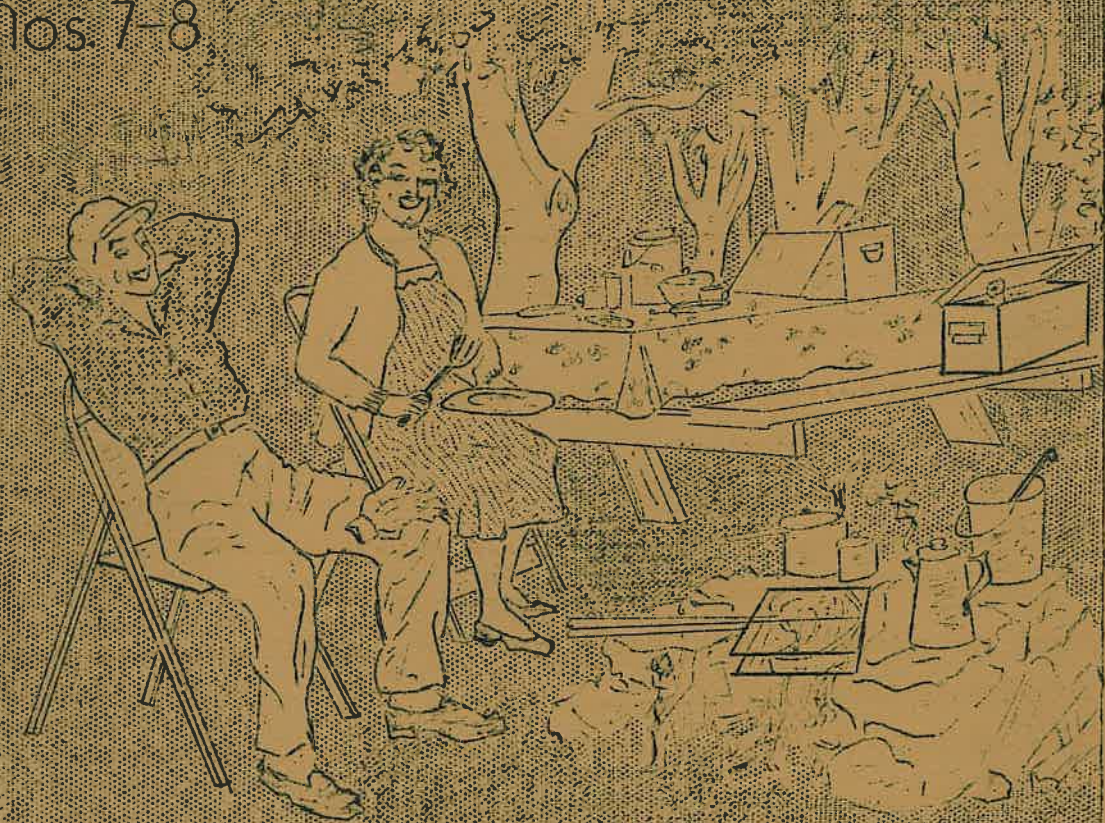


ARKANSAS HIGHWAYS

Vol. IV

Nos. 7-8



July-August
1956

ARKANSAS HIGHWAYS

A Monthly Magazine for Employees of the
Arkansas State Highway Commission

VOL. IV

July-August

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STATE HIGHWAY COMMISSION

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W. Ward Goodman, Chief Engineer

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CONSTRUCTION CONTRACT AWARDS

Boone County. 3.719 miles grading, and gravel base on the county Lead Hill-Sugar Loaf Road, to D. F. Jones Construction Company, Inc., of Little Rock.

Clark County. No. 51, 5.4 miles, gravel base, Okolona-Boswell Road, G. E. Steed, Contractor, Spring Hill, Louisiana.

Clark and Hot Springs Counties. U. S. 67, 2826.3 feet of remodeling, and widening bridges, on the Arkadelphia-Benton Road, J. H. Leveck and Sons, Little Rock.

Cleburne County. No. 16, 11.534 miles surfacing, Edgemont-Heber Springs Road, Interstate Construction Co. Pine Bluff.

Craighead County. No. 63, 5.568 miles grading and widening bridge, Trumann-Nettleton Road, D. F. Jones Construction Company, Inc., Little Rock.

Cross County. No. 42, 11.851 miles surfacing and 4 bridges, Hickory Ridge-Cherry Valley Road, Mississippi Valley Contracting Company, Inc., Paragould.

Dallas County. No. 8, 16.257 miles of gravel base and surfacing, on the Dalark-Princeton Road, Interstate Construction Company Inc., of Pine Bluff.

Faulkner County. 1.049 miles surfacing on county Sport Haven Road, to Interstate Construction Company, Pine Bluff.

Hot Spring County. 5.665 miles grading on county Malvern-South Road to Ollard Gregory and Son, North Little Rock.

Howard and Pike Counties. No. 26, 12.04 miles of gravel, surface, Point Junction 26:27 Road, A.P.T. Construction Company, North Little Rock.

Jefferson County. U.S. 79, 6.786 miles concrete base in Pine Bluff area, Graves Brothers, Pine Bluff.

Jackson County. U. S. 67, 12.584 miles of resurfacing on Newport-Tuckerman Road and on Newport-Harrisburg Road to Ben M. Hogan and Company, Little Rock. No. 37, 285.33 feet of precast slab bridge on the Tuckerman-Grubbs Road to J. H. Leveck and Sons of Little Rock.

Lincoln County. No. 11, 7.875 miles of surfacing and 1 span bridge on Fresno-Grady Road, Linwood Smith, Lake Village.

Mississippi County. U.S. 61, 1.361 miles resurface, in Osceola, Ben M. Hogan Co.. No. 151, 3.371 miles surface and 1 bridge Blytheville-Hornersville, Missouri Road, J. H. Leveck and Sons.

Ouachita County. No. 7, and U. S. 79, 3.04 miles of resurfacing in Camden, to Graves Brothers, Pine Bluff.

Phillips County. No. 85, 9.713 miles of grade and surface, Walnut Corner-Elaine Road, West Memphis Asphalt Company, Inc.

Pulaski County. U.S. 65, 7.1 miles widen and resurface, Little Rock-Conway Road, Ben M. Hogan. No. 10, 0.161 miles, grade, 1 steel ramp, and 1 steel I-beam viaduct, on Little Rock River Front Drive, to J. H. Leveck and Sons, Little Rock.

Sebastian County. No. 96, 8.361 miles surfacing, Greenwood-Junction Highway 22 Road, Bob Dills, Inc., Fort Smith.

White and Independence Counties. No. 11, 8.611 miles surfacing, on the Bald Knob-Batesville Road, Ben M. Hogan, Little Rock.

Woodruff County. No. 39, 8.857 miles of surfacing and 2 bridges in Monroe County Line-Hillemann Road, McGeorge Contracting Company, Inc., of Pine Bluff.

(Subject to the concurrence of the BPT)

(continued on page 29)

DRAINAGE STRUCTURES

by Walter E. Hicks

District Engineer, District 3

Roadway drainage systems have a history extending back to the days of the Roman Empire. During the time of Nero, giant causeways were built of rubble masonry arches and used by the Roman chariots. In Europe and Asia, cut stone arch bridges, which were constructed in about the ninth and tenth centuries, are in use today. During the pioneer days in our country, and the period when transportation was extending westward, construction of drainage systems for vehicular traffic was largely ignored. Along the east coast where settlement first occurred, toll payment ferries were placed on the larger streams. Later, fairly long span timber trusses were constructed over the rivers; and short span covered timber bridges were built over the smaller streams.

Westward, the stage coaches and prairie schooners, which were used by the traveling public, forded the streams during low water and the prairie schooners crossed the larger rivers during floods by floating the wagon and swimming the teams. As the demand increased, toll ferries were installed further West and light steel bridges were constructed in the East. All bridges and ferries were constructed by private companies, and payment for using them was made to the owners.

With the advent of the automobile, whose movement depended on a firm tractive surface, it became expedient to separate the roadway and the drainage way at the stream crossings containing unstable soil.

This improvement required a large capital outlay and forced local groups to donate considerable sums of money to construct roads and culverts. Many makeshifts were used to reduce cost such as spillways and overflow bridges which provided traction for vehicles but could not be used during considerable stream flow. Culverts with inadequate openings were built allowing passage over the streams but any flooding soon washed out the structure. Later, log culverts of sufficient size were built, with walls drift-bolted together, but the strength of the walls were not sufficient to withstand the thrust of the adjacent road embankment against the sides.

Public demand for improved construction became so great that the Federal Government appropriated moneys and created the Bureau of Public Roads, which had supervision of the distribution of allotments to the communities desiring a permanent system of highways. The law provided that the Government would match funds raised by the communities, who then formed Road Improvement Districts and sold bonds to obtain funds for their part of the cost. The quality and value of the finished work was improved by the use of concrete and steel, instead of untreated timber, for the bridges and culverts.

Because payment of the bonds, sold by local groups for financing, was secured by lien on lands belonging to the owners, payment of the taxes became a burden. The payment on the old bonds, and additional

funds for further construction, was given by legislation to an agency of the State. In Arkansas it is our Highway Department. The State enacted legislation placing a tax on gasoline, thereby taxing the users of the roads; and removed the tax from the lands. Now the State and the Federal Bureau of Public Roads jointly finance the construction needs for highway users. Maintenance of the roads is a separate function of the Department, and one in which the Government doesn't participate.

Drainage...A Constant Problem

Drainage enters into nearly every phase of highway construction and maintenance. A drainage structure may be defined as a device constructed for the purpose of removing water from roadway pavements and eventually from within roadway rights-of-way. As maintenance men well know, water and pavements are enemies. You men are constantly repairing pavement damage primarily caused by the action of excessive moisture in the supporting soil. You reconstruct drainage devices to remove water from the roadway, thus removing the source of the trouble.

The crown built on the surfaces of gravel roads, and the crown built into the pavements, may be classed as drainage structures. The same reasoning holds true for sloped shoulders along pavement edges; and the drainage structure principle also applies to the roadway curb and gutter, and side ditches. The side ditches convey the surface water from the shoulders to openings underneath the road, and the drainage channels from these openings remove the accumulated water from the highway.

Another moisture source which creates damage to pavements is commonly known as ground water, or subsurface water. During an extended period of rainfall, the pavements may be completely enclosed in a film of moisture. The subsurface water which enters the soils supporting the pavement, and by saturation, causes these soils to lose their rigidity, and thus they lose their bearing value to support the pavement. The drainage structures often used to combat this trouble are the small diameter perforated pipes, and the french drain. These subgrade structures collect underground water and transfers it to surface side ditches. This reduces the moisture content of the saturated soil to a percentage which provides a measure of stability. However, these structures are effective only where there is a degree of porosity in the subsoil.

In some cases of dense clays with high plasticity, a sand cushion is constructed between the pavement or pavement base and the clay subgrade. This layer of sand provides a space for the submoisture to enter and, until such time as the layer of sand becomes completely filled with water, it reduces the percentage of moisture underneath the concrete pavement, and prevents the bases of asphalt roads from becoming saturated.

Drainage from relatively large areas of land which slope toward the low point that is crossed by the roadway requires that provision be made for an opening under the road. This opening must be of such area that the collected drainage at the point may be discharged through the opening without flooding the roadway or any adjoining private property.

Sometimes stream channels cross the roadway at an angle and it becomes necessary to skew the culvert. The skew angle of a culvert is the angle made between the culvert alignment and an alignment at right angles to the center line of the roadway. There are many types of culverts. They are usually circular for the small drainage areas and may be corrugated metal or reinforced concrete. Where the depth of fill at the culvert is limited, it may be a metal arch culvert. The arch design is obtained by compressing the circular metal culvert to lessen the height and increase the span.

The larger culverts are usually single or multiple barrel reinforced concrete boxes or multiplate corrugated metal arch culverts. The concrete box culverts are constructed of reinforced concrete containing top slab, bottom slab, and side walls. It also contains aprons and toe walls which reduce scour around culvert ends; wing walls which provide for the earth fill slopes; and headwalls which reduce the required length.

Preliminary Survey Work

The survey work preliminary to bridge construction requires more investigation than for a culvert. Drainage areas are usually obtained from contour maps. The required opening for larger structures are derived from a formula which take into account other factors than necessary for culverts. The bridge opening is based on the volume of stream flow at times of flood. The high water mark at the bridge site is important. Also a comparison with openings of nearby bridges on the same stream are taken into account. Contour

maps are made adjacent to bridge site to determine stream behavior at flood time. Foundation borings are important not only to determine the depth to a solid foundation but sometimes it determines the type of bridge to be used. Steel bridges can be constructed on soils of comparatively low bearing value by adding foundation piling. Concrete arch bridges should be placed on a solid rock foundation.

Design According to Span Length

Reinforced concrete slab bridges are used for short span lengths. As indicated by the name, the floor system is a flat slab of large depth, without supporting beams. This design may be used where the height from stream bed to bridge floor is not large. The substructure may be concrete piling, or concrete columns, with connecting web wall. The standard precast concrete slab design, extensively used by the Maintenance Division, may be classed as a slab type design. The beam type superstructure is a concrete deck, the loading is transferred to either concrete girders or steel beams, and it may be either simple supported at the ends or cantilevered from one support. The beam design may be used for longer spans than the slab type and used where greater head room from deck to stream bed is allowed.

The substructure for longer spans may be concrete piers or tower bents. For an extreme length of beam span the design is usually a concrete floor on steel plate girders; the plate girders are a built-up section with a web of stiffened heavy rolled plate and flanges usually composed of angle sections. For the long river spans, the trusses are used. They are

made of steel sections arranged in an order so that loading is distributed and transferred to the different members. The top chord is in compression, bottom chord in tension, and diagonals may carry both tension and compression.

Arch Bridge Designs

In the arch groups, the concrete and rubble masonry barrel arch is earth filled from top of the arch ring to road grade.

The ribbed arch is made of two arch rings which support concrete columns carrying the concrete deck girder system. In the rainbow arch design, the concrete floor system is swung below the top of arch rings by concrete hangers for a greater part of the span length. The cable suspension span may be used for the longest span lengths, the floor system of which is carried by cables supported by towers. The cables are placed on top of towers, allowed a measured amount of sag, and are anchored in solid rock or heavy concrete masonry outside of the tower piers. The anchors are usually located on the stream bank. Steel hangers are placed on cable at intervals and fastened to the floor beams which support the stringers and carry the floor system. Proper truss arrangement along the floor eliminates side sway and cable sag under loading, and the suspension spans may be constructed as rigid as any other type of span.

— MAINTENANCE —

The maintenance of drainage structures may be divided into three groups and classed: Preventive Maintenance, Repair Maintenance, and Improvement Maintenance.

Preventive Maintenance. Installation of french drains to eliminate subsurface moisture may be called preventive maintenance and the procedure for construction is as follows: The section is uncovered to the depth where water or moisture has concentrated. A layer of coarse, clean gravel or crushed stone is placed in the area of saturation and extended to the roadway side ditch. Then the base and pavement repair is made and subsurface water is allowed to flow through the nest of stone and gravel into the side ditches.

Preventive maintenance may be performed by sealing cracks in concrete or asphalt pavements before pavement failure occurs. A valuable preventive is the undersealing of concrete pavements, which is accomplished by inserting nozzles through drilled holes in the pavement and forcing asphaltic cement, at high temperature, into the holes in an amount to completely fill all voids underneath the slabs. This work should be performed subsequent to mud-jacking work, and will recondition many old concrete pavements which have settled and become distorted.

Preventives may be the cementing or concrete encasement of a fireproofing compound on the piling; cleaning and sloping the shoulders and opening the side ditches to expedite flow of rainwater from the pavement surface to the culverts and bridges, from which adequate outlet channels will carry the drainage away; painting of steel bridges; scour repairs at outlet ends of culverts; the placing of sod along slopes and ditches; and construction of ditch dams in the side ditches. The ditch dams may be constructed of any impervious material, and

should be spaced at such intervals that the bottom of one dam is approximately level with the top of the next one below.

Preventive maintenance work is the cleaning of brush from around culvert headwalls, and we are permitted to use a mild weed and brush chemical killer which is usually effective for a season. This maintenance also includes attention to bridge expansion devices, loosening bolts at slotted bridge handrail connections, repairs to riveted expansion plates, and removal of debris from open bridge expansion joints. For pavements, it includes placing a sand cushion in sections of soft subgrade, and under the pavements, prior to patching; and it may include the sealing of old and cracked sections of hot mix pavement to prevent entrance of surface moisture.

Repair Maintenance. This maintenance is usually required because of preventive maintenance neglect. For the bridges, this work includes the refastening of the expansion plates which contain broken connections; the replacement of rotted timber piling, timber flooring, timber handrails, and rail posts. For concrete pavement, the removing and replacing of broken slabs, and the patching of asphalt surfaces. Nearly all asphalt patch work is caused by the action of water on unstable subgrade. Heavy traffic pounding the asphalt surface acts in a manner similar to the action of a diaphragm pump. The pavement serves as the diaphragm and sucks the moisture to the surface. The pavement and base become saturated and the result is mud pumping, breakage of the concrete pavements, and shoving and disintegration of asphalt pavements. We

now have a practice of removing softened material from underneath the asphalt surfaces and replacing it with base gravel. This plan, however, may be of questionable value, as the moisture condition continues to exist and, until a porous backfill is used to cut off seepage, the patch may be a temporary one.

Improvement Maintenance. This work includes replacement of timber bridge decks with concrete decks or metal flooring. Also, the placing of half-depth concrete floors on timber floors, and widening existing bridges. Our dust palliative work would fall in this category because the drainage is improved when a new and firm roadway crown is constructed and the road surface is able to quickly rid itself of the rainwater. Our practice of roadway resectioning, and the construction of the ditches outward to the right-of-way line, is an excellent improvement maintenance.

Make Our Efforts Count

When we are able to rid the roadway surfaces of water and eliminate excessive subgrade moisture, the maintenance man's work will be greatly lightened. Certainly tremendous strides have been made since the days of Nero, but we still haven't conquered the drainage problem. If those of you whose job it is to examine roads will do so with the thought in mind to study every drainage obstruction, a great deal can be accomplished in a relatively short time. Beginning at the center of the pavement, make it possible for all moisture to obey the law of gravity and to seek its level. As far as our roads are concerned, that level might well be the level with the Mississippi River.



34 ACCIDENTS
DURING
JUNE & JULY

Division 1 - Total 3

- 6/8/56, rubbed blister on left hand.
- 6/12/56, stung by a bee while driving.
- 6/27/56, struck on face lowering piling.

Division 2 - Total 4

- 6/8/56, injured jaw when jack hammer stuck. 4 stiches were taken.
- 6/12/56, piece of steel removed from eye.
- 6/18/56, piece of steel hit right finger.
- 6/26/56, particle from broken eye glasses flew into right eye.

Division 3 - Total 2

- 6/20/56, sprained arm when mower hit hole.
- 6/22/56, employee became overheated.

Division 4 - Total 0

Division 5 - Total 0

Division 6 - Total 0

Division 7 - Total 2

- 6/1/56, lacerations of right leg.
- 6/15/56, bridge decking slid off injuring knee and ankle.

Division 8 - Total 1

- 6/1/56, broken left leg.

Division 9 - Total 2

- 6/1/56, cut end from index finger.
- 6/29/56, truck overturned, injured side of chest and pulled ligaments.

Division 10 - Total 1

- 6/29/56, stepped on nail with right foot.

Jacksonville - Total 2

- 6/9/56, foreign particle in left eye.

- 6/11/56, broken eye glasses.

Little Rock - Total 0

Division 1 - Total 1

- 7/17/56, foreign object in right eye.

Division 2 - Total 0

Division 3 - Total 1

- 7/5/56, wasp stung employee on left hand.

Division 4 - Total 1

- 7/23/56, stuck briar in finger.

Division 5 - Total 2

- 7/9/56, injured left foot and ankle.
- 7/17/56, auto accident, no injuries.

Division 6 - Total 1

- 7/13/56, creosote in eyes.

Division 7 - Total 4

- 7/9/56, piece of steel hit left arm.
- 7/13/56, auto accident, no injuries.
- 7/17/56, wheel hit markers breaking arm.
- 7/20/56, cement blew into face infecting right eye.

Division 8 - Total 1

- 7/13/56, slipped on gas, 3 broken ribs.

Division 9 - Total 0

Division 10 - Total 1

- 7/6/56, blade slipped, breaking toe.

State Construction Division - Total 1

- 7/6/56, hand slipped, cut finger on blade.

State Maintenance Division - Total 1

- 7/12/56, piece of concrete in right eye.

State Surveys Division - Total 1

- 7/20/56, stepped on rock, sprained ankle.

Jacksonville - Total 1

- 7/23/56, piece of steel stuck in finger.

Little Rock - Total 1

- 7/20/56, automobile accident.

SPECIAL MEETING



The Highway Act of 1956 and its immediate effect on the Arkansas Highway Department was the principal theme for discussion at the all-day meeting, in the Commission Hearing Room at Little Rock, July 24, called by Director Eldridge with his Division Heads, District Engineers, District Construction Engineers, and District Maintenance Supervisors.

"The new Highway Bill challenges all Highway Departments of the nation and, perhaps, presents an even greater challenge to us," Mr. Eldridge told the group. "It is so tremendous, it staggers the imagination. Large sums are provided for the Interstate System, but there is only a small increase for Secondary, Primary, and Urban. And, though not unusual, it looks like we are going to be short of money for these systems, so we must continue to plan carefully and economically. Each of you must share your portion of the challenge there is upon us."

Mr. Eldridge mentioned that the Highway Act of 1956 immediately supplements the Highway Act of 1954; and went on to explain the provisions of the new Act, including the apportionment of moneys for Arkansas highways; when it could be used, how and where it could be used, and the standards which must be met. He brought up for discussion the ways and means of obtaining the additional qualified personnel which will be sorely needed.

"Train your own personnel," he urged. "The Highway Department has the greatest training ground of any organization. Give your people a chance...you don't know until you've tried. You may have the best prospects right in your own Division."

With the enormous maintenance increase, it seems we need about \$5 million more for roads not eligible for Federal Funds. We have increased our Highway Fund by producing more and better roads to bring in more revenue, and we cannot afford to have any of our money diverted into other State channels. We need it. We must have it. Counting the expected increase in revenue over the next 10 years, we will still fall short of the money required to fulfill the needs of Arkansas' lifeline of roads and bridges. This fact every employee should know: We do not have a surplus of money, but what we've had has been well-managed and placed where it would do the most people the most good.

If we fail to measure up to the opportunities and challenge the new Highway Act has opened for us, it will not be for lack of endeavor by our leaders. At the July meeting, the Commission approved the programing of 249 miles of secondary roads coming under the Federal Funds, amounting to \$7.4 million, as presented to them by our Director who commented that these roads should, by all means, be under contract within 18 months. These roads have had no prior survey, so there can be no laggardness, up or down the line. But, then, there can be no laggardness by any employee in striving to complete each job in record time, and go on to another... which could be UP, according to desire for progress in a Highway career.

CONCRETE PAVEMENTS

... a Technical Article - Part Two

by W. C. Ross

District 3 Construction Engineer

There are many details concerning sub-grade, cross-sections, plant operation, paving operations, and reporting, which have been omitted from this article because they are thoroughly described in the Resident Engineer's Manual. However, one refinement which does not appear in the Manual or the current specifications is that of longitudinal dragging of wet burlap as the final operation in finishing the slab surface. We required such finishing on the Texarkana-Paups Spur job, on Highway 67, in order to avoid the vibratory finish obtained by transverse belting. When we began paving the Benton-Pulaski County Line job, on Highway 67, the longitudinal finishing was stopped on the basis that governing specifications described transverse belting as the final operation. The new specifications will probably include the longitudinal finish.

The Joint Problem

The problem of joints is quite often the reason that many field men dislike concrete paving. This is a design detail. However, since the joint problem has never been satisfactorily solved, a discussion of the subject may be of benefit to some.

Missouri and Florida proved, 30 years ago, that elimination of all joints is bad practice. Other states have proved that frequent expansion joints are bad.

Consequently, a serious study is now being made of the various kinds and spacing of contraction joints, leaving out all expansion joints except where structures are to be in contact with the paving slab.

The 1/4-inch, tooled dummy joints, without dowels, constructed at 20-foot intervals, is a good design. Such joints are called contraction joints but when the uncut part of the joint opens, it serves as a small expansion joint without the serious spalling of the old 3/4-inch joint. Personally, my objection to dowels is that, unless perfectly placed, a transverse crack will appear at the ends of the dowels and, eventually, the concrete within the doweled area will disintegrate. And, if perfectly placed, the dowels will funnelize the concrete and will rust out to the extent of disappearance.

This article has been prepared in an endeavor to cover details of concrete technology which is not covered by the Resident Engineer's Manual or the specifications. Such admonitory remarks are usually interesting only to concrete technicians, but it has long been proved that case problems are interesting to nearly all engineers as well as those planning to become engineers. With this thought in mind, the following three case problems are presented.

Case Problem I Case Problem II

On a recent paving job, two mixers of like capacity were in use, one on each shoulder. Liquid air-entraining admixture was being introduced into the mixing water to produce 4 percent air in the concrete. Eight ounces per batch was used at each mixer. It was noted that air test results alternated at about 3.50 and 4.00 percent. The alternation persisted and the gap was too great.

The Resident Engineer finally suspected such variance was attributable to mixer characteristics. He did not take time to study the mechanical characteristics but proceeded to take several air test specimens from concrete discharged from one machine only, and recorded the results. He then proceeded the same way with concrete from the other mixer. One machine was old, the other was new.

It was then known that the lesser air content was in concrete from the older machine. Results were equated by continuing the use of 8 ounces of the admixture at the new mixer and by raising the admixture to 9 ounces at the old mixer.

We never performed research to find what mechanical details caused the disparity of air content, but it is probable that the older mixer had worn blades in the drum and was operating at less revolutions than the new machine, thereby developing less air due to less agitation.

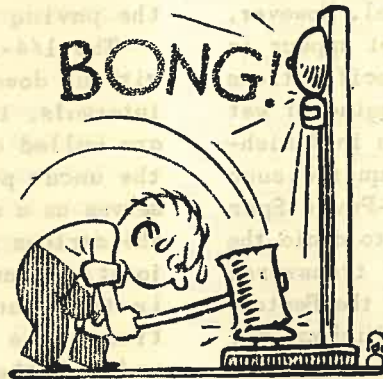
For several days, the cement content had been running about 1 percent high in addition to the overrun of 2 percent that the contractor had been buying to produce concrete for low subgrade.

The subgrade cross-sectioning and the cross-section computations were checked before accusing the plant operation of a shortage in plant yield. The plant operation was then checked by scale weight tests and nothing was wrong there. The barrel test was then made to check the water-discharge mechanism of the mixers, and the air content in the concrete was checked, since water and air are parts of the yield. The width between the forms was checked with steel tape, and the forms were checked for

settling and accumulation of mortar on top where the wheels of the finishing machine ran. There was nothing wrong in these details.

It finally occurred to me that since we cross-section the subgrade but not the crown of the slab, because the finishing screed is set perfectly to ordinates and is assumed to operate perfectly, that something had slipped so as to cause a slightly high crown.

On the following morning, the paving operation was not begun until the crown screed had been thoroughly checked. It was through this check that the error was found and corrected.



When the day's run had been completed, and the yield had been computed and found to be nearly perfect, it was then known that nothing had been wrong at the plant, and the plant technician began to feel much better.

Case Problem III

The contractor had been running about 510 batches per day which should produce approximately 750 cubic yards of concrete but an underyield of 5 to 7 cubic yards per day developed which could not be promptly accounted. The plant was checked and the paving controls in the field were the same as they were normally. The only thing left to do was to watch the paving operation, looking for something unusual without knowing what we were looking for.

The specification required selected material for subgrade and this material had been, in previous sections, a fine sandy loam. But now the material was much coarser and seemed more like a sugar sand. I then suspected that the loss in yield was due to loss of mixing water into the subgrade. Tests were made to prove the case and it was thought that additional mixing water of about 0.27 gallon per sack of cement, added at the mixer without redesign of the mixture, would correct the yield.

The yield was thereby corrected, but the slump then exceeded that which was desired. The mix was then redesigned with the same total solid volume of aggregates but with a higher ratio of sand to coarse aggregate. This stiffened the batch without reducing the volume of water. The yield then continued near perfection and the former slump was restored.

NEW E&P TRAINING SCHOOL

by Mary M. Hill

Equipment and Procurement Division

On May 17, an all-day school, covering the mechanics of the 1956 V-8 Chevrolet truck engine, was held at Jacksonville. The school was conducted by Charles L. Burns, Fleet Service Manager, Chevrolet Division of General Motors. G. T. Hahn, Zone Fleet Manager, was present also. The following Department employees, from all over the State, attended the school:

Division 1. Leland Harris, Equipment Supervisor; J. Edward Smith, Mechanic.
Division 2. J. L. Goins, Eqpt Supv; Calvin Rawls, Mech. Division 3. Floyd L. Pharris, Sr., Eqpt Supv; Clovis G. Tittle, Mech. Division 4. John Danner, Eqpt Supv; S. R. Cope, Shop Foreman; Lock Williams, Mech. Division 5. G.G. Carter, Eqpt Supv. Division 6. O. G. Duffee, Eqpt Supv; John Bryant, Mech. Division 7. Hugh Anderson, Eqpt Supv; J.C. Parker, Mech. Division 8. Nymph Jones, Eqpt Supv; Sherman Moore, Mech. Division 9. W.H. Porter, Eqpt Supv; Jack Holtby, Mech. Division 9-S. Otis Vaughn, Eqpt Supv; Arvis Clark, Mech. Division 10. William O'Guinn, Eqpt Supv; Graham Apperson, Mech. Central Shops. T. J. Eby, Superintendent; Frank Pratt, Sr., and R. C. Mosby, Foremen; J. E. Hardcastle Gregory Imbert, and Joe Stinson, Mechs. Equipment & Procurement Division. Asa L. Duncan and C. L. Elliott, Eqpt Inspectors.

The Department plans to hold schools of this nature covering chassis, transmission, and differential, for both Chevrolet and Ford trucks as soon as arrangements can be completed.

THE CHALLENGE ---

Chief Engineer Ward Goodman designed an inspired program around The Challenge of Highway Engineering in Arkansas, which was presented in Little Rock, August 3, at a State-wide meeting of engineering students employed by the Department. This all-day meeting, sponsored by the Personnel Division, was held in an endeavor to acquaint these young people with the diversified engineering capacities to be found in the field of highway engineering.

The group was welcomed by Mr. Goodman and Director of Personnel Dennison Yates, who explained the reason for the meeting and the "desire on the part of Department officials to impart information on the intellectual challenge of highway engineering and the great vocational possibilities it offers." There were very few dull moments, if any, during the program.

It is an interesting phenomena to watch how quickly Director Eldridge tunes himself in with his audience. The entire group was completely absorbed in his "Highway Program of the Future" before he had spoken more than a few words. This wonderful attribute has won many friends for the Department, for no one can listen to Mr. Eldridge and doubt his sincerity and desire to give full information. Informed people are understanding people.

No elaboration will be given on the talks by Messrs. Eldridge, Goodman, and Yates, because "The Challenge" must be thoroughly heard. It could mean so much to you. While this program was designed to stimulate the interest of young people employed for the summer and help direct

their studies toward a career in the highway field, you people permanently employed with the Department should have more than a passing interest in The Challenge...for you could be the early birds that feast. A degree in engineering is helpful, but experience is also of utmost importance. Aim for the top! Don't stop and specialize on the bottom...or middle. That's giving up...when opportunities are plentiful if you are willing to learn and ambitious enough to work for success.

There are 15 fields of highway engineering, any one of which could hold a profound interest for you. In programing The Challenge, there was time for only 6 of these fields to be discussed. With no thought of discriminating and believing all fields to be of equal importance, Mr. Goodman made his selections and asked young men from each Division to present the challenge of his particular field. We will continue The Challenge in each issue of "Arkansas Highways" until you have been given each presentation. It is hoped that one will strike a responsive chord which will lead you on to a brilliant career.

In order of appearance we will give you The Challenge in the: Bridge Design Field, by Robert Mattox, Senior Bridge Designer; Construction Field, by John Crouse, Engineering Assistant; Maintenance Field, by Gerald Sisk, Assistant Maintenance Engineer; Materials & Tests Field, by Joseph Irwin, Chemist; Roadway Design Field, by Glenn Trammel, Senior Designer; and, Traffic Field, Statistics & Analyses, by Billy Cooper, Engineering Assistant.

Bridge Design...A Challenge

by Robert Mattox
Senior Bridge Designer

Our State is entering one of the biggest construction programs in its history. The demand for a greater number of bridges to carry heavier loads has increased greatly in recent years. If the State is to fully develop its resources, it must have these bridges. On this basis, I believe Bridge Design to be a challenge.

We have 4,024 bridges on our State Highway System. This represents 1 bridge for each $2\frac{1}{2}$ miles of highway. Of these 4,024 bridges, we are deficient in 1,705 of them. By deficient, I mean that these bridges do not measure up to the current standards adopted by the American Association of State Highway Officials and will have to be replaced or widened.

The figures that I just gave do not present the over-all picture. The reason being that only a part of these bridges are on our Interstate System and the passage of the new Highway Bill calls for a complete overhauling of this System. The Arkansas Interstate System embraces approximately 500 miles of highways, some of which will have to be relocated.

To give some idea of the number of bridges and overpasses this System will require, let us consider the new Little Rock-Benton highway. It is to be a 4-lane divided highway with frontage roads. There are 5 stream crossings. That will require 20 bridges. Several roads intersecting this highway carry enough traffic to warrant an overpass. Possibly 5. That totals up to approximately 25 structures

in as many miles. Of course, we won't have one structure for each mile of road on the entire System, but this gives you some idea of the magnitude of the job that has to be done.

Design in the Bridge department can be broken down into two main classifications ...new bridges and remodeled bridges.

The design of a new bridge requires a structure that does not obstruct the flow, that has the capacity, strength, and durability, to carry all present traffic plus that predicted for the future at a cost that is not excessive.

The remodeling of an existing bridge, in some cases, can be more of a challenge than the design of a new bridge. The requirements are the same, but in the case of widening an existing bridge, the structure must first be analyzed to determine that it will carry the design load. Then a method of widening it must be developed.

In the case of reflooring an existing bridge, a type of deck that will not increase the dead load must be determined. Then the problem of placing a new deck and connecting it to the existing structure must be solved.

In all cases, whether it be a new bridge, a widening, or a reflooring job, there must be a set of plans and specifications. The detailing of these plans is very important. The time required for drawing the details for different structures varies greatly. For example, a structure that makes a crossing at an angle other than 90 degrees and is on a vertical curve will require many more calculations and several extra details

(continued on page 28)

1956

DIVISION MAINTENANCE

January 1 to

TYPE OF WORK	DIVISION 1	DIVISION 2	DIVISION 3	DIVISION 4	DIVISION 5					
ROADWAY	Miles	Miles	Miles	Miles	Miles					
Pavement Resurfaced	10.93		7.50		1.2					
Widened & Resurfaced										
New Pavement		20.01	16.50	1.85	9.8					
Grading & Minor Drainage	13.40	11.62	12.04							
Gravel Resurfaced		13.03	0.25							
Sealing		14.97	34.00	38.44	13.5					
Dust Palliative	6.31									
TOTAL ROADWAY MILEAGE	30.64	59.63	70.29	40.29	24.6					
BRIDGES	No.	Linear Feet	No.	Linear Feet	No.	Linear Feet	No.	Linear Feet	No.	Linear Feet
Replaced by Culverts			2	84	2	103				
Old Bridges Redecked										
Concrete			6	932	1	32	3	165	8	1,1
Asphalt			1	338					3	
Timber										
Widened & Redecked										
Concrete	8	471	1	58						
Asphalt			1	32			1	162		
Timber									1	
Hand Rails Set Out										
New Bridges										
Precast Concrete	2	211	10	627	7	391				
Steel			1	82						
Timber			3	198					1	
Multiple Pipe										
TOTAL BRIDGING	10	682	23	2,267	8	423	4	327	13	1,1

WORK COMPLETED

ough June 30

1956

DIVISION 6		DIVISION 7		DIVISION 8		DIVISION 9		DIVISION 10		TOTAL	
Miles		Miles		Miles		Miles		Miles		Miles	
7.55		8.92								28.69	
2.58		10.70				3.50		5.76		7.55	
		1.65		4.90				29.05		70.70	
		14.13		6.84		16.80		29.91		71.01	
				31.20				20.80		51.68	
										183.85	
										6.31	
10.13		35.40		42.94		20.30		85.52		419.79	
No.	Linear Feet	No.	Linear Feet	No.	Linear Feet	No.	Linear Feet	No.	Linear Feet	No.	Linear Feet
		6	238					2	73	12	498
						2	102			20	2,347
1	40					1	22			6	617
5	253	5	328					5	292	24	1,402
								1	33	3	227
										1	51
		3	722	5	708	2	133	4	180	30	2,250
										3	722
										1	82
										4	229
6	293	8	1,050	5	708	5	257	10	505	92	7,927

COOPERATIVE TEAMWORK GETS RESULTS

Our Highway Department has gone a long way since January 13, 1953, when a new Commission took over the helm and started the reorganization of the Department into a nonpolitical road-building agency. And build roads is just what we've done. It hasn't all been apple pie, but faith, confidence, leadership, determination, business acumen, and the courage to face issues and strive to accomplish more and more each day, has brought us almost unbelievable success.

The administration of Highway affairs was put into the hands of a man, a proficient engineer, who knows his highways from an engineering standpoint and need, who has kept abreast of the times in business administration, personnel and public relations, and who has a keen understanding of our problems, both material and mental, as well as the experience and know-how to lead us to accomplishments for our State and our people. Our Commission and our Director and his executive staff have provided the leadership and the plans and each employee has had the opportunity to share in carrying out those plans and know the satisfaction of being a part of Highway Department attainments.

There have been some dissenters. There have been some who preferred argument to action, who fought every modern advancement in system, policies, and procedures. There have been some who spread false propaganda and vicious gossip in an effort to tear down the work of the builders. However, these people are only a few who will eventually be completely weeded out.

The majority of our Highway personnel has justified the confidence placed in them and can take a personal pride in the good work done and great strides accomplished in Highway development. We will take even greater strides in the years to

come with the sincere effort of each employee to do his own job to the best of his ability. It's teamwork that registers economical and efficient results.

Let's take a look at one example of the results of cooperative teamwork by the Commission, Director and his staff, employees, and the good people of Arkansas:

As of January 13, 1953, Arkansas had 4,326.3 miles of paved roads (43 percent) and 5,685.3 miles of unpaved roads (57 percent), some of which were still in a condition belonging to the horse-and-buggy era. That made a total of 10,011.6 miles of roads on our Highway System.

The figures as of July 1, 1956, tell an entirely different story, almost like a fairy tale...except that it took hard work to make this tale come true. Roads on which contracts for paving have been awarded are considered as paved in these figures because the paving will be completed before the year's end. Today, our total Highway System mileage is 10,038.9 miles, of which 7,780 miles are paved (77 percent) and only 2,258.9 miles (23 percent) are still unpaved. How about that?

Could you have visualized such a tremendous accomplishment in such a short time? Just think! an increase of 3,453.7 miles of paved roads in 3½ years. That's an increase of 34 percent, and you did it!

Party Line Parade

HEADQUARTERS

BRIDGE DESIGN DIVISION

Virginia Tackett - Reporter

We are happy to welcome Keith Curtis and Billy Hart who are working with us during the summer months as Junior Draftsmen. They are both students of engineering. Glad to have you both.

* * * *

Your reporter and family visited in New York City for 2 weeks in June. We took in Birdland and other local spots and had a wonderful time.

* * * *

Jake Knott and his family vacationed in June at Lakes Hamilton and Ouachita to do a bit of fishing, as well as Doc and Etta Bonner who spent part of their time at Lake Ouachita fishing and other places. Eddie and Esther Williams had a delightful trip to Pensacola where they soaked up some Florida sun.

* * * *

Opelousas catfish and hush puppies were the piece de resistance for all in Bridge Design July 13 at Boyle Park. We have little get-togethers pretty often in our Division and everyone enjoys them and looks forward to the time there will be another.

* * * *

Jim Matthews who holds a Captain's rating with the U.S. Army Reserve, spent a 2-week military leave at Camp Polk, Louisiana, in July with the Engineering Corps. Welcome back, Jim.

Catherine Carlson, daughter of L. P. Carlson, appeared on "bigtime" television the Home Show June 27, with Ted Shawn and Ruth St. Denis. Catherine was one of the Texas State College for Women Modern Dance Group. In September she will become a staff member of the Physical Education Department of Alabama State College down in Montebello, Alabama. Good luck, Cathy.

* * * *

We extend our Best Wishes and Heartiest Congratulations to newlyweds, Reid Beckel and the former Miss Sally Green of Arkadelphia, who tied the knot July 1, at Second Baptist Church in Little Rock. The new Mrs. Beckel is a nurse in the office of Dr. W. E. Phipps, Jr., North Little Rock. May the happy pair have many, many, happy and prosperous years together.

* * * *

B. Vinson and wife, Ann, left recently for a vacation trip to the East which will include stops in New York City and Canada. While in New York they plan to take in some Broadway shows and other places of interest. Hope they have fun.

* * * *

Jim Matthews and his family took a spin out west to Los Angeles and Disneyland. (For the small fry, of course.)

* * * *

Larry Carlson has been enjoying a season of ball playing with a batting average of around 250. Larry, son of L. P. Carlson, is with Coleman's Dairy Team in the American Legion League.

Party Line Parade

MATERIALS AND TESTS

Julia Mae Steele - Reporter

Our congratulations to James and Billie Earnhart who are the proud parents of a fine baby boy who was born in July at St. Vincent's Infirmary. James is one of our inspectors and they are now living in Plummerville.

* * * *

Horace Cox, who is a former employee in Materials and Tests, paid us a visit recently and we enjoyed having him. Horace now lives in Louisiana.

* * * *

We welcome the following boys who will be with us for the remainder of the summer: Don Jones, Harry Metcalf, Raymond Whittier Neil Harper, and Donald Stephens. Edwin Wilkinson, a former employee, and Bobby G. Hughes are new regular employees and we hope they will be happy with us.

* * * *

Raymond Lynch and his family of Conway visited Bill Lynch in Amarillo recently and reported to have had a nice visit. Russell Newsom is enjoying a visit from his sister who lives in Austin, Texas.

* * * *

We are happy to report that Alton T. Beard's mother, who was operated on recently, is recuperating at his home, and we hope she will continue to improve. Mrs. Beard lives in Wattensaw.

* * * *

We are sorry to learn that Robert Donham is having eye trouble again. We miss you, Bob, and hope you will be back with us soon.

Your reporter and mother enjoyed the recent visit from my sister and family, Zelma, John, and Darlene Rose of Arizona.

* * * *

We send our best wishes to Frances Roller's niece with the hope she will be home soon. She is in a Memphis hospital.

* * * *

We offer our deep and heartfelt sympathies to Edwin Wilkinson and Regal Cotton who each lost his father recently. Mr. Cotton resided in Sheridan and Mr. Wilkinson in Williford.

CONSTRUCTION DIVISION

Mary Sue Gipson - Reporter

Mr. and Mrs. E. E. Mashburn entertained the Construction Office with a lawn party in their home Monday night, May 14. The only complication came when it began to rain, but that was soon remedied when the barbecue grill was moved into the garage and the guests into the house. The menu for the night consisted of grilled hamburgers with all the trimmings prepared by our Chef, Gene Ashcraft. Our evening was devoted primarily to eating and playing bingo. Our host and hostess certainly entertained us royally and we are all looking forward to another party.

* * * *

We are sorry to lose Gene Ashcraft who transferred from the Construction Office to the office of B. L. Ryan, Resident Engineer at Fayetteville. We all miss you, Gene, and our very best wishes go with you and your family. Be sure to drop in to see us when you can.

Party Line Parade

IBM SECTION

Nadene Trantham - Reporter

We are happy to have Rita Hardcastle as a member of our cozy crew. Rita has been with us for some time now.

* * * *

Billie Ratliff took a vacation in July and got up enough courage to cook a chicken dinner for the rest of us. Billie is a good cook and we all enjoyed being in her home and the delicious dinner.

* * * *

Yours truly vacationed in Texas and had a wonderful time, but home really looked good to us when we got back.

* * * *

Smitty spent his summer at his favorite hobby, gardening. We can vouch for his green thumb, since he brought us fruits of his labor in the form of cantaloupes and tomatoes. Smitty, they were good!

* * * *

Roy Shelby and his family spent some time visiting in Dallas, Texas, recently. Roy said, "It's mighty hot down that-a-way." Fun though, wasn't it, Roy?

* * * *

Erma Jetton's son, Lane, stationed in Homestead, Florida, with the Air Force is home on leave. Welcome home, Lane, and congratulations on your promotion to A/2c. Erma is also planning a vacation in August and will spend most of her time at their new cottage on Lake Conway.

* * * *

Laverne Henderson and her family spent the first part of their vacation in Northern Arkansas and then to Oklahoma.

The Art Johnson's spent some time in Chicago and first came baseball, friends, dinner, and dancing and then back home the long way. Sounds like fun.

* * * *

Our children just will grow up and that's what happened in the Gladys Plunkett home. Gladys spent her vacation helping her daughter, Sue, prepare for her freshman year at the University. Then Fred, Sr., and Freddie joined them on a trip to Fayetteville to get Sue settled.

* * * *

Happily we awaited vacation time, but on the joy of settling down to work again.

PURCHASING OFFICE

Mildred Sanderson - Reporter

Linda Colbert is our newest addition to the Purchasing crew and we are happy to have her with us. She is replacing Nancy Brown who recently resigned to plan for her wedding September 8.

* * * *

Dan Cupid has had a busy season in this office as evidenced by the recent engagements of Nancy Brown to Jamie Howe of Wabash, and your reporter to Arnold Olstein of Miami, Florida. I also spent a delightful week visiting my future mother and father-in-law and think Miami is a fabulous place to take a vacation.

* * * *

Jim Meredith is pleased as punch over his new 1956 Buick. It's a black and yellow Riviera, and Willene Gray is also sporting a pretty new 1956 blue and white Ford. Congratulations to both.

Party Line Parade

PERSONNEL DIVISION

Hazel Norman - Reporter

Congratulations are in order for Joe and Therese Peyer over the arrival of their little bundle of heaven, Cathy Jo. Little Cathy was born June 30 at St. Vincent's Infirmary and she's a doll.

* * * *

Your reporter motored to Shreveport to get "Sonny," who was released from the Shriner's Hospital after a stay of 6 months. He's very happy to be home and wants to thank everyone for sending him the nice get-well cards.

* * * *

We haven't heard directly from Arnold Weese since leaving 2 weeks ago for his vacation in Seattle, Washington. He got an extended week off so he must be having a wonderful time.

* * * *

We are happy to report Sarah Neel's mother, Mrs. Susie Smith, is convalescing at the Swilling Nursing Home, 1005 Barber Street after suffering from a broken hip received in a fall June 22. Mrs. Smith is 79 years of age and appreciates receiving cards and letters.

* * * *

Mr. and Mrs. Yates took a 2-week vacation recently and drove their daughter to Spokane, Washington. He reported they had a wonderful trip and the scenery was just beautiful and the weather perfect.

* * * *

Mrs. Rhoades is on vacation but since we do not have the details, will have to put it in the next issue.

Jean and Harry Redwine enjoyed having Harry's niece and her husband, Jennie and Vince Franklin and 4-month-old Jeffie of Kansas City, as house guests recently. This was a surprise visit as Harry had not seen his niece in several years. They are hoping to see them again real soon.

* * * *

Frank Lewis, our night elevator operator, and his family, had a pleasant few days stay down in Pensacola during June. Mr. Lewis said there was plenty of activity down there, what with the Navel Base being there. We forgot to find out if he did any deep sea fishing but imagine he did since he's such an ardent fisherman.

* * * *

School Days! School Days! Terry Tyson and Bobby Hendrix, who have been part of our Personnel family this summer, will be leaving us soon and we shall miss them. Terry will enter the University of Miami and Bobby goes up to Fayetteville at our University. We've enjoyed having them and look forward to seeing them again soon.

Reporters
Deadline for
Party-Line news
is September 15

Party Line Parade

COUNTY PROGRAM

Zelda M. Riggs - Reporter

Jack and Mary Teasdale, accompanied by their daughter, Patricia Allen of Houston, Texas, spent a wonderful vacation in Florida. Jack came back to the office on July 30 with a marvelous tan. Glad to have you back with us, Jack.

* * * *

We regret to inform you that our good friend, and capable Engineer, Carl B. Pendergraft has retired due to disability. Mr. Pendergraft has been with the Department almost 20 years and he will be greatly missed by his many friends here. We offer our best wishes for a speedy recovery so that he can really enjoy his retirement, as well as come back to see us often.

* * * *

We welcome Elmo A. Knoch who joined our Division recently as Draftsman. We hope he will be happy on his new job.

* * * *

We will miss Gerald A. Gassaway, our Junior Draftsman, who will leave on August 12 for a 2-week military leave. Gerald will be stationed in Gulf Port, Mississippi, with the National Guards.

* * * *

Max Hall accompanied by his daughter, Helen Ann, has been visiting in Fort Worth. Helen remained for a longer stay but has recently returned to Little Rock with her sister and brother-in-law, Mr. and Mrs. Ernest Evras and their two children, who visited with his parents in North Little Rock.

Your reporter spent a week of her vacation in Texarkana spoiling her new grandson, "Danny" B. Johnson, and granddaughter, Martha Sue. The Johnson's have recently visited with Mother Allen, Richard L., and your reporter. I must admit that at age 3 months the new grandson is quite a handsome young man.

STATISTICS AND ANALYSES

Bill Headrick - Reporter

We are glad to have Ed Johnson back with us after 2 weeks of active duty at Fort Chaffee in Fort Smith. Ed is Commanding Officer at Headquarters Company, 212 Signal Corp.

* * * *

Lee Gibbons and Richard Sanders will leave August 5 for a 2-week military leave at Camp Polk, Louisiana. Lee and Richard have been getting in condition on the annual "Loadometer Survey," a highlight in S & A's summer schedule. Have fun, boys.

* * * *

It has become more than a suspicion! Billy Cooper and Dorothy Redmon, an attractive nurse at Baptist Hospital, will tie the knot early in September. Dorothy has accepted a job at a hospital in Lafayette, Indiana, while Billy works on his master's degree at Purdue University beginning in September. Billy recently was awarded the \$2,000 Automotive Safety Foundation Fellowship for graduate study in Traffic Engineering. Congratulations to two wonderful people and our best wishes for a happy marriage.

Party Line Parade

EQUIPMENT AND PROCUREMENT

Mary M. Hill - Reporter

We extend a hearty welcome to the following new employees: Lewis M. Wade and Jo Ann Simpson in the Procurement Office; Sally Schadt, switchboard operator in the Equipment Office; David M. Stuart in Stock Room; and Buddy D. Davis in the Heavy Equipment Shop.

* * * *

Frank J. Boyett also had a pleasant vacation in Oklahoma and Texas the week of July 8, and Patsy Navens (lucky!) from the Procurement Office is vacationing in Florida. Have fun, Patsy.

* * * *

We will miss Ralph D. Henson who resigned May 31 to accept a position with Little Rock Road Machinery Company in Little Rock. Good luck to you, Ralph.

* * * *

Mr. Oswaldo Sitjar from Asuncion, Paraguay, was an interesting visitor in the Equipment and Procurement Division. Mr. Sitjar has been in the States since March 1 under a program of study sponsored by the International Cooperation Administration arranged by the Bureau of Public Roads. Prior to coming to Little Rock he had been with the Missouri State Highway Department for study. He is particularly interested in field servicing and repair of equipment, utilization of equipment on construction and maintenance operations, and the organization of maintenance operations and repair shops. We have been happy to have had Mr. Sitjar with us and hope he will visit us again soon.

Congratulations to the following employees in Equipment and Procurement who were presented Certificates of Merit and Service Pins by C. Don Hayes July 24. Those who received the awards for 10 years of service were: James C. Hammond and James E. Hardcastle; those with 5 years service were: James H. Gill, O. S. Marett, and Hershel Russell.

* * * *

H. "Doc" Burns spent his vacation in Stockton and San Francisco July 2 through 12 visiting his daughter and family and reported to have had a wonderful trip.

* * * *

James H. Gill, mechanic in the Heavy Equipment Shop, attended the Shrine Convention in Detroit in July.

* * * *

We offer our deep and sincere sympathies to C. Don Hayes and his family in the loss of his brother, Colonel Rex P. Hayes, who was fatally injured in a plane crash in Russellville on July 15.

CROSSWORD PUZZLE SOLUTION

a	c	c	e	s	s	p	a	r	a	p	e	t	d	r	o	p
s	o	r	r	o	w	a	n	i	m	a	t	e	r	o	p	e
c	r	u	i	s	e	r	e	d	t	o	n	a	m	e	n	
e	n	d	s	d	r	a	w	e	r	n	o	r	m	a	n	s
n	e	e	b	e	e	r	u	b	r	o	a	n				
t	a	r	r	y	s	p	a	g	a	s	o	s	c	a	r	
					h	e	a	p	e	r	s	t	h	a	t	e
h	e	r	o		d	i	s	t	o	r	t	e	d	e	d	a
a	v	e			h	a	r	t		b	a	l	l	o	o	n
m	e	e	l	e	e		e	l		g	e	t		a	d	d
					a	l	a	s		d	a	b		e	a	r
i	m	p	o	r	t	s	s	a	f	a	r	i	s	l	a	t
r	a	s	p		r	o	c		n	a	g		d	e	c	a
a	l	e	e		a	d	o	r	a	t	e		e	l	a	t
n	e	s			w	a	b	b	l	e	d		s	i	r	e

Party Line Parade

DISTRICT 1

Headquarters Kathryn Booher Jonesboro

Leadership and its accompanying responsibilities was re-emphasized at a meeting of District Engineers and the Division Heads of the Department here in Jonesboro, at Hotel Noble, May 22. J. C. Perkins, District Engineer, was in charge of arrangements for the meeting. Others attending were District Engineers H. R. Lucas, W. E. Hicks, W. F. Turner, C. M. Matthews; Chief Engineer, Ward Goodman; and Division Heads L. P. Carlson, E. E. Mashburn, E. L. Wales, A. G. Rives, E. F. Nelson, F. J. Herring, C. K. Brown, J. R. Henderson, C. Don Hayes, V. E. Scott, W. R. Thrasher, Dennison Yates, and Guy Cobb.

* * * *

Congratulations to Mr. and Mrs. Perkins who are sporting a 1956 Plymouth. It's blue and white and really a beauty. We are hoping to take a ride in it soon.

* * * *

G. E. Nunnally and his family have recently returned from a vacation spent in Florida. They visited relatives and friends and had a wonderful time.

* * * *

Mr. and Mrs. C. H. Kelly were happy to have their youngest son and daughter-in-law visit them the last week in May. They are now living in Wichita, Kansas.

* * * *

Mr. and Mrs. L. A. McCain spent a recent week end fishing and picnicing. We don't have all the details, but understand they had a most enjoyable time.

We were delighted to have the following guests in our office recently: Herbert Eldridge, Ward Goodman, A. G. Rives, E. E. Mashburn, Walter E. Carter, H. R. Lucas, and Mrs. Pat Denson. We hope they will visit us again soon.

DISTRICT 3

Division 3 Olive Jackson Hope

Sue Clark, daughter of Nellie and Ardell Clark, made the last semester honor roll at the University of Arkansas. Sue is a major in education.

* * * *

Congratulations to Gloria and Floyd Pharris, Jr., who are the proud parents of a son, Joe Michael, born May 22.

* * * *

Ernest A. Whitten, son of Louise and Newburn Whitten, represented Hope High School at Boys State in Little Rock recently.

* * * *

We are sorry to lose A. T. Jones, bridge carpenter, who resigned June 1 to accept a job with the Standard Oil Company of Dallas. We wish A. T. the best of luck on his new job.

* * * *

Edna Lewallen is happy to have her sister, Mary Jones, of Los Angeles, visiting with her.

* * * *

Clovis Tittle has completed a course and received a diploma from the General Motors Hydromatic Transmission School in Memphis. Clovis took this course while on vacation. Congratulations, Clovis.

Party Line Parade

We are happy to report that Mack Hicks is recuperating from an operation in Texarkana. Also on the sick list is Dick McElroy who has typhoid fever. We wish them both a very speedy recovery with the hope they will be back with us real soon.

* * * *

Congratulations to Montie Mountcastle of Columbia, Tennessee, nephew of our Equipment Clerk, Georgia Whittemore, who received a 4-year scholarship to Georgia Tech in Atlanta, Georgia. Montie, a 1956 high school graduate of Columbia, was selected by his scholastic record and outstanding ability. This scholarship was presented by the Monsanto Chemical Company. Good luck, Montie.

* * * *

Edna and Eldredge Lee are happy to have their daughter and son-in-law, Mr. and Mrs. Troy Flowers as their guests. Troy is in the Navy and is stationed now in California.

* * * *

Sid and Reba Flowers have returned from Fort Worth where they visited their son, Wayne, over the week end of July 14.

* * * *

We offer our deep and heartfelt sympathies to the family of James Luther Hamric, age 69, who passed away of a heart attack May 30 while operating his motor patrol on Highway 73. Mr. Hamric had been employed by the Department for 23 years. "Uncle Luther" was loved and respected by all who knew him and will be greatly missed. Survivors include his wife, Mrs. Ola Hamric and a daughter, Mrs. Bryant Taylor of Texarkana.

DISTRICT 4

Division 4 Faye Carter Fort Smith

We extend a hearty welcome to Patsy Rogers, payroll clerk, and R. E. "Gene" Bell, stock clerk. We hope they enjoy working with us as much as we enjoy having them with us.

* * * *

Clarence Lafleur was happy to have his mother, Mrs. Felida Lafleur, visit him for a week recently. Mrs. Lafleur's home is in Elton, Louisiana.

* * * *

Congratulations to Patsy Rogers and Eugene Symonds who are both the proud owners of brand-new automobiles. Patsy has a '56 white and blue Ford Victoria; and Eugene has a '56 charcoal and white Chevrolet Pickup. We wish them lots of happy motoring.

* * * *

Congratulations are also in order for Beatrice Wall and E. M. Andrews who were married May 5 at 8:00 p.m. in the home of his daughter and her husband, Mr. and Mrs. Granville Ellington, with Reverend Clifford Lion officiating. The happy couple are now at home on Highway 10, east of Booneville. Now for the cute story behind this wedding. Mr. Andrews asked for his vacation mumbling something about his income tax being too high and he was going to see just what could be done about it. Now we know, he lowered his income tax and got himself a new wife. We're only kidding E. M. and we offer our very best wishes to you and Beatrice for a long and happy life together.

Party Line Parade

DISTRICT 5

Division 9 Shirley Morton Harrison

We are happy to report that Minnie Shinn and Louise Day are both back on the job with us after being on the sick list for awhile. We all missed you, Minnie and Louise!

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C. M. Matthews took his family to Hot Springs for a week's visit with daughter, Nancy, and family. Another daughter, Mott, is making preparations to go to Memphis where she has accepted a teaching position this fall. Mott graduated from the University of Arkansas.

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Curtis Gardner enjoyed a vacation trip to Chicago visiting with relatives and friends. Curtis formerly lived in Chicago so he was happy to get back to the "Old Stomping Grounds" for a few days.

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We understand that Effie Gutensohn also had an enjoyable vacation. Even though we don't have the details, we are glad she had a good time. Effie is the Division Equipment Clerk at Springdale.

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John Burlsworth's son, Leo, recently appeared on Television at Springfield, Missouri. Leo is quite an accomplished musician, playing several instruments, and we are all very proud of him and are looking forward to his next appearance. Not to be outdone by Son, we expect any day to see John strumming on a guitar, but hope he doesn't go in for Television. (We're only kidding, John.)

We extend the welcome mat to Bob Holtby who started to work recently in the Division. We hope you will be happy on your new job, Bob.

* * * *

C. G. Williams and his "Push and Hurry Gang" are on the 'go' again. From recent reports we hear they are now working in Baxter County, but it won't be long until they will complete that job and move to another location. It is practically impossible to keep up with those boys!!

* * * *

Warren Stanford, Joe Schamer, and Ed Orsini were at the Division Office 2 days in July to instruct the Division employees on the use of the Manual of Accounting Procedures for the present fiscal year. Their visit was certainly very helpful. Other visitors in the Division and District were: Harry Wright, Jake Clements, and N. A. McLeod. We were happy to have all these men in our Division and hope they will all stop by to see us when it is possible.

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Mr. and Mrs. W. H. Cook spent a week end in Little Rock and Pine Bluff on business and also visited with relatives. Their nephew, Philip Hankins, came back with them for a visit in their lovely new apartment on West Nicholson Avenue.

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Oscar Rogers, Harvey Norton, and John Wise are retiring from the Department after years of loyal service. These men will be missed but our best wishes go with them all for a very long and happy retirement.

THE CHALLENGE continued from page 15

as compared to one that crosses at 90 degrees and is on a level grade. Regardless of the complexity of the crossing, the details should be clear and should be as simple as possible.

If the plans and the specifications together do not clearly indicate the method of construction, it is reflected in the cost of the job. Because if the contractor has any doubt, he is going to bid higher.

Bridges offer more of a variety in design than is found in many of the other phases of engineering. The design may involve any, or a combination, of the following types of span:

Arch; I-Beam; Plate Girder; Reinforced Concrete Deck Girder; Truss; Slab; and, in the future, we can probably add Pre-tensioned and Post-tensioned Girder Spans to this list.

One other phase, which does not deal directly with design, is field trips. These field trips are for the purpose of inspecting an existing bridge, or checking the location of a new bridge. From a personal standpoint, it presents the opportunity of observing structures in various stages of construction.

In closing, I would like to add that the fullest satisfaction of a good design is realized when you see and actually use the completed structure...to know that you had a part in its origin.

EDITOR'S NOTE: Each engineering challenge brought to you in this series will show you a completely different phase of engineering work. Some may open new vistas for you. Prepare yourself for the future.

It Couldn't Be Done

Somebody said that it couldn't be done,
But he with a chuckle replied That
Maybe it couldn't but he would be one
Who wouldn't say so till he'd tried.

So he buckled right in
with the trace of a grin
On his face. If he worried he hid it.
He started to sing

As he tackled the thing

That couldn't be done,

And he did it!

Somebody scoffed; O, you'll never do that
At least, no one ever has done it;

But he took off his coat

And he took off his hat,

And the first thing we knew he'd begun it
With lift of his chin and a bit of a grin
Without any doubting or quiddit,

He started to sing

As he tackled the thing

That couldn't be done,

And he did it!

There are thousands

To tell you it cannot be done,

There are thousands

To prophesy failure;

There are thousands

To point out to you, one by one,

The dangers that wait to assail you.

But just buckle in with a bit of a grin,

Just take off your coat and go to it;

Just start to sing

As you tackle the thing

That cannot be done,

And you'll do it!

--Edgar A. Guest

CONTRACT AWARDS FOR JULY

Benton County. No. 72, 6.144 miles of surface, Pea Ridge-Garfield Road. No. 12, 6.380 miles surface, Rogers to Huntsville Road, to Interstate Construction Company, Inc., of Pine Bluff.

Clark County. No. 8, 18.863 miles of gravel base and surface, Alpine-Arkansas Road, Steinberg-Boyd Construction Company Broken Arrow, Oklahoma. No. 67, 6.833 miles grading resurface, Arkadelphia-Malvern Road; and No's. 51, 53, & 67, 2.828 miles resurfacing with asphaltic concrete in Gurdon and Arkadelphia, Reynolds and Williams, Little Rock.

Crittenden County. No. 42, 5.698 miles base and surface, Jct., No. 149-Twist Road, Mississippi Valley Contracting Company, Inc., Paragould.

Dallas & Clark Counties. No. 7, 11.6 miles base and surface, Dalark-Arkadelphia Road, Ben M. Hogan & Co.

Faulkner County. No. 36, 9.846 miles base and surface, Mt. Vernon-Jct. No. 64 Road, Ben M. Hogan & Co.

Hempstead County. No. 73, 6.562 miles base and surface, Graves Brothers, Contractors, Pine Bluff.

Howard County. No. 4, 4.462 miles base and surface, Center Point-Dierks Road, A.P.T. Construction Co., North Little Rock.

Johnson County. No. 64, 1.556 miles of surface in Clarksville, Forsgren Brothers of Fort Smith.

Madison & Franklin Counties. No. 23, 18.598 miles base, Brashers-Ozark Road, Graves Brothers, Contractors.

Phillips County. No. 44 and 85, 16.35, miles base and surface, Elaine-Snow Lake Road, Ben M. Hogan & Co.

Poinsett and Mississippi Counties. No. 14, 13.38 miles of base and surfacing on Lepanto-Marie Road, to Memphis Stone and Gravel Company, Memphis, Tennessee.

Pope County. No. 64, 9.626 miles of stone base and surfacing on Russellville-Atkins Road, and also on No. 64, 0.168 miles of base and surface, on West Main Street, Russellville, Ben M. Hogan & Co.

Pulaski and Perry Counties. No. 113, 11.86 miles of base and surfacing on Bigelow-South Road, to Graves Brothers.

Saline County. No. 70, .776 miles of grading and paving on South Traffic Lane, Frontage Roads, and 1 reinforced steel overpass on Little Rock-Benton Road, to Reynolds and Williams and W. C. Burrow Company of Little Rock and Malvern.

Scott County. No. 28, 20.751 miles of surface course on the Heavener, Oklahoma-Junction No. 71 Road, to the Interstate Construction Company, Inc.

Searcy County. No. 27, 3.122 miles of grading and base, Witt Springs-Marshall Road, to A. K. McBride, Fort Smith.

Sebastian & Franklin Counties. No. 96, 19.863 miles of base and surfacing on the Lavaca-Cecil Road, to Northwest Arkansas Asphalt Company, Sulphur Springs.

Van Buren County. No. 92, 4.874 miles of stone base and surfacing on the Bee Branch-Morgantown Road, to Freshour Corporation of Sweet Home.

White and Cleburne Counties. No. 5, 9.841 miles of stone base and surfacing on the Rose Bud-Heber Springs Road, to Fell Vaughan, Contractor, Little Rock.

(Subject to the concurrence of the Bureau of Public Roads.)

This and That

Program Participation

One of the highlights of the special staff meeting, July 24, occurred when Miss Willie Lawson appeared on the scene and presented John S. Harris, Jr., District 2 Construction Engineer, with a 25-year Service Pin and Certificate of Merit in appreciation of efficient and loyal service with the Highway Department.

Mr. Harris began his Highway career in 1928, just before his 19th birthday, and since that time he has served as Draftsman, Instrumentman, and numerous engineering capacities with Bridge Design, Surveys, and Construction Divisions. He has capably handled the duties and responsibilities of his present position since July 1, 1955. Mr. Harris studied civil engineering at the University of Arkansas and is a Registered Professional Engineer. We offer hearty congratulations to him, not only for having completed 25 years of service but also for his attainments during his career with us; and we prophesy a great many more successful achievements for him in the future.

Miss Willie had just returned from a 3,000-mile motor trip covering 8 states, and gave the group a brief summary of her trip, comparing highways in the various states with ours. She highly commended the work accomplished on our system, but stressed the need for good roadside parks in our State. If her enthusiasm rubbed off, we should have some delightful roadside parks before very long. Her pride in the Department and its personnel, quick praise when it is due, friendliness, and incomparable wit, always gives a "lift."

SASHO Convention

The 15th Annual Convention of the Southeastern Association of State Highway Officials (SASHO) will be held in Roanoke, Virginia, September 5 through 7. A very thoughtful program committee is planning entertainment for wives of the members attending the convention, which will include a sightseeing tour of Roanoke and its vicinity, September 6; and an all-day outing to Blue Ridge Parkway and Natural Bridge, September 7.

Those planning to attend the SASHO convention are: Mr. and Mrs. Herbert Eldridge, Mr. and Mrs. Fred J. Herring, Mr. and Mrs. C. M. Matthews, Mr. and Mrs. W. E. Hicks, Mr. and Mrs. W. F. Turner, Mr. and Mrs. C. Don Hayes, Mr. and Mrs. A. G. Rives, and Mr. J. R. Henderson.

Questions and Answers Fade Away

Well, that was a short life, wasn't it? As we told you when the "Question and Answer" Department was made a part of the magazine, "its life depends upon you." There were no questions submitted for an answer and, consequently, that Department is missing from this issue. We can't help but wonder...Does everyone interested now know all the answers? We do have this one question, however, which was submitted too late for the last magazine:

Q. When an employee is hired by the Highway Department on a temporary basis for less than 90 days and signs a waiver for membership in the Retirement System, does that waiver still stand if for any reason his employment is continued past the 90-day temporary period?

A. If the employee is being paid at a rate of \$2,400 a year or more at the time his temporary status changes to permanent, the waiver is automatically canceled and Retirement System membership is begun as of the date his salary rate first equaled \$2,400 a year. The employee's contributions will then be due from the date his membership is begun.

Anne Merica Sends Good News From Our People at Daisy

Thanks for the crossword puzzle in the last issue of "Arkansas Highways," but there are a couple of words that have me stumped...what is a spider?*

Job No. 3454 was sold on July 10, it is Highway 70 and is now completed to the Oklahoma line. Local people say it is the best road in the State. Of course, they could be prejudiced!

We have as our engineer, George Karnes who, with his wife, Thelma, and 4-year-old son, Chuck, transferred to District 3 from District 5 in February. He has been with the Highway Department 13 years. We certainly enjoy working with George and have a lot of fun on barbecues held at the home of Frank and Jan Novak with their three children, Frank Jr., Mary Frances, and J. D. Then, we have Doyle Tollet and his wife, Eva, and their 14-year-old son, La Voy. Lige Martin is from Prescott and has been on this job from the beginning. Lige has also been with the Highway Department for 13 years. S. D. Jones is a native of Daisy; and then, myself. There is just myself and my husband, and we are from Hot Springs.

We, who are out in the field, often feel like an unknown entity. We do enjoy

reading the magazine and learning of the happenings of others...and we do hereby extend a welcome to anyone who wants to do some fishing on Lake Narrows to stop in and see us. Frank Novak is the owner of the Lone Star Cabins, and we always have room for one more. So a WELCOME to you all.

(*The word you want is "cob," which is derived from the French word "coppe," meaning spider. Its general usage is with the word "web," making a combination word i.e. coppedweb, cobweb, spiderweb.)

Office Arrangement Nearly Complete

The Legal and Right-of-Way Division offices in the Old Highway Building, back of the main building on Capitol Mall, are almost completed and the Chief Counsel and his staff are more than ready to move in. It is bound to have been a handicap to work with a divided office and constant "commuting," but we have heard only the highest praise of the management and productive accomplishments of the new combined Division, headed by W. R. "Billie Bob" Thrasher. Even though they aren't moving far away, the building won't seem the same without our sweet little Betty Lane and Mr. Billie Bob. We sorta liked having them close by...an understatement, if there ever was one!

Get Well Wishes

We all miss Dave Hamilton, our Chief Accountant and Cashier, who has been quite ill for some time. We send him our very best wishes with lots of love and our prayers that his condition will soon improve and he will find himself well on the road to complete recovery.

