

Annul Report of Chief Engineer
State Highway Department
1927

Dover, Del.
December 31, 1927

Members
State Highway Department
Dover, Delaware
Sirs:—

I herein submit a resume of the work accomplished by the State Highway Department during 1927, with a list of roads the Department has been petitioned to improve.

As an appendix to the report, several recommendations for the ensuing year will be found.

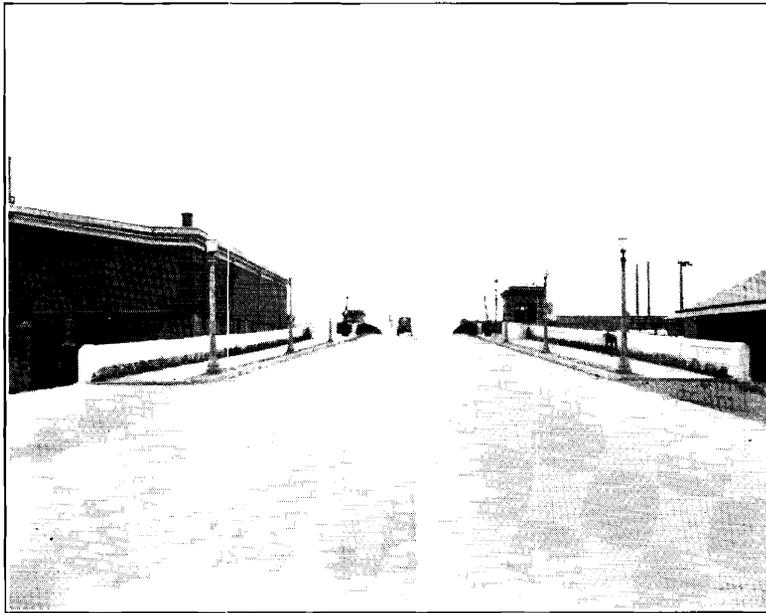
PRELIMINARY SURVEYS AND PLANS During the calendar year 75 miles of preliminary surveys, 55 miles of construction surveys and 73 miles of final surveys, also miscellaneous surveys for right-of-way purposes, have been completed in different parts of the State.

Our office engineers prepared data and plans and estimates for 68 miles of surfacing, platted, planimetered and obtained final computations for 73 miles of roadway cross sections.

TESTING LABORATORY Our laboratory during 1927, tested and passed upon all materials supplied for state highway work. Tests were made on cement, sand, stone, gravel, slag, reinforced concrete pipe, reinforcing steel, water, and stone screenings. The bulk of the cement testing was handled by representatives of the Department at the various cement mills, and all cement was bin tested. Loading from the bins to railroad cars was inspected by Department representatives, and all cars sealed with Department seals before leaving the mill.



OLD SOUTH MARKET STREET BRIDGE AND APPROACH LOOKING SOUTH 1926. TWO LANES OF TRAFFIC.



NEW SOUTH MARKET STREET BRIDGE AND APPROACH LOOKING SOUTH. FOUR-LANE ROADWAY.

Gravel, slag, reinforced concrete pipe, reinforcing steel, water and stone screenings were tested in comparatively small amounts while cement, sand and stone made up the bulk of the material tested. Approximately 139,382 barrels or 696 cars of cement; 55,753 tons or 1,115 cars of sand; and 111,506 tons or 2,230 cars of stone, were used and tested. This material, if in one shipment would make a train 30 miles long.

A limited amount of research and investigation work was done in the laboratory during the year. Various admixtures for use in concrete and several accelerating agents were tested. An investigation was made of a method of determining the strength of concrete roadway. It is hoped that this test may be developed, by the next construction period, so that it may be used as a guide in opening new concrete to traffic with a shorter curing period, but only at such a time when it has attained sufficient strength to withstand the traffic for which it is designed.

BRIDGES The duties and responsibilities of our Bridge
AND Division this year were greater and more im-
CULVERTS portant than ever before.

Detailed surveys and investigations of the sites of all structures built, were made, and suitable plans and specifications prepared for each particular location. Twenty-three bridges were designed and 185 culverts located during the year.

South Market Street Bridge, our most important 1927 project received minute supervision; and the finished structure is considered a credit to the Department and State. The final cost of all work involved in the undertaking, including the approaches will approximate \$545,000, of which amount the New Castle County Levy Court contributed \$166,666.66. Consummation of the work required exactly a year and was planned and executed with only a 79-day interruption to traffic.

In Sussex County, a bascule bridge across the Broadkill River on the Milford-Rehoboth highway was complete in June at a cost of \$66,500. The finished structure is an excellent piece of workmanship and closes the one gap, long missing, in the boulevard to Rehoboth.

Surveys and preliminary plans have been started, for the reconstruction of the bascule bridge crossing the Lewes and Rehoboth Canal on South Street, Lewes, the replacement of the antiquated swing bridge over the Christiana River at Newport, with a modern structure, and plans completed for a new "fixed" bridge over the Assawoman Canal at Ocean View.

RIGHT OF WAY Our right-of-way engineers have been particularly busy during the year obtaining additional land for the widening of the Philadelphia Pike. This road serves as an example of the importance of securing ample rights of way when roads are first constructed. In this case, had this been earlier done, considerable money could have been saved that had to be expended at this time in moving buildings, acquiring land where the properties are now divided into building lots, but which were large tracts at the time the road was constructed, and the increase in the value of the property.

Since last December new rights of way have been obtained on 259 properties, or 13 contracts, totalling 44.31 miles at a total cost of \$27,709.23 or at an average cost of \$612.77 per mile. These figures are exclusive of the Philadelphia Pike widening. An itemized report of these expenditures follows:

Salaries and Expenses	\$2,397.53
Legal	7,922.74
Right of Way	4,630.00
Fencing	7,103.40
House moving	2,400.05
Condemnation	2,007.62
Crops	460.18
Miscellaneous	787.71
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TOTAL	\$27,709.23

The widening of the Philadelphia Pike from Shellpot Park to Bellevue Quarry to an 80-foot right of way necessitated acquiring additional right of way on 34 properties, 33 of which were secured by agreement and one by condemnation, the total cost was \$22,526, divided as follows:

Salaries and Expenses	\$960.73
Right of way	6,926.00
Legal	511.15
House moving, etc.	8,041.00
Fencing	192.12
Moving trees and shrubbery	1,250.00
Condemnation	4,500.00
Miscellaneous	145.00
	\$22,526.00
TOTAL	

Briefly, the work of the Division included writing of 457 descriptions, securing of 253 options, and the execution of 479 deeds and 166 releases. The cost as given covers all expenses made necessary by the widening and re-alignment of the roads, including payments for land, salaries, preparation and recording of deeds and releases, condemnation awards, resetting and erecting fences, moving 15 buildings, digging new wells, and crop damages.

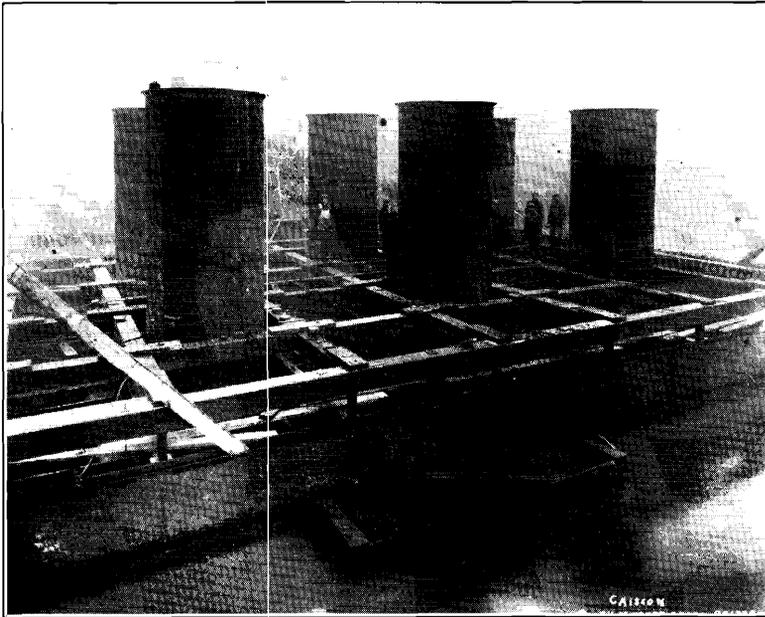
On the new roads constructed, the Department has maintained the low cost for right of way established last year, and, in addition acquired title to a number of properties on earlier contracts.

CONSTRUCTION Ten "Lettings" were held during the year when 113 competitive bids were received for twenty-five road jobs and a wharf. All twenty-six contracts were awarded to the lowest bidder. The estimated cost of these projects was \$1,610,633.35.

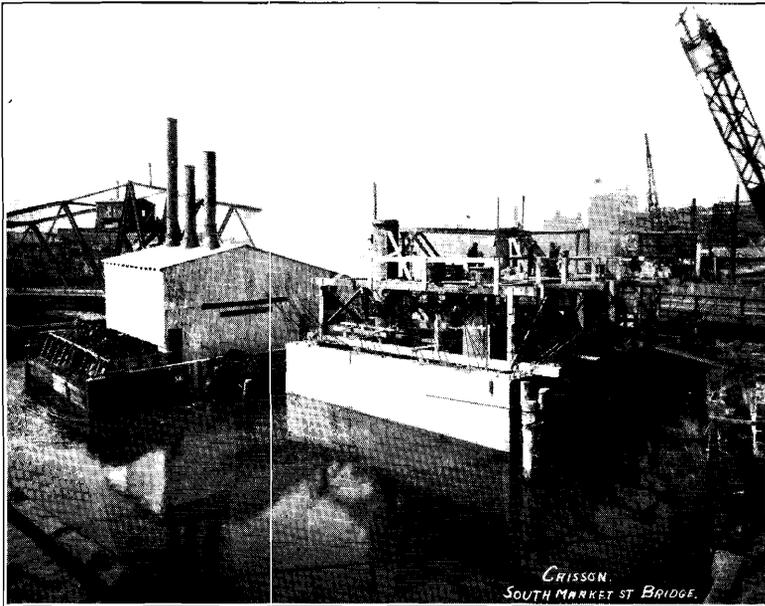
The twenty-five contracts made for roads, contained 75.7 miles. Of this total 37.95 miles were new construction, 26.95 miles widening of earlier roads, 9.8 miles surfacing of slag macadam roads and one mile earth grading, with sand surfacing. At the close of the construction season, 74.34 miles had been completed.

There are now in the State's system of roads 615 miles of hard surfaced highways, the equivalent of 17% of all roads in Delaware.

This year the first 9-foot concrete highways in the State were built. Contracts for 26 miles of this type were awarded and 7.3 miles finished. The roads selected for this improve-



PNEUMATIC CAISSONS, BEFORE SINKING, SOUTH MARKET STREET BRIDGE, SHOWING STEEL CUTTING EDGE.



NORTH CAISSON, SOUTH MARKET STREET, BRIDGE DURING CONSTRUCTION. PNEUMATIC CAISSONS, BUILT OF CONCRETE AND STEEL WERE SUNK UNDER AIR PRESSURE TO A DEPTH OF APPROXIMATELY 20 FEET BELOW BED OF RIVER AND REST ON A FIRM FOUNDATION OF GRAVEL AND BOULDERS

TABULATION OF CONTRACTS AWARDED IN 1927

Cont. No.	Location	Length (Miles)	Contractor	Type of Roadway	Cont. Total
74	Rogers Cor.-Wilm. City Limits	0.63	Alex Petrillo & Co., Wilmington, Del.	20' Conc. Widgn.	\$31,956.00
77	Dover-Cheswold	3.87	George & Lynch, Dover, Del.	4' Conc. Widgn.	30,513.75
78	Armstrong's Corner-Blackbird	3.22	F. W. Lovett, Newark, Del.	4' Conc. Widgn.	28,160.00
79	Maryland Line-State Road	9.91	George & Lynch, Dover, Del.	4' Conc. Widgn.	77,717.50
80	Brenford-Du Pont Road	1.65	George & Lynch, Dover, Del.	9' Conc. Roadway	26,035.50
81	Philadelphia Pike, Shellpot-Bellevue	1.86	Mazzola & Marano, Philadelphia, Pa.	20' Conc. Widgn.	161,523.00
82	State Road-Wilmington Causeway	5.32	William Eisenberg, Camden, N. J.	20' Conc. Widgn.	198,551.50
CS57	Midway-Angola	6.15	Old Line Construction Co., Chestertown, Md.	14' Conc. Roadway	142,809.50
72B	Wilmington Bridge Approaches	.15	D. E. O'Connell & Sons, Ridley Park, Pa.	40' Conc. Roadway	34,318.00
CS58	Dublin Hill-Woodenhawk	5.70	Walter Roach, Georgetown, Del.	9' Conc. Roadway	94,069.93
83	Hartly-Kenton	4.44	George & Lynch, Dover, Del.	16' Conc. Roadway	124,488.00
85	Fishing Creek Surfacing	.06	George & Lynch, Dover, Del.	15' Amiesite	1,530.00
86	Bethany Beach Government Road	.71	Highway Engr & Constr. Co., Selbyville	14' & 9' Concr.	19,997.50
69A	Harrington-Mastens Cor.:				
	Big Ash-Warrens School	5.80	George & Lynch, Dover, Del.	Oiling 12' Slag Rd.	7,720.00
89	DuPont Road-Lane, Pike-Kennett Pk.	.66	D. E. O'Connell & Sons, Ridley Park, Pa.	16' Concr. Roadway	29,668.50
CS59	Columbia-Laurel Road	1.54	W. W. Truitt, Lincoln City, Del.	15' Concr. Roadway	43,497.67
87	Little Creek-Leipsic	6.54	E. Riley Mixner Co., Goshen, N. J.	9' Concr. Roadway	115,029.00
92	Philadelphia Pk. (Bellevue-Claymont)	2.08	George & Lynch, Dover, Del.	20' Concr. Widgn.	185,490.00
93	Stanton-Lincoln Highway	.43	D. E. O'Connell & Sons, Ridley Park, Pa.	16' Concr. Roadway	35,149.00
53C	Broadkill Bridge Approaches	.23	Walter Roach, Georgetown, Del.	16' Concr. Roadway	8,607.50
94	Warren School-Sandtown	4.10	Field, Barker & Underwood, Phila., Pa.	9' Concr. Roadway	67,335.00
95	Pleasant Valley Sch.-Lincoln Hwy.	2.70	Sutton Contz. Co., Philadelphia, Pa.	9' Concr. Roadway	52,224.50
87	Bear-Corbit	2.83	D. E. O'Connell & Sons, Ridley Park, Pa.	16' Concr. Roadway	88,921.00
88	State Wharf-Leipsic		George E. Shoedley		1,849.00
88	Boyd's Cor. Rd. to Shallcross Rd.	1.00	Delaware Automatic Crowner Co.	Grading earth road	1,600.00

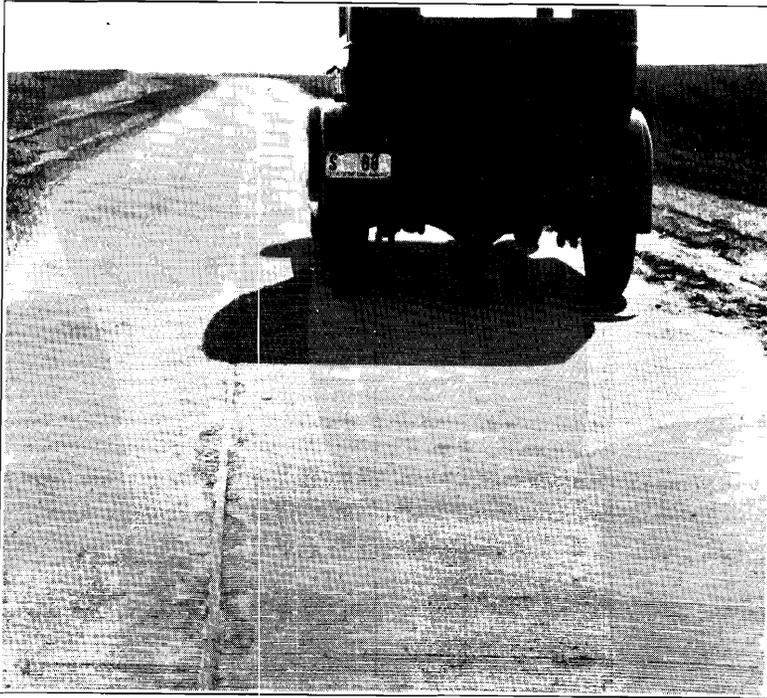
ment were off the main lines and feeders to the through highways. In designing for the narrow width, the pavement was placed 3 feet off center in order to allow for widening to 15 feet if traffic in later years demands it. Where suitable local gravel is available, a 5-foot gravel shoulder is provided and where this material cannot be obtained, concrete turn-outs will be built at intervals of 1000 feet or more. This type of road can be built for \$16,000 per mile.

The innovation in this year's construction having the most merit, we believe to be the practice adopted, to produce better non-skid surfaces for concrete roads. The idea that concrete pavements, unless sheeted with ice, are skid proof, is a delusion. Few road surfaces after several years use under heavy traffic with its consequent oil drippings, when wet, are more slippery. In our attempt to improve this undesirable feature we provided corrugations in the surface 1-16 to 1-8 inch deep, by means of a light flexible pronged leaf rake, after the initial set of the concrete and while still "green." This simple expedient we believe will serve to prevent many accidents.

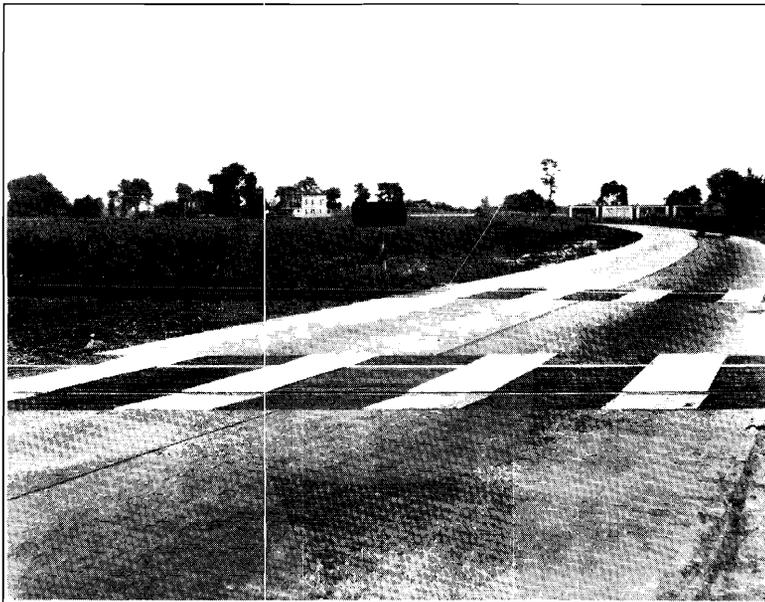
Attached is a summary of contracts awarded during the year, their location, type and estimated cost.

WIDENING EX- Four widening contracts were completed during the year. The two most important were those for the boulevard, south of Wilmington and the Philadelphia Pike north of the city. In the former the new roadway is 38 feet wide and the latter 40 feet wide with sidewalks.

Judging from comments heard of these improvements at the time they were made, the common belief appears to be, that if the additional surfacing had been provided when the roads were originally built, a substantial saving to the State would have resulted. The opposite is true. As an instance—the improvement just completed to the highway between State Road Station and Wilmington if made in 1921 when this road was first reconstructed by the State, would have cost \$21,000. a mile more than was required to do the work this year. The concrete laid on this road in 1921 cost \$17.98 a Cubic Yard as compared with \$11.42 this year. Similar prices held on other widening contracts.



CORRUGATED CONCRETE SURFACE DESIGNED TO LESSEN SKIDDING



HEALD STREET CUTOFF NEAR WILMINGTON. IN CO-OPERATION WITH THE RAILROADS, THE DEPARTMENT HAS ENDEAVORED TO IMPROVE THE RIDING QUALITIES OF RAILROAD GRADE CROSSINGS. THE USE OF STEEL TRAFFIC PLATES, AS SHOWN ABOVE, HAS PROVEN VERY SUCCESSFUL

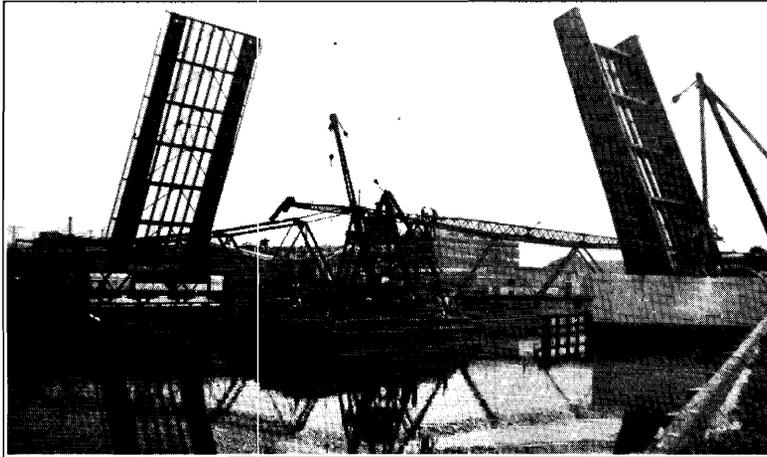
MAINTENANCE The Department's outstanding achievement of the year is the substantial saving that has been made in the average cost per mile of maintenance over a period when the class of work provided has been above that of former years. This year there were 583 miles of highways to care for and the maintenance of these roads was attended to for \$265.70 per mile, or \$29.30 less than it cost in 1926. With standards for maintenance more exacting than those of any state in the Union, the year's record is particularly gratifying.

Nineteen maintenance crews were engaged during the year and their duties in addition to the necessary repairs to the concrete pavements, shoulders, ditches and culverts, included the frequent mowing and brambling of all rights of way, the prompt removal of snow, erecting and repair of direction and warning signs, the planting and watering of 1,300 young shade trees, and in summer, the semi-monthly collection of refuse scattered along the highways by patrons of the too numerous hot dog kennels.

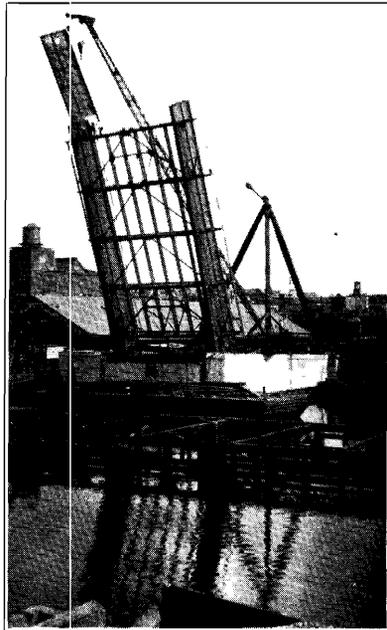
HIGHWAY POLICE The calls upon our police and the service they are rendering has become so general that their duties as highway patrolmen is becoming conspicuously less important each year. As the mileage of improved roads increases, their field of activity as law enforcing officers increases, and located as our stations are throughout the State, the men are available on short notice to citizens some distance away. Judging from the calls made, their usefulness is becoming more generally recognized.

As evidence of their activity this year, the organization consisting of 38 men on the first of the year and 36 now, made 2,414 arrests, issued 4,764 reprimands and recovered 86 stolen cars before December 1st. They inspected 2,594 vehicles for proper brakes, lights, etc., and devoted 323 hours to investigations and 9,026 hours on special assignments. Fines received prior to December 1st totaled \$41,927.33.

It is worthy of mention that on the widening contracts, of which there were a number, no accidents occurred by reason of the traffic which continued without interruption while work was in progress. This record may properly be credited to the



SOUTH MARKET STREET BRIDGE SHOWING OLD BRIDGE IN POSITION AND NEW BRIDGE UNDER CONSTRUCTION. MOVABLE SPANS WERE ERECTED IN THE OPEN POSITION TO AVOID INTERRUPTION OF RIVER TRAFFIC



SOUTH MARKET STREET BRIDGE SHOWING ERECTION OF STEEL BASCULE SPAN. PLACING PART OF N. W. MAIN GIRDER

Highway Police who devoted 1,326 hours to this particular assignment.

The co-operation received from, and the work performed by the Motor Vehicle Inspectors operating under the Secretary of State is commendable. Our records disclose in eleven months, 203 arrests by this Force of 6 men with resultant fines of \$2,660.00 to the State Treasurer.

A tabulation of arrests by the Highway Police between January 1st and December 1st includes the following violations:

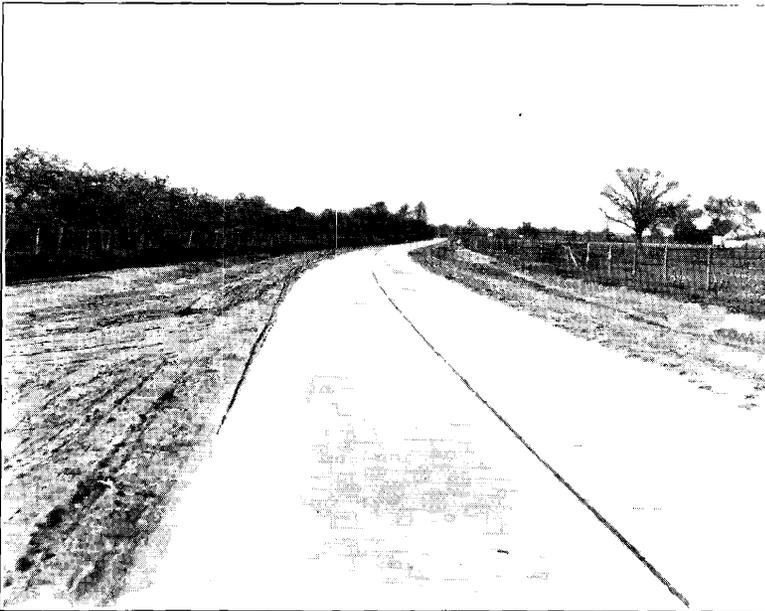
Abduction	3
Accessory to fact	3
Adultery	2
Assault	8
Assault and Battery	44
Assault Felonious	2
Assault to murder	1
Arson	1
Attempted	1
Bastardy	1
Breaking and entering	24
Carrying concealed deadly weapon	13
Changing motor number	1
Common nuisance	2
Conspiracy	1
Contempt of court	1
Defective brakes	19
Disorderly conduct	28
Drunk and disorderly	99
Failing to stop at Cross Roads	19
Forgery	2
Held as a witness	9
Highway robbery	7
Horse drawn vehicle no lights	3
Improper lights	60
Improper motor number	8
Improper tags	183
Insane	2
Interfering with an officer	1
Keeping gambling device	1
Keeping gambling house	1

Larceny	35
Leaving accident and not complying with law....	24
Lewdness	2
Making threats	6
Malicious mischief	1
Manslaughter	12
Manufacturing liquor	2
Murder	3
No mirrors	292
No operators license	212
No photo on paid drivers license	3
No public service permit	6
Non-support	5
No title for cars	14
Operating after license had been revoked	10
Operating under age	2
Operating under influence of intoxicants	243
Overloaded trucks	63
Passing on the right	90
Passing worthless checks	10
Perjury	1
Playing crap	40
Possession of stolen cars	4
Possession of stolen goods	10
Possession of whisky	13
Rape	2
Reckless driving	515
Selling liquor	4
Taking car without consent of owner	24
Throwing glass on highway	2
Transporting liquor	21
Trespassing	4
Unregistered cars	158
Using female child for immoral purpose	3
Vagrancy	5
Violating school law	3
Wife beating	1

Another service the police performed, came in protecting the highways against overloaded trucks. Their activity in this



THIS NINE-FOOT CONCRETE HIGHWAY, CONSTRUCTED IN 1927
BETWEEN BRENFORD AND THE DU PONT BOULEVARD
IN KENT COUNTY, HAS PROVEN SATISFACTORY
FOR LOCAL TRAFFIC



KENTON-HARTLY ROAD, CONSTRUCTED IN 1927

field resulted in 18,511 commercial vehicles being weighed in eleven months.

A statement of expenses for the operation of the State Highway Police Force from January 1st to December 1st shows an expenditure of \$84,644.13; in the same period there has been received \$41,927.33 from fines. These figures permit of accurately estimating that the net cost to the State this year has been \$99.00 per man per month for the services of its police.

The following figures show the different items of expense incurred by the force from January 1st to December 1st, 1927.

Administration	\$2,801.74
New Motors	1,253.57
Salaries of Uniformed Officers	33,790.63
Travelling and Subsistence Expenses of Uniformed Officers	207.16
Motorcycle Maintenance and Repairs.....	4,146.01
Uniforms and Equipment	4,616.45
Telephone and Telegraph	1,619.12
Light, Heat and Water	502.93
Insurance	880.57
Buildings and Land	5,691.46
Furniture and Fixtures in Stations	100.32
Printing, Stationery and Supplies	233.79
Shop Expense	3,044.29
Operation	4,400.39
Examination of Intoxicated Drivers	540.00
Storage for Police Cars	80.00
Sundries	101.41
Police Houses and Overhead Boxes	230.00
Training School	404.29
	<hr/>
	\$84,644.13

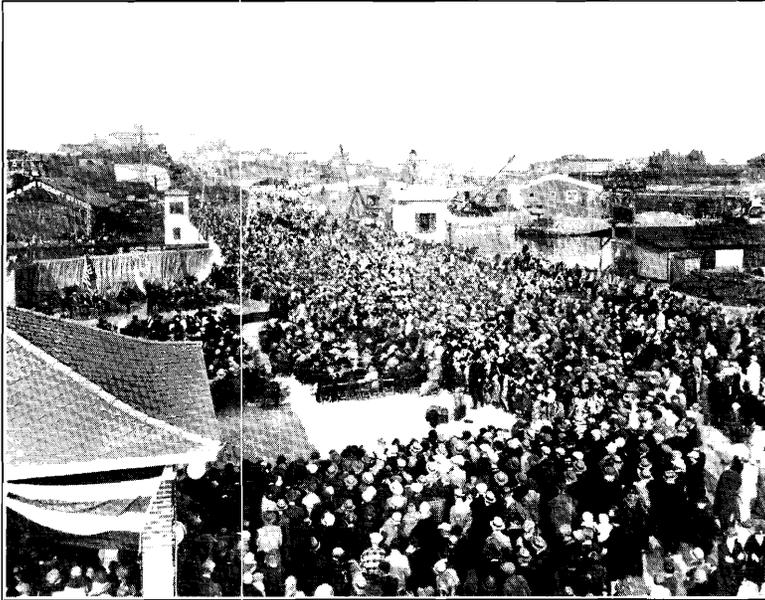
Accurate records of all highway accidents occurring in the State outside of the City of Wilmington have been kept. A tabulation of these, totalling 650, in which 31 persons were killed, 386 injured and property damage done, amounting to \$103,000 is submitted.

CLASSIFICATIONS

	{	Motor Vehicles	27
Fatalities		Pedestrians	19
		Railroad Crossings	5
	{	Slight	293
Injured		Serious	54
	{	Slight	22
Pedestrians		Serious	17
	{	Dry	483
Location		Wet	162
	{	Tangent	412
Condition of		Intersection	183
Highway		Railroad Crossing	18
	{	Curves	32

CAUSES

Recklessness	185
Carelessness	105
Operating while intoxicated	58
Inattention	54
Jay Walking	36
Skidding	35
Failing to stop at Cross Roads	29
Glaring headlights	20
Loss of control	18
Operating while asleep	15
Misjudgment	10
Inexperienced operator	9
Parking on highway	8
Livestock loose on highway	8
Confusion	7
Bad brakes	6
Tire (blow out)	6
Parking no lights	5
Obstructed view	4
Horse-drawn vehicle no lights	4
Fog	3
Pedestrian (intoxicated)	3
Defective steering gear	3
No tail light	2



CEREMONIES AT OPENING OF SOUTH MARKET STREET BRIDGE.
NOVEMBER 11, 1927



STATE HIGHWAY POLICE STATION, NO. 3, NEAR DOVER

Axle breaking	2
Jumped from moving truck	1
Fell from moving truck	1
Wheel breaking	1
Defective eyesight	1
Passenger grabbed steering wheel	1
Front wheel locked	1
Frightened horse	1
Not stated	2

NUMBER OF ACCIDENTS

	Total	Fatal	Non-fatal
Sunday	184	12	172
Monday	80	4	76
Tuesday	63	3	60
Wednesday	65	6	59
Thursday	69	4	67
Friday	76	4	72
Saturday	108	8	100
TOTALS	645	41	604

LOCATION OF FATALITIES

Highways—	
State Highways	34
County Highways	5
Towns, except Wilmington	6
Railroad Crossings	5
Street Car Crossings	1
TOTAL	51

GRADE CROSSING SURVEYS An effort was made this year to obtain practical information on all rural highway-railroad grade crossings, in the State. Surveys made at odd times by our engineers permit now of a comprehensive tabulation of all such crossings. Information collected furnishes the location, number of tracks, number of sidings, number of daily trains, the protection if any and hours provided, the visibility, the grade of approach, type of road, and estimated vehicular traffic. A summation of data



PHILADELPHIA PIKE, U. S. ROUTE NO. 13, NEAR BELLEFONTE, SHOWING SIDEWALK AND 40-FOOT PAVEMENT. CONSTRUCTED IN 1927.

collected shows 158 crossings in New Castle County, with 72 at which the visibility from one or both directions is poor. In Kent County the ratio is 78 to 50 and in Sussex County not so high. These figures serve partly to explain the too frequent grade crossing fatalities, and are evidence that much remains to be done to lessen the danger existing at these intersections.

FARNHURST BRIDGE Your endorsement of the recommendation made a year ago
AND that the highway bridge at Farnhurst be widened to conform to the increased width of the public road between State Road Station and Wilmington, and that the grade crossing on James Street, Newport, be eliminated by the construction of an underpass for the highway has resulted in negotiations with the Pennsylvania Railroad which indicate that the work required will be performed, and it is hoped completed, during 1928.

LOW COST The one serious problem confronting the
ROADS Department is the need of a low cost road, which without excessive maintenance will answer the traffic requirements of our numerous rural highways. Later in this report will be found a great number of roads the State has been asked to improve, totalling more than 250 miles. Citizens demanding these improvements must realize that to complete the program with concrete, which they most desire, would require an outlay of \$7,500,000. The idea itself is not only preposterous, but the period is fast approaching when State expenditures for costly roads must be curtailed. Surfaces for roads costing much less than the high type, even if less desirable, must be applied if partial relief is to be afforded many citizens still required to reach their homes over thoroughfares little better than they must have been several generations ago.

Anticipating the approaching problem the Department has been on the alert to discover a "cheap" road applicable to our soil and climate. A few States, those within or bordering on the arid regions have to some extent successfully solved the difficulty, but their treatments cannot be adopted with equal success in States visited by frequent rains and low temperatures.



PENNY HILL, U. S. ROUTE NO. 13. ORIGINAL PAVEMENT 19-FOOT VITRIFIED BRICK; WIDENED TO 40 FEET WITH CURB AND SIDEWALK IN 1927.

The Department has in the past 18 months successfully designed and constructed six satisfactory roads at an average saving of \$15,000 per mile, over concrete highways costing \$25,000 per mile. This reduction, however, is still insufficient to meet the demands, and our latest attempt is a contract awarded for the reconstruction of a dirt road for \$1,600 a mile, which we have been given to understand will satisfactorily carry traffic throughout the year. Work on this project is underway, but results cannot be judged this early.

ROADS I offer for reference when considering **PETITIONED** additional highways to the State system the following roads, almost all of which the Department has been petitioned to improve.

NEW CASTLE COUNTY

Stanton-Ogletown.
St. Georges-State Road Station (Widen).
Relocation Lincoln Highway through Marshallton 1-4 mile.
Newport and Gap-Turnpike-Brandywine Sanatorium-Lancaster Pike.
Christiana-Hare's Corner.
Old Baltimore Pike (Cooch's Bridge-Maryland Line)
New London-Newark.
Thompson Station-Milford Cross Roads.
Delaware City-Port Penn.
Walker's School-David's Corner.
Taylor's Bridge-Collin's Beach.
Middletown-Warwick Road (through the Levels to Maryland Line).
Adam's Dam-Thompson Bridge.
Perry Tavern-Thompson's Bridge.
Dexter's Corner-Delaney.
Industrial Highway (Wilmington).
Clayton-Delaney.

KENT COUNTY

Wyoming-Alms House Hazletville Road.
Woodside-Willow Grove Petersburg Road.
Leipsic-Dover.
Little Creek-Magnolia.
Houston-Kent Sussex Line
Viola-Petersburg.
Moore's Corner (Cheswold-Kenton Road) Dover-Pearson Road.
Davis' Corner (Pearson-Hartly Road) Kenton.
Todd's Church-Prospect Church (Harrington).
King's Highway, Dover (Police Station No. 3-Water Works).
Wendall's Corner-Woodland Beach.
Andrewville-Farmington or Greenwood.
Andrewville-Vernon.
Masten's Corner-Felton Hollandsville Highway.
Frederica-Harrington.

SUSSEX COUNTY

Du Pont Boulevard-Milford-Selbyville (Widen).
Road east of Milford to connect Rehoboth highway and Du Pont Blvd.
Lowes Cross Roads through Gumboro to Selbyville.

Ellendale-Milton.
 Argo-Slaughter's Beach.
 Roxana Millville Highway-Bayard.
 Bacon to Pittsville-Gumboro Highway.
 Bridgeville, east via Twin Bridges or Robbin's Cross Roads
 Bridgeville, east via Sunny Side School.
 Owens-Ellendale.
 Lincoln City-Milford-Rehoboth Highway.
 Bethel-Laurel-Sharptown Highway.
 Green's Mill-Bowden Corner.
 Harmon's School-Angola.
 Indian Mission-Angola-Harmon School Road.
 Marshy Hope Road-State Highway, North of Greenwood.
 Flower's Station-State Line.
 Dublin Hill-Bridgeville Scott's Store Highway.
 Extension Cedar Neck Highway-Milford.
 Lone Gum-Seaford-Bridgeville State Highway via Old Furnace Mill &
 Middleford.
 McCallister Corner-Atlanta.
 Hardscrabble-Millsboro.
 Williamsville-Bayview-Fenwick Island.
 Roxana-Sound Church Road.
 Millsboro-Gravel Hill Old King's Highway Road.
 Milton-Ellendale.
 Concord-Laurel Georgetown Road via Spicer's Mill.
 Columbia-Providence Church.
 Shaftox Corner-Frankford.
 Du Pont Boulevard to Shockly.
 Collins' Mill-Middleford.

43RD STREET When the two contracts awarded this
BY-PASS year for the widening of the Philadelphia Pike
 are completed, there will soon after be an increase in the num-
 ber of motor vehicles on this highway, but notwithstanding,
 congestion will be much relieved and vehicles using this road
 should thereafter experience little difficulty in maintaining a
 satisfactory rate of speed, even in seasons of heaviest traffic,
 until they reach the city limits of Wilmington. Between 43rd
 and 14th Streets is the bottle neck of this important highway,
 produced by cross street traffic and a double track car line.
 To relieve this condition, I suggest providing an additional
 entrance to the city and recommend a diagonal road with a
 right of way not less than 80 feet to leave the Pike at about
 43rd Street and connect with the Miller Road or Boulevard
 extended at 32nd Street. The section traversed by such a
 line is yet undeveloped and an improved street through it
 should prove invaluable to those owning property which it
 crossed.

WIDEN—BOULEVARD I deem it important that the
THRU SUSSEX COUNTY highway between Selbyville and
 Milford which is now a 14-foot concrete road be widened, and



McCOY'S HILL ON DU PONT BOULEVARD NEAR STATE ROAD BEFORE WIDENING

recommend a 6-foot shoulder, or a finished surface 20 feet wide for this section of the Du Pont Boulevard.

NEW WILMINGTON-NEWARK HIGHWAY As the construction of 3.8 miles of road between Stanton and Ogle-town would provide a second direct highway between Newark and Wilmington and one devoid of any railroad grade crossings, I offer for your consideration the desirability of improving this section of road during the coming year.

7-MILE SUPER-HIGHWAY The number of out-of-state motorists, especially those from New York, New Jersey and Pennsylvania, and particularly the latter, who will seek Delaware during the spring and summer, will be limited only by highway congestion and its consequent delays. If it is to the State's benefit and the prosperity of our citizens to encourage citizens of other States to visit us, roads of adequate width will attract them and in limitless numbers by reason of the State's geographic location.

From Wilmington 6 miles south, the Department altered this year an 18-foot road to one 38 feet wide. Since its reconstruction all the comments heard have been favorable. However it does not function as it might, since some drivers persist in holding to the center of the road instead of driving to the right, as is intended.

The nearest "perfect" highway that the engineering talent of the country can design today—the fastest, the safest and the most desirable to travel, is a road of proper width built for traffic moving in only one direction and sufficiently far removed from other roads to prevent "night blinding."

To provide such a super-highway; I offer the suggestion, and hope for your approval, to construct between St. Georges and State Road Station, a 20-foot road paralleling the present highway at a distance of possibly 30 feet to the east or west.

SIDEWALKS THRU MARSHALLTON AND ELSMERE The Department having accepted from the Levy Court of New Castle County the responsibility for the upkeep of the "Lincoln Highway," it behooves the State as one of its first duties, in an effort to avert loss of life, to construct for the benefit of the citizens of Elsmere and Marshallton, as well as all who travel the highway, sidewalks thru these towns



MCCOY'S HILL ON DU PONT BOULEVARD, U. S. ROUTE 40, NEAR STATE ROAD AFTER WIDENING TO ACCOMMODATE FOUR LANES OF TRAFFIC

on each side of the road. The need of this improvement is so apparent, it is felt property owners will co-operate by donating the additional right of way that will be needed.

SIDEWALKS During my tenure of office, I once asked counsel if the Highway Department under the Act creating it was empowered to build sidewalks for pedestrians as well as roadways for vehicles. The apt reply was—

“The existence of public highways for the convenience of pedestrians is equally as important as their existence for the use of persons travelling by vehicles. In fact, the use of such highways by pedestrians is the most ancient use to which such conveniences have been devoted. The rights of pedestrians to the use of such roads is fully equal to the rights of any other users.”

Because of the demands upon it, the Department has never been able, and may never be, to consider the needs of highway pedestrians, equally with those of motor vehicles. While this perhaps can properly be excused by the comparison in numbers of one class of users to the other, it does befit the Department at this period of construction to carefully consider the possibility of constructing walks along these sections of our highways where it appears they are most needed.

I submit for reference at a time when improvements of the kind are to be made, the following sections of state highways where sidewalks would prove invaluable and be greatly welcomed.

WILMINGTON

Philadelphia Pike, 32nd Street to Shellpot Park.
New Castle Road, Eden Park-Rogers' Corner.
Du Pont Road through Richardson Park.

NEW CASTLE

Wilmington Road-City Limits to 6th Street.
Delaware Street—6th Street to Washington Avenue.

FARNHURST

State Asylum, Main entrance to Post Office.

BLADES

Nanticoke River to Main Street.

LAUREL

Broad Creek to Georgetown Highway.

FRANKFORD

Main Street, Boulevard to Railroad.

DAGSBORO

Main Street, Boulevard to Railroad.

ASPHALT PLANT Believing a number of roads in Sussex County adapted to sand asphalt, remain yet to be improved, I recommend for your consideration the advisability of the State owning its own plant for work of this type. Such a plant if purchased to be leased at a nominal rental to responsible contractors submitting the lowest bids on work to be done.

One of the disadvantages of obtaining the best prices in asphalt roads is accounted for by the cost, which must be consumed, in moving a plant into the State, erecting it, and then dismantling and moving it away after the completion of a contract. A State-owned portable plant could be operated at a saving. The approximate cost of such a plant, capable of producing 1,000 Square Yards would be \$20,000.

Alternate bids for concrete and sand asphalt that have been taken by the Department show a saving of \$4,000. a mile for the asphalt type; this amount should increase with the use of State equipment.

In conclusion I desire to thank his Excellency the Governor and each Member of the Department for the counsel and support afforded me in administering the affairs of the Department during the year, and to all my associates, true acknowledgment of the valuable assistance each has so willingly contributed towards effecting the accomplishments just reviewed.

Respectfully submitted,

C. D. BUCK, Chief Engineer.