The pumping equipment and the interceptor sewer system were placed in operation on January 1 of this year. The plant is only partly in use at this time.

This plant has several very unusual features and is just a little different, so I am told, from any other plant in the state. On behalf of the City of Peru I want to extend to each and every one of you an invitation to visit our plant at any time that it is convenient for you to do so.

CCC DRAINAGE CO-OPERATION

A. T. Fahl,
Huntington County Surveyor,
Huntington, Indiana

Huntington County has received excellent co-operation from the CCC Drainage Camp D-2, Fort Wayne, Indiana. The camp now serves territory within a radius of twenty miles from the camp site, so that only the northeastern portion of Huntington County can obtain this CCC work in the future. This camp is serving seven counties in northern Indiana; therefore, it cannot do all that is asked of it in each county. We have always had co-operative superintendents in this camp, of which we are justly proud. In the past years they made several clean-outs in open public ditches, but no tile repairs. They have constructed concrete headwalls in Huntington County to the fullest satisfaction of the landowners and me. The CCC workmen and supervisors have done splendid hand labor and tractor operations in open ditch clean-outs and dredge work.

They have given dynamite demonstrations for open ditch clean-outs in our county with good results, yet I deem it inadvisable to use dynamite in the winter months, as the explosion propagation goes under the frozen banks instead of upward, and breaks out beyond the banks in the fields, leaving large crevices that loosen the banks, causing them to sluff off into the ditch. I would suggest a summer demonstration to determine what can be done with dynamite ditching under favorable conditions.

At present we have a project up for government approval in Washington for clearing and dredging the Little Wabash River, which we hope will be acted upon soon. This camp cleared approximately 15 miles of this river in 1938 in Allen County with splendid results.

Too much time spent in transporting the boys to and from the project site during the daily six-hour working period is the reason given for the mileage reduction. We feel that the

Note: Credit for the cuts illustrating this paper is due Mr. Don Heaton, Supt., CCC Camp SCS-18, Monon, Indiana.
Fort Wayne CCC Camp is one of the greatest assets to all types of drainage work that federal aid could give to each of these seven counties; therefore, we hope for a permanent location of this camp at its present site. I believe that the personnel of the camp and the boys assembled are doing splendid work.

**DRAINAGE PRACTICES IN HUNTINGTON COUNTY**

By strict enforcement of the present drainage law and with the splendid co-operation of all interested landowners, Huntington County has experienced the most complete drainage work, including tile repair and open ditch clean-out, in its history.

I favor serving ditch notices every two years on each public drain. I also favor amending the state drainage law so that surveyors may contract all public open ditches to be cleaned as a unit, then assess the costs to landowners accordingly. One open ditch in my county was cleaned under this plan last year with very good results.

As the law sets out, no surveyor should cut trees on banks along open ditches where soil erosion is bad, but should cut all growths on the bottoms and side slopes. I have advocated construction of wire-mesh dams along open ditches where soil erosion is noticed, using old fencing cut to desired lengths and interlacing the wire with the earth fill. This method of constructing a check dam has proved highly successful. Landowners should build a series of such dams in ravines in pastures and woodlands to check rapid waterflow and stop erosion.

The procedure of rolling up old fencing to stop wash in gullies has not been found practicable in Huntington County. This fencing can be utilized to a greater advantage if it is interlaced two ways and earth placed on it by tractor and scoop equipment.

I have also suggested that, after the mowing and cleaning of open ditches, landowners should clean their barn floors and hay-mows of all chaff or seedings and scatter these accumulations along the ditch banks where they will take root and hold the soil. This has given fine results in my county.

**DITCH RECORDS**

All open ditch records in my office have been changed to coincide with the new drainage laws requiring the first open ditch clean-out to start at the mouth or terminus of the ditch and progress up to the origin, on the allotment plan. All completion periods are re-dated each year. The new law does not require that notices be served each two years, but I find that by doing so we secure better cleaning results.
Fig. 1. Location of tile drain before conversion to open-ditch drain in Pulaski County.

The entire drain must be cleaned out or mowed to give perfect and adequate drainage. We do not serve individual notices on odd years for weed or bush mowing, but have the requirements printed on each clean-out notice. We have subdivided practically all of our open ditches so that one-half of them are cleaned each year. In making up the notices in my office in early spring, I use the last recorded name as of record. About that time, the township trustees have just finished their spring assessing and all old as well as new landowners’ names

Fig. 2. Same location as Fig. 1, after completion of open-ditch drain by CCC Camp at Monon. Very sandy soil. Side slopes 3 to 1.
are fresh in their minds. The trustees are then given these notices about May 21 each year, ready for delivery on May 31. Each trustee is asked to insert names of new owners or tenants on the notice and the stub. After all notices are delivered, the stubs are returned to my office so that the new names can be entered on the ditch books, thereby eliminating serving of incorrect notices. We pay the trustees six cents a mile for all notices served and open ditch inspections made in the county. Needless to say, I have twelve men eager to do this required work each year.

Each year during the month of August printed notices are distributed requesting the mowing of all public open ditches. The work usually starts about the middle of September and continues until about the last of November. Men are put on each ditch to mow and clear all unfinished allotments for the entire ditch length. These men are paid out of the general ditch improvement fund, and landowners are then notified by cards to call at my office to pay for the cost. Otherwise, the costs are certified against the farm lands and collected accordingly through taxation. This plan works out very satisfactorily.

Most landowners are negligent about placing permanent markers on their allotments after they have been located and staked by the surveyor. I have been told that some county surveyors in the northern part of the state have enforced this marker law by installing the markers and assessing the respective landowners for the costs, which I believe is a good plan.

I have 170 miles of open ditches to supervise and inspect in Huntington County, or approximately 85 miles each year. I have on record approximately 400 miles of public-petitioned tile ditches to maintain.

As the new drainage law sets out, I do enforce cutting of trees and brush over all public tile ditches for a distance of twenty-five feet along each side and advise all landowners to adhere to this phase of the law on all private or compromise drains, especially those drains along fences or through wood lands. I also feel that counties are saved thousands of dollars each year by immediate tile repairs. Damaged tile are replaced as promptly as possible after my office is notified.

I have always advocated wire-web wall construction at the terminus of all tile ditches, whether public or private, and the use of corrugated metal culvert pipe at the bank outlets instead of clay or vitrified tile. No bank stabilization will hold a two-foot length of tile, and it is best to use 10 to 12 feet of metal culvert pipe. The largest repair costs in my county are for damaged concrete head walls and broken tile just back of the walls. In the past, weirs were not built to provide openings for flood water entry. I have recut and rebuilt several
old concrete walls for water overflow. In the past, much concrete was put into the walls, which was more or less useless, because approximately 75 per cent of the concrete was above the tile and little or no concrete was placed under the tile to serve as a footing. Therefore, about 85 per cent of these old walls toppled over into the open ditch, blocking the tile with accumulated silt.

When county surveyors took over the drainage work from the trustees, they found that many tiles were plugged at the terminus of the drain, causing the tile back of the headwalls
to heave, thus necessitating immediate costly repairs. In the past years contractors have dug flat bottom ditches to receive round tile, and as a result many failures are now occurring, because the earth was never tamped under the curved bottoms of the tile so as to bear the loads properly. Today's modern farming, with tractors and heavy machinery such as combines, binders, cultipackers, and such, breaks down the tile, especially when the covering is very shallow on the larger tiles. I now recommend that contractors use a tool curved to fit all outside tile diameters in forming the bottom of the ditch, thereby supporting the tile snugly on the bottom.

Landowners should encourage more trapping and killing of animals such as muskrats, ground hogs, and coons, as they are a menace to all open and tile ditches.

We should never join laterals or branches with a right-angle connection into any private or public tile drain. I always use a 45-degree vitrified tile when attaching to main ditches. Angling these connections in the direction the water is flowing in the main ditch creates a suction from the laterals. I have one tile firm in Huntington County experimenting with 15-, 30-, and 45-degree connections with very good results.