In the same year we also purchased a ¾-cubic-yard, crawler-type shovel with clamshell bucket and dragline attachments to which we added a short boom and dipper stick to make an all-purpose machine, one we could keep busy the entire year.

Up until 1938 we used a 650-gallon distributor, which was entirely too small for our long hauls. This same year we purchased a new 1,070-gallon distributor, which meets our needs for long hauls and also will handle the heavy grades of bituminous materials.

It has been our custom to buy two new trucks each year. These replace our older trucks and we reduce our maintenance costs. We have a large fleet of trucks and they are from eight to ten years old before we can replace them under this plan. After being used that long, with steady work, their upkeep expense is high.

In 1937 we purchased one caterpillar tractor and 6-cubic-yard hauling scraper that so improved our methods of excavation that we added another unit in 1938.

I should like to give you a total cost and yardage of one mile of road excavation involving extra heavy yardage. For this one mile of road we used two R. D. 7 tractors and two 6-cubic-yard hauling scrapers, and in fourteen ten-hour working days we moved 21,890 cubic yards of earth. This is an average of 781 cubic yards a unit a day at a cost of $0.107 a cubic yard.

COUNTY HIGHWAY EQUIPMENT

Alfred Krause,
Franklin County Surveyor and Road Supervisor,
Brookville, Indiana

The eastern third of Franklin County is practically level, with the roads laid out along the section and quarter-section lines. The remainder of the county is very rugged and hilly. The level portion, of course, has the better roads. The land is more valuable and the cost of road building has been less; hence, under the old township system there were more funds for highway use in this eastern part.

Mr. Hoffman, my predecessor as road supervisor, had a program well under way to rebuild the main county highways. The principal highway in this plan was the road from Brookville to Oldenburg, which, since it connects with U. S. 52 at Brookville and State Road 229 at Oldenburg, carries the bulk of the traffic between the central and western parts of the county. With this road completed in 1937, our next move was to get a road through the western part of the county running north and south from Andersonville to Batesville. This was most certainly a much-needed road since it connected State Routes 52 and 244 with 229. Hereafter all traffic in
this vicinity was compelled to travel a much longer route either to the east or west, as there was no direct route between these towns and state highways.

Our equipment at that time consisted of one grader with a 10-foot blade, one grader with a 12-foot blade, one 35-tractor, one 60-tractor, one model "M" tractor, two multiple-blade maintainers, one power shovel with 5/8-cubic-yard capacity, seven dump trucks from one-and-a-half to three-cubic-yard capacity, and three power units.

Since we had a great deal of material to haul and no way to load our trucks except with the shovel, we were compelled to confine our construction program to projects that could be handled with the graders and tractors. We were able to get the necessary right-of-way on fairly level ground, .8 mile being new location so as to miss two rather steep grades and at the same time cutting off 1.6 miles of the old road. This particular part of the county is all underlaid with limestone; and since the nearest gravel deposit was 9 miles from the project, it seemed that the best and cheapest metal for the new grade would be crushed stone. Quarry stone was purchased for five cents per cubic yard and one of the old township crushers was set up. Two bins, each of 24-cubic-yard capacity, were built with the gravity screens to grade the crushed material.

With the co-operation of our area supervisor, this road was made a part of the WPA program. One crew of laborers cut out the trees and bushes and tore down the fences and set them up again on new right-of-way lines. Another crew worked with the tractor and grader outfits, pulling stumps and installing culverts and headwalls.

By the time the first half-mile section of the grade was completed, the quarry was in operation and a layer of coarse stone from 4 to 6 inches in depth and 12 feet wide was spread on the new grade. Of course, 12 feet of metalled surface is not adequate for a two-lane road, and the stone was not deep enough; but it was our desire to keep the road open if at all possible. The entire 6 miles of road was completed insofar as the grade and the 12-foot stone surface was concerned. The following summer, 1939, another layer of coarse stone was applied and the roadbed increased in width to 20 feet. This was followed with a coat of crushed stone from 1 inch down, screenings left in. As a result we have a hard-surfed road that is easily maintained. The construction of this highway has not affected our maintenance program on other roads in the least.

Within the past two years we have built 22 miles of new road with 40-foot rights-of-way, all culverts and bridges having a clear roadway of at least 22 feet. Our highway budget for the year 1940 includes an appropriation for another power shovel. This added to the equipment purchased
last year, namely, two trucks and one auto-patrol grader, will enable us to undertake the building of roads in the more hilly sections of the county. One shovel and the necessary trucks and graders will be used on construction, while the other shovel and the remainder of the trucks will be free for loading and hauling the much-needed material required for maintaining the remainder of our roads. Thus we expect in the coming year to give better service to the more hilly sections that have heretofore been neglected.

PROGRESS IN THE CONTROL OF STREAM POLLUTION IN INDIANA

B. A. Poole,
Chief Engineer, Indiana State Board of Health, Indianapolis

All persons interested in the conservation of this country's natural resources are agreed that the pollution of streams and waterways must stop. A study of the pollution control bills that have appeared before recent sessions of Congress shows a wide divergence of opinion of the methods of accomplishing this end. Some of these bills provide for relatively mild federal participation with existing state agencies, whereas other bills establish complete federal control by means of the injunction process. In the bitter debate that has developed over these two types of proposed federal legislation, there has been considerable misrepresentation of facts. For this reason alone, a review of past accomplishments and an outline of the future problem in Indiana are deemed timely.

The first Indiana pollution control law was passed in 1901. This law provided that no polluting material could be discharged into a stream by any factory unless written permission was obtained from the State Board of Health. Since municipal waste was exempted from the provisions of the Act, its weaknesses are obvious.

The McGinnis law of 1909 repealed the Act of 1901. The 1909 law empowered the State Board of Health to make investigations of stream pollution upon petition of the common council or board of health of any city or town, the county commissioners of any county, or the trustee of any township. If the investigations revealed a case of stream pollution, the State Board of Health was authorized to order its abatement. Streams that formed state boundaries were excluded. Streams that flowed from another state into the state of Indiana were also exempted as long as the untreated sewage from other states was permitted to discharge into the watercourse upstream from Indiana.

A third stream pollution control law was enacted in 1927. This law gave the State Board of Health the power to investi-