map is taken from reference 2.
Second map is taken from reference 5.
Third map is taken from reference 4.
All others from the Engineering Department, Picatinny Arsenal.

1. P.A. File 314.7/1 - Military Histories.

2. Army Ordnance, Vol. VII, No. 37, July-August, 1926.

3. Dover Dates, 1722-1922, Charles D. Platt, Author.

4. History of Morris County, 1882 - Dover Public Library, No. 10456.

5. Geological Atlas of the United States, Raritan Folio, New Jersey, 1914.

6. Folder - Engineering Department - Picatinny Lake, Dam, and Spillway. (Memo. to Captain Cyphers, August 13, 1919).

7. P.A. File 682/18 - Arsenals and Armories.

8. Copy of letter, U.S. Powder Depot, dated November 18, 1886, to the Chief of Ordnance, serial number 254, filed loosely in book of deeds, Picatinny Arsenal.

9. P.A. File 682 - Arsenals and Armories.

10. P.A. File 600.913 - Folder, Engineering Department - P.A. Real Estate.

11. Deed Record book - Picatinny Arsenal.

12. History of Morris County, 1710-1915 - Dover Public Library, No. 10437, page 411.

13. P.A. File 601.1 - Deeds and Records.

14. P.A. File 400.21/35-1 - Administration of Depots and Arsenals.

15. Employment Records, Picatinny Arsenal.

16. History of Explosions - Institute of Makers of Explosives - on file in the library, Picatinny Arsenal.

17. P.A. File (old) 1-a.

18. Army Ordnance, Vol. VIII, No. 45, November-December, 1927.

19. Army Ordnance, Vol. VIII, No. 48, May-June, 1928.

20. Army Ordnance, Vol. IX, No. 52, January-February, 1929.

21. File C.O. 600.913/2811, P.A. 600.913/148-246-12.

APPENDIX

Synopsis of Reports of Fire Boards

The History of Picatinny Arsenal is hardly complete without a tabulation of the more serious accidents incident to the past industry carried on at the Arsenal. The available reports of boards convened to report on the more serious incidents, from 1915 to the present time, and including two prior accidents, one in 1911, and one in 1912, have been briefed for this purpose, and show as follows:

Date, Time, and Reference	LOSS			CAUSE	RECOMMENDATIONS
	Building Numbers and Value	Property - general description of and value	Personnel Affected		
			POWDER FACTORY		
June 14, 1911 3:30 P. M. 1-a/99		Dehydrating Press damaged at head and gibs with which it engaged.	1 Foreman severely burned, later dying as a result. 1 Operator severely burned. 2 Operators painfully burned.	Low order explosion. Top of head of press blown upward thru roof, landing 75 ft. from building, burying itself 2 ft. in ground. Definite cause not determined. Explosion occurred after the piston had been withdrawn from 4" to 6" from the position it held when high pressure was applied, and not until a few seconds after the release valve had been closed. The piston was therefore nearly stationary or what motion it had was due only to the compressibility of the water at the bottom end of the hydraulic cylinder. Press had been "greeling" all afternoon.	
Sept. 6, 1916 2:30 A. M. 600.913/10	Restoring - Mixing House $791.62	Product in process $100.00	4 Operators burned all of whom it is thought will recover.	Fire in powder mixer in which the dehydrated pyro had been placed, and was being fluffed up (preliminary to adding ether) by the turning of the mixing blades. Suddenly a loud explosion occurred followed by fire, flames shooting out from under the lid of the mixer, which was closed. A screw found in the mixer was thought to have caused a spark by scraping against metal which probably produced a spark, with sufficient heat to ignite the pyro.	
Feb. 22, 1918 5:30 A. M. 600.913/18	Entire roof of Finishing Press House at Powder Factory destroyed, electric light circuits, motors, and sprinkler pipes burned $3,000.00			Neglect of operative in improperly adjusting the machine, and of Asst. Foreman for allowing the cutters to become dirty. (Powder Factory Superintendent found that a fire had been communicated by a flash from the 1 pdr. cutter to the attic between the ceiling and peak of the roof.	

Date, Time, and Reference	LOSS			CAUSE	RECOMMENDATIONS
	Building Numbers and Value	Property - general description of and value	Personnel Affected		
March 11, 1918 7:00 P. M. 600.913/17	Shed - Mixed & Storage tanks, Powder Factory - damaged $500.00			Fire caused by steam pipes, which were placed right against the nitrated wood and which had high pressure in them.	
June 5, 1918 Morning 600.913/26		Part of pile of wet cotton - scorched - $50.00		Fire the result of spontaneous combustion in some damp cotton which is subjected to considerable heat. Opinion of operative that fire was caused by wet cotton coming in contact with dry cotton which was very warm.	
June 6, 1918 9:05 P. M. 600.913/26		$75.00		Press House - Fire caused by a cushion of air in the press, under high pressure, acting on the nitrated cotton.	
June 19, 1918 3:30 P. M. 600.913/26	None	30# powder, motor, and sprinkler heads $70.00	Arm of Operator slightly burned - no lost time	Fire started in #13 graining press in the Finishing House during the pressing of an extra long block of powder, some of the powder being "pinched" in the clearance space between the ram and the cylinder as the ram entered the cylinder, causing accompanying considerable friction which probably caused the fire.	None (the pressing of extra long blocks is not an unusual procedure).
Aug. 8, 1920 1:17 A. M. 600.913/90-1 etc.	80 and 81 lost Original Cost $33,000.00 Replacement Value $230,216.00	Equipment - Boiling tubs, Miller Duplex and Jordan beaters, motors, Allis Corliss engine, lathes, milling machines, shafting, etc., pumps, tanks, setting equipment etc. - Original Cost $72,228.00	None	Fire preceded by an explosion of medium order unexplained.	That facilities destroyed be restored. That the boiling tub house, beater house, and reworking mill equipment be installed in separate buildings, sufficiently separated to prevent fire spreading, and that none of the buildings be erected on the old site because of proximity of central power house. That in all future installations provision be made for proper cutting off from the building concerned of steam and electricity when the building is not in operation.

Date, Time, and Reference	LOSS			CAUSE	RECOMMENDATIONS
	Building Numbers and Value	Property - general description of and value	Personnel Affected		
July 24, 1925 600.913/140-1	Poaching House - damage $25.00		None	Blew the result of sparks from an oxy-acetylene torch - used in boring a hole in a steel upright in the rebuilding of the pyro pit used for catching pyro cotton from the Poaching House - igniting dry pyro cotton either in or on the outside of a steam ejector, the ejector and outlet pipe blowing up.	That the Arsenal Safety Regulations prescribe that oxy-acetylene torches be not used in explosive areas where electric drills or other means will do the work required, except with the express approval of the resident safety engineer in every instance.
March 10, 1926 8:20 A. M. 600.913/177-1		Cracked mixer lid $10.00 in Building No. 473	None	Fire caused by piece of iron wire from block breaker screen getting caught on the mixer blade, and thereby generating sufficient friction to ignite the fibres of guncotton.	That use of all slugs of brass and balls in the block breaker be discontinued, for as long as these hit the screen, it is possible for undue wearing to cause a break. This may come suddenly or slowly enough to be detected. That an additional block breaker be installed if capacity is affected thereby. That a better system of inspection of block breaker be carried out to the end that safety point in using a block breaker screen may not be exceeded.
Jun. 17, 1926 9:00 A. M. 600.913/178-1	Building No. 494 - damage $17.91 Note: This report is out of place it should appear on page 9 - under Experimental Propellant Plant.		One man badly burned, face and hands.	Fire of explosive violence - during charging of mixer with dehydrated long fibred unpulped pyro-cellulose cotton of approximately 12.20% nitrogen content - due probably to some pyro-cotton, probably quite deficient in alcohol, so caught under the mixer blades or balled up in such a manner that the friction generated thereby was sufficient to start the combustion of the charge.	That hereafter, no pyro-cotton of any kind be mixed in a mixer without sufficient solvent to make the charge moist. To this end dehydrated blocks will not be held over a period of time sufficient to allow contained alcohol to evaporate in minimum amounts. That the mixer blades be given sufficient clearance from the bottom of the mixer so that long fibred unpulped material, if used, cannot become caught. That a sheet steel guard be installed between the operator's usual position and the mixer so that in case of a flash, the hot gases will be less likely to reach the operator's body before he is able to escape.
Nov. 29, 1926 11:35 A. M. 600.913/186-S	Annex to Building No. 135 damage $175.00	Equipment and 1,000 lbs. powder (for 156 m/m Gun) $1137.25	One death resulted from burns received.	Fire in a solvent recovery box in which was being carried out an experiment on recovering solvent from smokeless powder (pyrocotton cellulose base) at 95°C., cause not established.	

Date, Time, and Reference	LOSS			CAUSE	RECOMMENDATIONS
	Building Numbers and Value	Property - general description of and value	Personnel Affected		
March 10, 1930 800.913/192-2	Powder Factory Bldg. No. 473, damaged $150.00	Equipment damaged $350.00 Powder lost $105.00	None	Explosion - ignition of powder, probably due to either compression of entrapped air raising its temperature to ignition point of the powder; or that unealloided guncotton in preliminary blocking press may have been ignited by friction.	That low pressure hydraulic system be modified so as to give the 250 lbs. necessary for efficient operation of the low pressure side of all presses in the Powder Factory area.
			DRY HOUSES		
April 6, 1918 11:30 A. M. 600.913/13	Tray Dry House - one story light wood building, destroyed.	14,679 lbs. small arms and small cannon - straight nitrocellulose powder	Face and one hand of one man burned - not severe.	Fire started by a static spark from the body of a man handling partly dried Small Arms Powder in the immediate vicinity of trays of green powder for 2.95" Mountain Gun. No explosion, gases lifted and broke up roof, side walls consumed by resulting fire.	
Dec. 2, 1921 7:20 P. M. 600.913/113	Fulminate Dry House No. 325, damaged $1200.00			Explosion, cause undetermined.	Repair as was, replacing hand mixing methods by the installation of a mechanical mixer.
			CANNON BLENDER		
July 31, 1928 3:40 P. M. 600.913/181-6	Cannon Blender conveyor belt between Buildings Nos. 290 and 291, and Cannon Blender Buildings Nos. 290 and 291. Also Building No. 94, Small Arms Blend House, Building No. 134, Mull House, and Building No. 564, Paint Shed - all destroyed, value $50,550.00	100,000 lbs. of P.A. lot No. 3492 smokeless powder for 14-inch Gun, B.R. Mount, Model 1920 - destroyed, value $70,579.48 Also motors, cans, screens, rolling stock, scales, etc. contents of buildings, value $22,961.54	11 Employees, all either incurring burns or wounds caused by being struck by rocks or gravel.	Fire believed due to one of the following: (a) The ignition of powder or powder dust, or solvent along the conveyor by static discharge. (b) The ignition of powder or powder dust from the heat of friction arising from powder grains becoming jammed in the revolving guide rolls supporting the conveyor, or from the powder dust collecting in the bearings of these rolls.	That all buildings lost in this fire be rebuilt. That the Cannon Powder Blender be rebuilt near the point of the peninsula now occupied by the Proving Ground. That the Small Arms Powder Blender be rebuilt approximately upon present site. In rebuilding the Cannon Powder Blender attention should be given to the selection of a type of conveyor or hoist which will reduce the possibility of the development of static charges by friction between the powder grains and the belt or the parts of the hoist and which will also be free from the possibility of powder grains becoming jammed in any part of the machinery or powder dust collecting in any bearings.

Date, Time, and Reference	LOSS		Personnel Affected	CAUSE	RECOMMENDATIONS
	Building Numbers and Value	Property - general description of and value			
July 15, 1929 P. M. 600.913/198	Experimental High Explosives Nitrating House, Building No. 327 No damage.		HIGH EXPLOSIVES PLANT 1 Operator severely burned by acid.	No. fire - accident caused by the breaking of a pipe line containing acid, the acid splashing over operator during endeavor to remove the acid line.	None
			LOADING DEPARTMENT		
Nov. 16, 1915 11:50 A. M. 600.913/1	Filling House - all panes of glass broken out of 6 windows, some sash broken, paint and woodwork blistered and charred, part of ceiling fell, brick walls cracked, and roof slates cracked.		SEWING 3 women sewing machine operators frightfully burned 2 to a lesser extent.	Explosion started due to action of a broken needle on the igniting powder being quilted into the end of a 12" Gun cartridge bag. This explosion of 2 or 3 lbs. of igniting powder in primers at this sewing machine caused the immediate explosion of all the primers at four other machines, some 12 to 14 feet across the room.	The present Filling House (old No. 49) is very poorly adapted for its purpose and a new one radically different, should be constructed. The methods of conducting this work recommended changed, so as to eliminate therefrom all danger, so far as is possible, economy to be given practically no weight in the consideration.
June 13, 1923 10:15 A. M. 600.913/119-2	Building No. 191 - damaged $100.00	Equipment $300.00	PRIMERS Resulted in an immediate death.	Explosion due to unknown causes during handling of Mercury Fulminate in the usual loading operations carried on daily. Possible causes: (a) Dropping of mixing tray containing the primer mixture. (b) The accidental knocking over of the bottle containing approximately 2 oz. of Mercury Fulminate, which it was testified was in the building for use in experimental investigation. (c) The accidental spilling of some of the primer mixture on the table and an attempt to clean it up.	That in the future no experimental operations be carried on in buildings at the Arsenal where regular production operations at the same time are in progress, and further, that all experimental apparatus be removed from any production building before regular production is again resumed.

Date, Time, and Reference	LOSS			CAUSE	RECOMMENDATIONS
	Building Numbers and Value	Property - general description of and value	Personnel Affected		
Feb. 18, 1927 1:00 P. M. 600.913/168-2	Building No. 197 - no appreciable damage.		1 Operator received 1 burns about face, hands, and chest - serious only to the eyes.	Explosion probably caused by female operator reaching for and dropping one or more friction primers which caused 200 to 300 friction primers - for Mk. IV Point Detonating Fuzes - to detonate.	That arrangements be made to prevent reaching on the part of employees engaged in the Mk. IV primer operations. That the number of friction primers of the Mk. IV Fuze while under work near any operator be reduced to the minimum and never be greater than five when the operation is unbarricaded or the operator is not protected by a glass screen. That experiments be made to determine whether or not the cleaning of such primers may not be accomplished by tumbling in contact in a barrel.
June 21, 1927 600.913/170		1 Bomb Fuze destroyed $4.00 (Mk. III Bomb Fuze)	FUZES 3 women employees injured.	Accidental explosion while placing fuzes in tin container when one detonator exploded.	That Loading and Inspection Departments observe very carefully the condition of this fuze in regard to whether or not the safety device is properly assembled in the fuze before proceeding with the packing operations.
October 24, 1928 2:57 P. M. 600.913/185-3	Building No. 196 - damage $200.00	Repairs to Detonator Charging Machine (est.) $600.00	DETONATORS 1 death resulting from injuries received	Explosion possibly due to: (a) Operator accidently struck the empty hard rubber cap block and brass holder for same, which, it is believed he was placing in the machine, against some other portion of the machine. (b) (Held not probable) that one of the holes in the rubber charging block became bridged over with fulminate and that operator was endeavoring to clear this hole when the explosion occurred.	
March 11, 1929 9:25 A. M. 600.913/188-1		Equipment in Building No. 192 - damaged $300.00	1 employee injured - later losing one eye.	Explosion believed due to a misalignment of one or more of the detonator casings in the holder with the pins of the press. In so doing, one or more of the pins probably did not enter the detonator case or casings properly, thereby crushing one or more of the detonators during the pressing and causing the explosion. - no fire.	That equipment be repaired.

Date, Time, and Reference	LOSS			CAUSE	RECOMMENDATIONS
	Building Numbers and Value	Property - general description of and value	Personnel Affected		
			MELT LOADING		
May 28, 1925 800.913/139-S	(Melt Loading) Building No. 204 lost, $4,100.00 Nos. 203, 205, 497, 15 damaged, $924.50	Equipment - $4,000.00	1 Operator killed.	Explosion followed by fire due to anyone of three possible causes: (a) Explosive material may have become entrapped in the working parts of the discharging valve of the melt kettle and exploded when valve was opened or shut. (b) That enough friction was created either by the stirrer breaking the clinging explosive remaining in kettle or by direct rubbing between the stirrer and the kettle to initiate the explosion that ensued. (c) That the iron pipe in the end of the hose used for heating the water in the interior of the jacketed kettle may have struck some explosive in or around the kettle in such a way as to have initiated the explosion. (Preparing to start another batch through melt kettle for melt loading purposes.)	That as soon as possible outlet valves in melting kettles be done away with and that means be provided for discharging the contents by tilting the kettles and pouring over the lip. That steps be taken to design stirrers for melt loading kettles which are not integral with the kettles and which are driven from without the room in which the kettle is located. That the Safety Regulations of the Ordnance Department require that when the explosive materials in a melting kettle in a Loading Plant become solidified after once having been melted that the stirrers be not started nor withdrawn from the kettle until the explosive has been thoroughly resulted. In view of the increase in size of units being loaded experimentally in the Experimental Loading Area over those units contemplated for loading within this area when it was established, it is recommended that the melt loading facilities of the Experimental Loading Area be installed at a greater distance from the Officers' Quarters than the area now used.
			EXPERIMENTAL		
July 9, 1924 6:30 A. M. 800.913/129-S	Building No. 136 lost, $900.00 Building No. 492 damaged, $150.00	Materials and Supplies $4,000.00	STORAGE OF SUPPLIES FOR	Fire probably originated from spontaneous combustion in one of the bales of cotton linters stored in building, the heat generated being sufficient to set fire to some of the combustible materials, such as ether and alcohol, diphenylamine, or other chemicals stored nearby. (Storage of supplies for Manufacture of Experimental Powders.)	

Date, Time, and Reference	Loss: Building Numbers and Value	Loss: Property - general description of and value	Personnel Affected	Cause	Recommendations
Oct. 23, 1923 11:45 A. M. 600.913/123-1	Building No. 494 Building and Equipment damaged $500.00 Note: See also forth item (Jan. 17, 1928) page 4.		PROPELLANT PLANT 2 men blown out of room - no lost time.	Explosion due to subjecting powder to a temperature sufficiently high to cause an explosion and further that this high temperature resulted from a defect in the mechanical equipment provided for obtaining and regulating the temperature which could not be foreseen or detected by those in charge (about one pound of P.A. Experimental Flashless Powder, NH, under 400 lb. per sq-in. pressure in Hydraulic Press being heated to 89°C to make plastic prior to its being forced out of the cylinder through a die which forms it into a perforated grain of powder - had been placed in press and operation started at 9:00 A.M.)	
March 21, 1930 Early Afternoon 600.913/199-6	Building No. 39 - Experimental Propellant Area - Approximate damage - $800.00	Equipment - approximate damage - $1,200.00	3 fatal 1 Officer 1 Engineer 1 Operator 4 injured 1 Officer 1 Engineer 2 Operators	Explosion of nitrocellulose during mechanical mixing operation.	(Taken from Report of accident; not from Report of Board of Officers.)
April 26, 1923 11:00 A. M. 600.913/118			EQUIPMENT Resulted in the amputation of shattered arm of operator. 2 other men injured.	Detonation caused by friction between steel chisel and steel tank making spark which communicated with finely divided nitrocellulose in tank causing detonation of a deposit of nitrocellulose in tank. (Tank had been brought from another area and was thought to be entirely empty - for the purpose of local needs.	
			STORAGE		
May 30, 1920 Discovered 6 P.M. 600.913/99-1 etc.	Buildings Nos. 141, 299, 448, 449, 451 - Lost $13,926.00	Testing Ground Equipment - Powder Boxes - unserviceable powder (value not included - no value) and boiler $80,800.00	MAGAZINES	Fire - Not definitely determined. Unserviceable powder stored in building No. 141, was, prior to the fire, being destroyed as rapidly as available labor permitted. Available information indicated that some of this unserviceable powder was dangerously unstable and ignited spontaneously.	That destroyed buildings be not reconstructed but that a constant temperature magazine for testing ground use be erected upon this area. That disposition of unstable powder be given priority over all other storage work. That roadways be improved to enable motor fire apparatus to reach inaccessible buildings and that suction feed pipe be installed along the shore of the lake.

Date, Time, and Reference	LOSS			CAUSE	RECOMMENDATIONS
	Building Numbers and Value	Property - general Description of and value	Personnel Affected		
Feb. 5, 1919 10:00 A. M. 600.913/49-1	Building No. 127 - damage $100.00	Powder Boxes and Powder $156.00	OPERATIONS	Cover of testing box displaced molten solder, falling through and igniting powder.	That if possible use a solder of sufficient low temperature that will not ignite powder.
			RESEARCH LABORATORIES		
Sept. 26, 1923 600.913/121-4	Building No. 250 lost. $500.00		SURVEILLANCE MAGAZINE 1 firefighter hurt head.	Fire due to heat generated by the decomposition of one or more of the samples of powder contained in the chamber undergoing stability tests. Practically all samples there were experimental nitroglycerin powder.	
Dec. 18, 1919 Discovered a few minutes before 12:00 Midnight. 600.913/84-6	Buildings Nos. 36, 37, 110, 242, 243, 244, 245, 246, 247, 248, 289, 293, 294, 295, 304, 315, 249, Annex to 244 Millwright shop - lost. P.A. Buildings destroyed - $37,800.00 P.A. Buildings damaged - $49,696.00 Damage to buildings at U.S. Naval Ammunition Depot $1,835.25 Damage to buildings other than on Government property $243.10	PRODUCTION IN LABORATORIES Apparatus and material (Research Laboratory and Experimental Section, Saw Mill Machinery, Paint Shop, Millwright Shed, Hose and Engine House) P.A. $131,065.05 Damages to personal property of employees of the Arsenal - $204.45	Death of 1 Private - U.S.M.C. and serious injuries to 5 other Privates, U.S.M.C., and slight injuries to 4 Arsenal civilian employees. Also several Picatinny Guards received minor injuries.	Fire preceded by a minor explosion in Building 244, followed after a period of approximately 5 minutes by a heavy detonation; after which fire spread rapidly. Cause not determined.	That Research Laboratories be built on a new site. That no production work be attempted in the Research Laboratory area and that the activities of the Research Laboratories be limited strictly to research work. That no attempt be made to salvage and explosives or loaded ammunition in the area of the fire, and that those materials be destroyed under competent supervision. That proper safety regulations be adpoted for the government operations at the Arsenal with special reference to distances between buildings, installation of machinery and equipment and methods of operation and segregation of explosive materials.
Jan. 24, 1923 11:00 A. M. 600.913/137-2	Building No. 108 - Chemical Laboratory - damaged $662.00	Chemical Equipment $393.00 Chemical Supplies $470.50	STORAGE OF SOLVENTS	Fire, possibly due to any one of four causes: (a) A spark from the motor running the Riehle Press ignited the ether fumes. (b) Spark from man's shoes. (c) Static discharge from broom being used or from occupants of room (d) Spilling of metallic sodium - used to dehydrate ether - on floor some days previous and may have become ignited by water coming from refrigerator.	That damage be repaired. That refrigerator for storing solvents be placed in separate building. That single phase motors in laboratory be replaced by a three phase system and installed in separate compartments where possible. That - to avoid contact between rotors and stators - a system of inspection of all motors be instituted at the Arsenal.

Date, Time, and Reference	LOSS: Building Numbers and Value	LOSS: Property - general Description of and value	LOSS: Personnel Affected	CAUSE	RECOMMENDATIONS
			TESTING GROUND		
Feb. 3, 1928 600.915/174-1		75 m/m Gun, No. 1694, at Testing Ground - test of experimental powder - Gun continued in service.	SHELL BURST	No positive evidence that shell burst in bore.	That full data be kept of all firings.
1924 600.915/128		TEST FIRING RESULTING IN BRUSH FIRE		Brush fires in vicinity of Pyrotechnic area due to small particles of phosphorous - ejected, unignited, from a grenade or grenades fired April 17, 1924 from the island in the Pyrotechnic area - which, after a period of moisture preventing its ignition from April 17 to April 25, ignited and set fire to dry leaves, wood, etc.	That test firing upon the island be done only on days of little wind and that objects under test be fired at a high angle over the center of the lake.
			GENERAL		
Sept. 19, 1921 9:00 A. M. 600.915/105-1		Salvaged powder, telephone poles and wires, flat car, and railroad. $469.20 (Burning Ground)		High wind blowing burning embers into pile of powder.	Better fire protection for this area.
Jan. 10, 1922 7:25 P. M. 600.915/107-2	Ejector Station, Building No. 398, lost - $200.00	Electrical Equipment $250.00		Fire caused by failure of the automatic electrical equipment to function properly.	If installation is replaced - that the motor be of such size that there will be no question of its starting any load possible of the equipment, and that switches, fuses, etc., be placed in steel panel boxes.
July 10, 1926 5:00 P. M. (cm) 600.915/148	Lake Denmark Explosion (See Chapter IX of the History)			Lightning - fire - detonations, at adjoining Naval Ordnance Depot.	
June 25, 1929 2:00 P. M. 600.915/192-3	Quarters No. 102 - damaged $600.00	None	None	Struck by lightning - No fire.	That quarters be repaired.