HIGHWAY SERVICES

Care Takers—An old-fashioned, high-drifting snow covered much of Kent County one morning last winter when word came to the State Highway Department radio center in Dover that William Allen, snowbound in his isolated farmhouse, needed to get to a hospital . . . and quick. He had suffered a heart attack.

But the operator knew that an ambulance could make it only to a nearby highway. Between it and the farmhouse was a rolling white expanse of virgin snow, erasing fields, fences and the driveway to the farm.

How to get across that glistening half-mile? The quick-thinking radio operator at the Department knew the answer. He roused someone at a local equipment company, which he knew owned a "Weasel", a tracked vehicle capable of going just about anywhere.

In no time at all, the Weasel, sending snow flying like sea spray, was bounding over the field to the Allen farmhouse where it picked up the patient and brought him safely to the ambulance.

The time from receipt of the first phone call to the patient's delivery to the hospital was about 35 minutes.

Specialized Sidelines—Though by no means a routine Highway Department service, this incident serves to point up the fact that the Department is expected to do much more than build roads. The truth is that the Department handles a remarkable variety of specialized "sidelines".

Among them are such things as sign-making (21,000 last year); cooperating with garden clubs on highway beautification projects; designing artificial lakes; map-making and distribution (100,000 copies of the 1956-60 Official State Highway Map); cooperating with the University of Delaware on engineering research projects; statewide mosquito control operation; conducting numerous statistical and engineering studies of value to the entire state; cooperating on an exhaustive report (published in a 556-page volume) of the State's vital water resources.

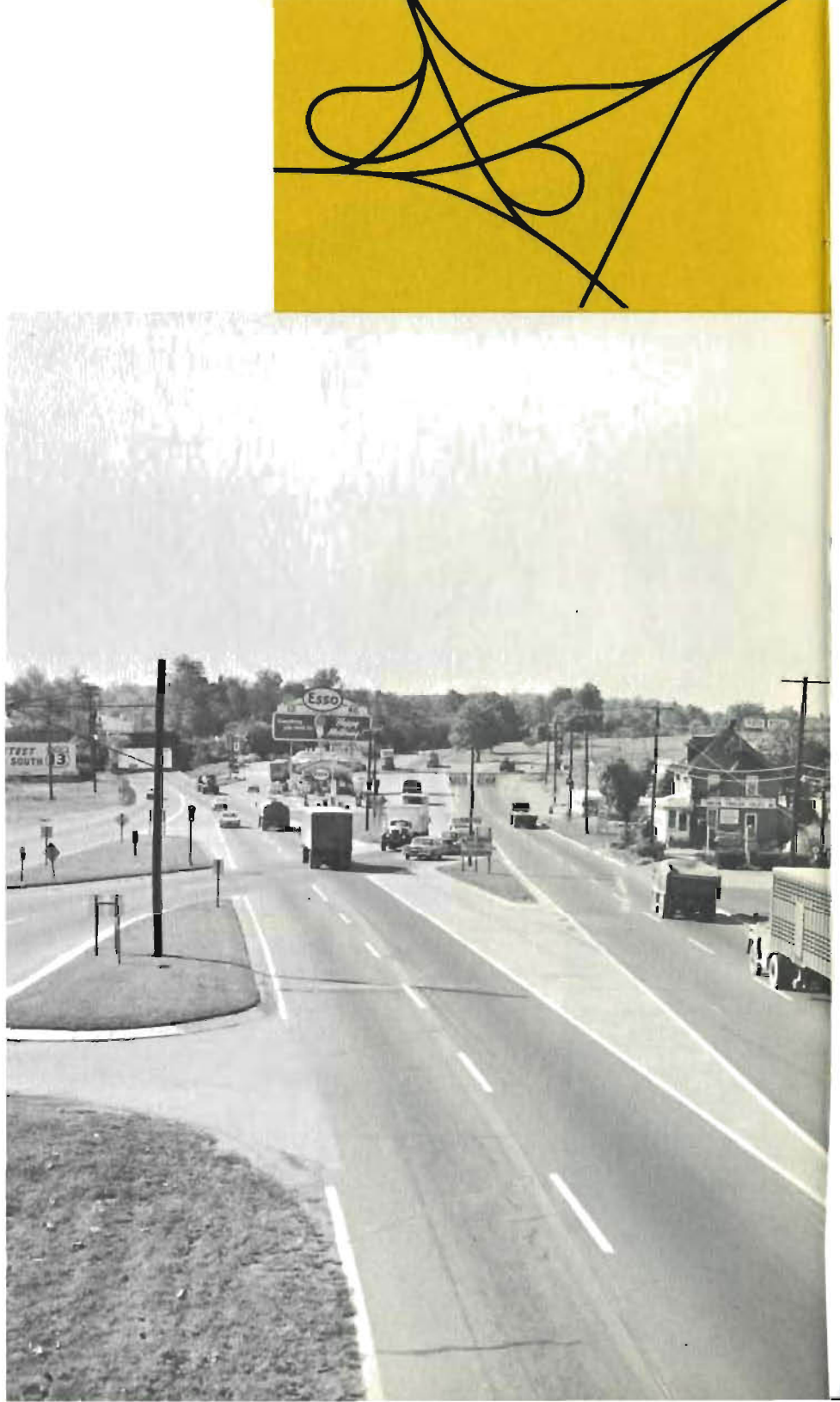
Main Job First—All this, of course, came after the Department's main job: Building and maintaining a highway network that is among the best in the nation. Last year the Department stayed right on top of the job. During fiscal 1960, the Department engineers supervised private contractors in the building of 71.58 miles of new highway. By the year's end the Department had 213.2 more miles under construction.

This expansion means that for its size Delaware continues to have one of the most extensive highway systems of any state in the nation—a total of 4100 miles of roads reaching into every nook and cranny of the State. A Delaware motorist, bent on seeing the First State first, could make the equivalent of a cross-continental trip and back without ever leaving his tiny State.

Freeways Coming—While the mileage added to the State System last year was not unusually large, the 1960 road building effort was notable for the size and importance of the projects. Six of the year's major contracts involved work on the massive overpass and interchange structures at Farnhurst, part of the Interstate Highway System. This work was under the direct supervision of the Freeways Division.

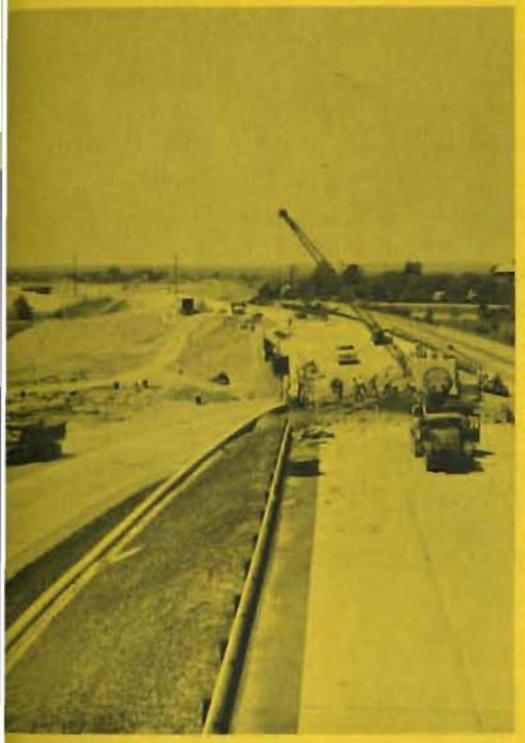
Two of the six Farnhurst Interchange contracts were completed in fiscal 1960 at a cost of $1,343,-040.70 in Federal and State funds. The four others are from 50 to 90 percent complete.

Some idea of the extent of this work can be gained from the fact that the four unfinished projects last year required 2,671,150 pounds of bar reinforcements, 5,197,000 pounds of structural steels and 18,855 cubic yards of cement masonry.



One of nation's busiest intersections—U.S. Routes 13, 40, and 301.

Massive Farnhurst Interchange progresses.



Major Jobs—In all, the Department had 62 contracts still underway on June 30, 1960. Other major jobs included: construction of a southbound lane from Milford to Frederica, another link in the Route 13 dual Highway; concrete approaches to the new high-level Summit Bridge; widening of Route 14 from Milford to Waples Pond; completion of a two-lane highway from Bethany Beach to Indian River, the first section of what will be a dual running from Rehoboth south to the Maryland Line.

Road Crews—As important as building new highways, is the job of maintaining the existing ones. It is cheaper to keep a road in good condition than to rebuild it after it has deteriorated. The unending job of repair and maintenance also falls to the county crews.

Sussex's 1960 maintenance program was particularly noteworthy. A reorganization was carried out eliminating small district crews and combining them into larger work groups capable of handling bigger projects more quickly and efficiently.

The Sussex Division also designed and built a highly effective road patching machine. It has front-end rollers, hydraulically controlled from the vehicle's cab, which compress the patch mix on the roadway. Formerly this was done by the wheels of a truck. Eight months of use proved that the new device lengthens the life of the patch considerably. Five of the machines are now in use in the County.

In Kent County, maintenance work also was reorganized under a new system of "Area Operations".

Many incidental—and not so incidental—chores are carried out by the county divisions: snow removal, grass cutting along miles of highway shoulders and median strips; flooding and drainage correction projects; insect spraying; maintenance of parks, including historic Christina Park in Wilmington where restoration work is now underway.

Suburban Boom—A dynamic factor in the growth of the State's road system is the suburban building boom, particularly in New Castle County. Nearly all of these new home communities are unincorporated, which means that their streets must become part of the State Highway maintenance system.

The job of making sure that home developers build their streets to meet Highway Department standards so that they can be accepted into the State's system is carried out by the Department's Suburban Development Division.

The unit is represented on the Regional Planning Commission of New Castle County, which approves all plans for new home developments. Thus, in the very early planning stage, the highway specialists make sure that home buyers will get streets that meet the high requirements of the State Highway System. The home developer is required to post a bond to guarantee that he will follow his plans and the Highway Department engineers follow through by checking on the streets while they are being built.

Thanks to this system of double checks, 20 miles of streets in 33 new suburban developments were accepted into the State System during fiscal 1960. The construction cost came to about $1,300,000. Another 35 miles of streets, costing $2,197,000 were being built at year's end.

In cooperation with the Home Builders Association, the Department now is reviewing its regulations for street building. The aim is to up-date them so that Delaware's home buyers will continue to get the best streets for their money, streets that will require even less maintenance and so ease the taxpayer's burden.

Delaware Highways receive constant attention for citizens' benefit.

Roads of Tomorrow—To keep ahead of Delaware's motorists, certain specialists in the Department must live in the future. These are the members of the Plans and Design Division. On their drawing boards the highways of tomorrow now are taking shape.

In 1960, Plans & Design drafted specifications for 19 contracts covering a wide range of highway construction. In addition, they prepared 20 contracts calling for surfacing of 172.65 miles of dirt roads, a continuance of the program aimed at eliminating all dirt roads in Delaware. By the year's end all these contracts were either advertised for bids or ready for advertising.

The Division's very limited staff also turned out plottings for five smaller projects. Some idea of the Division's volume of work is pointed up by the fact that the Blueprint Room turned out 99,950 prints during the year.

Plans & Design does not, of course, handle all the Department's design of projects. Some of this is done by outside consultants. In the long run, this is more economical because consultants can be hired only when needed, thus eliminating the necessity for a large, year-round staff.

Traffic checks unearth vital statistics.

Center lines can be life-savers.

Pre-stressed concrete makes good bridges.

Proper lighting creates safety.

Du Pont Parkway carries heavy traffic load.

Check and Double Check—Back-stopping the consulting engineers is the Department's Review Division. The reviewer's job is to go over the consultant's plans and root out possible errors or miscalculations at every stage. The sooner errors are caught, the bigger the saving in construction costs.

In Fiscal 1960, the Review Division specialists checked plans for 65 highway projects in various stages of design. At the end of the year, 25 of these were completed and 9 had been advertised for construction. The work ranged from site plans for a proposed New Castle County Maintenance Building to the design of the big Interstate Highway projects, FAI-1, FAI-2, and FAI-3.

Bridge Builders—A separate phase of highway construction altogether is bridge building. This highly specialized work is handled by the Bridge Division. As with the Review Division, the bridge specialists are charged with double-checking plans of outside consultants. They also originate many designs for bridges.

In 1960, the Bridge Division reviewed consultant's plans for 9 bridges in the Interstate Highway project at Farnhurst and another 9 structures for the Bay Bridge Connector from FAI-1 to Route 40.

The Section completed its own designs for 7 bridges constructed during the year, and numerous others were designed but are waiting funds to start the work.

Among its many incidental chores, the Bridge Division prepared detailed cost estimates on parts of the Interstate System; completed plans for creating artificial lakes on the Murderkill River and another on Blackbird Creek. The latter projects were proposed by the Fish and Game Commission, but were later rejected by property owners.

The bridge specialists also got involved in some boat designing last year. They worked with a naval architect consultant in designing a new steel ferry to replace the picturesque "Patty Cannon", an old wooden craft that plied the Nanticoke River at Woodland. The new ferry will be known as the "Virginia C".

Constant Checking—Skilled construction teams, sound engineering, expert planning, all are vital to modern highway building—but they are not enough. There is a fourth essential: top-grade materials. Only the very best materials can guarantee a long-lasting roadbed. To make sure that only the best materials go into Delaware's highways is the responsibility of the Department's Division of Tests.

Every type of material, indeed virtually every batch that goes into a new highway, is tested by one of the division's eight units. For example, the Bituminous Concrete unit last year carried out 5,482 tests of various sorts. In addition, it drilled 788 sample cores from finished bituminous concrete pavement, just to double check on completed roadways. Altogether its tests covered a total of 252,270.84 tons of bituminous concrete.

A companion unit, the Portland Cement testing group, performed a similar range of tests, covering 826,802.38 bags of cement. Two other testing units, Asphalt and Physical, together conducted 10,364 separate tests on 58 different types of materials. Field men from these units carried out first-hand inspections of all types of pipe, sand, stone and gravel used in Delaware roads.

Soil beds under new roads also require testing to make sure that they will provide the support needed for paving. The Division of Tests Soils unit made 167 miles of soil profile surveys, checked out 251 "borrow" pits from which soil was hauled for sub-surfacing roads and also carried out a broad range of other soils tests. Much of its work was in connection with the hard surfacing of the State's dirt roads.

After 14 months of study, the Division wrote a new set of Standard Specifications, setting up-to-date requirements for materials used in Delaware highways.

In another forward step, the Division now is in its third year of a ten-year study being conducted jointly with the U. S. Bureau of Public Roads to find out what happens to asphalt in a roadway on a year by year basis. The research aims at getting data that will make possible the building of more durable, wear-resistant roads.

Acquiring the Land—When a new highway is built across open country, the state must acquire what are called "rights-of-way" from private property owners in the path of the proposed road. This ofttimes knotty legal task, which must be done far in advance of the actual highway construction, falls to the Department's Right-of-Way Division.

To acquire property, the right-of-way staff first gets an objective appraisal on which it bases a fair price to offer the property owner. If he refuses to sell, the Division can resort to its power of "Eminent Domain" to take over property vitally needed for a public thoroughfare. In the few cases last year where owners took their case to court, the Department was upheld.

The great majority of rights-of-way are acquired without trouble and to the satisfaction of all concerned. A standout example during fiscal 1960 was the purchase of 400 parcels of land for the route of FAI-2, the freeway scheduled to be constructed through Wilmington.

Never before in the Department's history has such a mass purchasing program been carried out with so little confusion and public criticism or so few complaints from property owners.

The properties ranged from row housing through apartments, commercial establishments and churches, yet the average price was kept at $9,914.39. In each case, a fair and equitable price was offered.

For the money it spends on rights-of-way for freeways the state can get federal reimbursement up to as much as 90 per cent, providing the price it paid for the land was fair. Proof that Delaware paid neither too much nor too little for its rights-of-way during 1960 is the fact that a representative of the U. S. Bureau of Public Roads reported that "Delaware stands first in the nation in the rate of Federal reimbursement for right-of-way expenditures".

In fact, Delaware got back from the Federal government exactly 89.1 per cent of the money it paid for freeway rights-of-way. This is just about a perfect record. The average rate for the states is much lower. The lowest rate reported last year was 49 per cent.

Virtually gone are the days when public spirited property owners will donate lands to the state for highways, but one such gift—the largest ever recorded—did occur last year. This was a donation by Francis V. du Pont who transferred to the Department a 200-foot wide tract running from Haven Lake, Milford, south to the Maryland State Line. The land, cost of which would have been prohibitive, was owned by T. Coleman du Pont Road, Inc.

Federal Aid—In addition to rights-of-way refunds, the state also is eligible for substantial federal aid in the construction of highways that will function as part of the Federal Road System.

Last year the State received a total of $12,575,946 in such aid. The detailed administrative work necessary to collect these funds is handled by the Department's Federal Aid Division.

Silent Police Force—Directing traffic on every modern highway is a silent police force composed of hundreds of signs, lights and painted guide lines. The signs instruct, command, exhort and warn. The lights govern criss-crossing currents of traffic at complicated intersections. The painted lines marshal vehicles into an orderly traffic flow.

Without such aids today's traffic would be hopelessly snarled. Motorists would be at each other's mercy.

Designing and setting up these mute guardians of the highways is the work of the Department's Traffic Division. During 1960 the Division's sign shop alone turned over 23,000 signs. Among them were these innovations in sign design:

New type brown and white reflectorized signs for state parks; new lines of orange colored day-glo signs to warn of construction and maintenance work; blue and gold name signs for streams and developments; oversized green and white reflectorized destination signs at major locations on U. S. and Delaware routes; new reflector assemblies for use at key intersections and dead end streets.

The Division also introduced flexible rubber pylons for channeling traffic into desired patterns, and it standardized the signs and markings at points where divided highways begin and end.

Improvements in painting road guide lines resulted from the introduction of a large paint machine, which makes possible applying lines during winter weather. The machine heats the paint and applies it at high temperature. For example, the guide lines on the new Summit Bridge were painted last year in sub-freezing weather.

Prosaic though their work may appear, the sign makers and line painters of the Highway Department play an important part in highway operation. The steady improvement in sign design and placement, plus the refinement of traffic light and guide line controls, add up to a significant contribution to highway safety.

Planning Ahead—Though they are seldom in the public eye, two other department units—the Planning Division and the Research Division take a vital role in the creation of modern highways.

Research paves the way.

Traffic is one of biggest headaches.

The Planning Division gathers and analyzes data on all phases of highways and compiles what it has learned in reports to state and federal agencies and the general public.

Among the division's 1960 projects were: (1) Completion of the 1959 annual average traffic book, a statewide record of traffic fluctuations as recorded by automatic counters; (2) Completion of the 1959 Sufficiency Study of the primary road system, a report on the physical condition of highways in relation to their ability to handle traffic so that money can be budgeted on the basis of need; (3) A report to the Federal Bureau of Public Roads on the total cost of completing the Interstate System in Delaware, part of the National Study to determine the allotment of Federal Aid among the states for the years 1963-66; (4) Up-dating the Department's field inventory listing the total mileage, surface type, widths and other information on the 4,148.9 miles of roads and streets in the state system; (5) A Road Life Study, based on construction and maintenance. records, to determine the life of various pavement types; (6) An annual inventory of streets in every municipality to determine the allotment of Municipal Aid funds from State Motor Fuel Taxes; (7) An Intersection Accident Study, based on police records, to determine where safety correction measures are required; (8) A Railroad Grade Crossing Protection Study, still uncompleted, to find out through a field inventory, plus study of accident records and other data, where improvements can be made.

These, plus many other studies, provide a mother lode of information for use not only by the Highway Department, but other government agencies, private businesses and the motoring public.

The Planning Division also is the state's chief map maker. It drafted the state's official 1959-60 Highway Map and has distributed over 100,000 copies.

The Advance Men—The advance men of the highway department are the specialists in the Research Division. They get into many curious sidelines. An example is highway beautification. In cooperation with the Delaware Roadside Council and the Delaware Federation of Garden Clubs, a plan for roadside planting has been worked out.

The researchers also serve as liaison men between the Highway Department and the University of Delaware on major research projects: (1) A geological survey to map and classify Delaware soils and water table fluctuations; (2) Completion of a prestressed concrete slab study; (3) Engineering research into rainfall and run-off relations; (4) Preliminary studies into soil stabilization for the state's dirt road program.

Perhaps the Research Division's biggest 1960 task was the completion of a voluminous report on Delaware's water resources, part of a Delaware River Basin Survey. The Delaware report was accepted as part of an over-all U. S. Corps of Engineers Study to be submitted to Congress. Because of its interest to many groups, the Delaware Report also was published in a 556-page volume.

Second to None—This summation of the Highway Department's activities in 1960 has been necessarily brief. But from it emerges a basic definition of the Department: It is a collection of varied skills, talents and specialties united behind one objective: to build highways for Delaware that are second to none and to keep them that way.