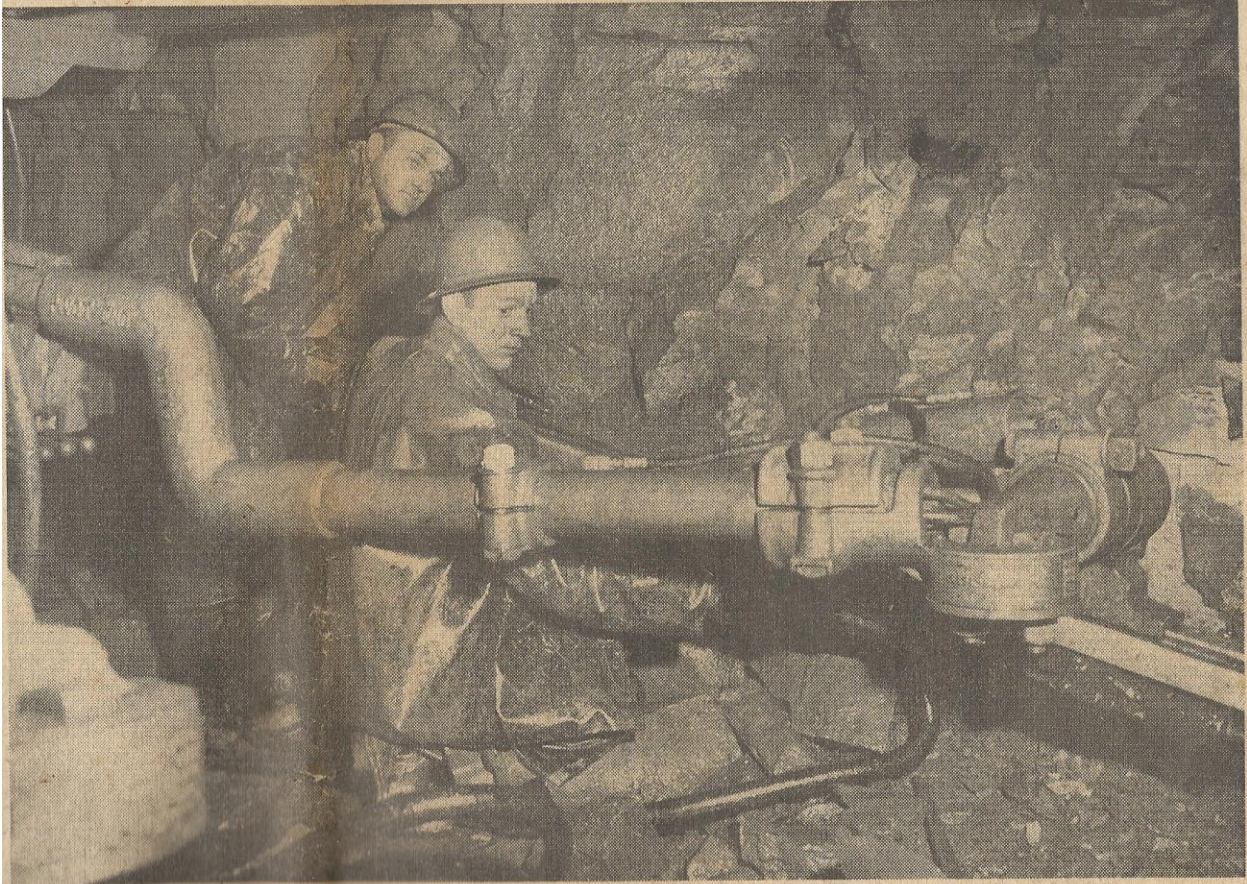


**44-MILE AQUEDUCT BEING DRILLED AT CANNONSVILLE PROJECT**

# *Blasting a 'River' Through Rock*



**MAN THE BRACES**—Workers near the business end of the tunnel brace, the 6-inch piping which carries underground water out of the future aqueduct. Jointed piping in the foreground, connected to the manifold at right, carries air under high pressure to the pneumatic drills. Hose visible at bottom carries water to the drills to lay dust. Water also is pumped into the dripping tunnel to settle dust after the dynamite blasts. Water on the way out is gray with rock dust.



—Press Photos by Swierkosz.

**GRITTY JOB** — Three drillers shove an air hammer into the roof of the West Branch Delaware tunnel, 350 feet from the Intake Portal near Cannonsville, to make a hole for one of 50 dynamite charges which will push the tunnel ahead 10 feet. Tunnel will link Cannonsville Dam with other parts of the New York City watershed sometime after 1960.

# \$90,000,000 Tunnel Will Help Quench New York City's Thirst

By **JERRY HANDTE**  
*Sunday Press Writer*

A HALF-MILE southeast of Cannonsville, where the West Branch of the Delaware River is a thing of doomed and quiet beauty, men have dynamited 3,900 tons of rock in the last two weeks to help fill bathtubs in The Bronx.

The way to the carnage under the hills passes from the dainty charm of the Cannonsville bridge over an unimproved town road to the rough-hewn facade of Intake Portal, West Branch Delaware Tunnel.

The portal is the entrance to what will be a 44-mile aqueduct, 12 feet in diameter and underground all the way, linking the Cannonsville and Merriam dams of the New York City water supply system.

Total cost of the Cannonsville project will be about \$140,000,000.

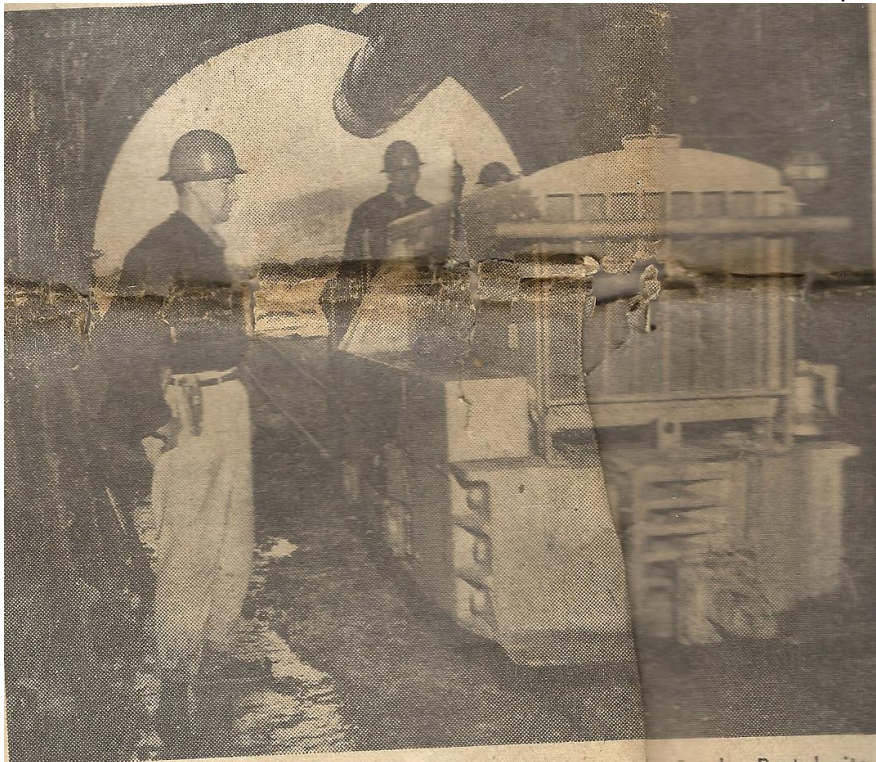
Intake is the province of 90 tunnel workers of the AFL Hodcarriers union, working round the clock five days a week to blast their portion of the tunnel to a junction with Shaft 1 crews, starting 30,000 feet away.

The tunnel at present has been blasted 500 feet into the rock, and it must be a place of damp and silence.

Crews engaged in the \$90,000,000 tunnel job for the New

(Continued on Page 12 A)

unimproved? facade Portal

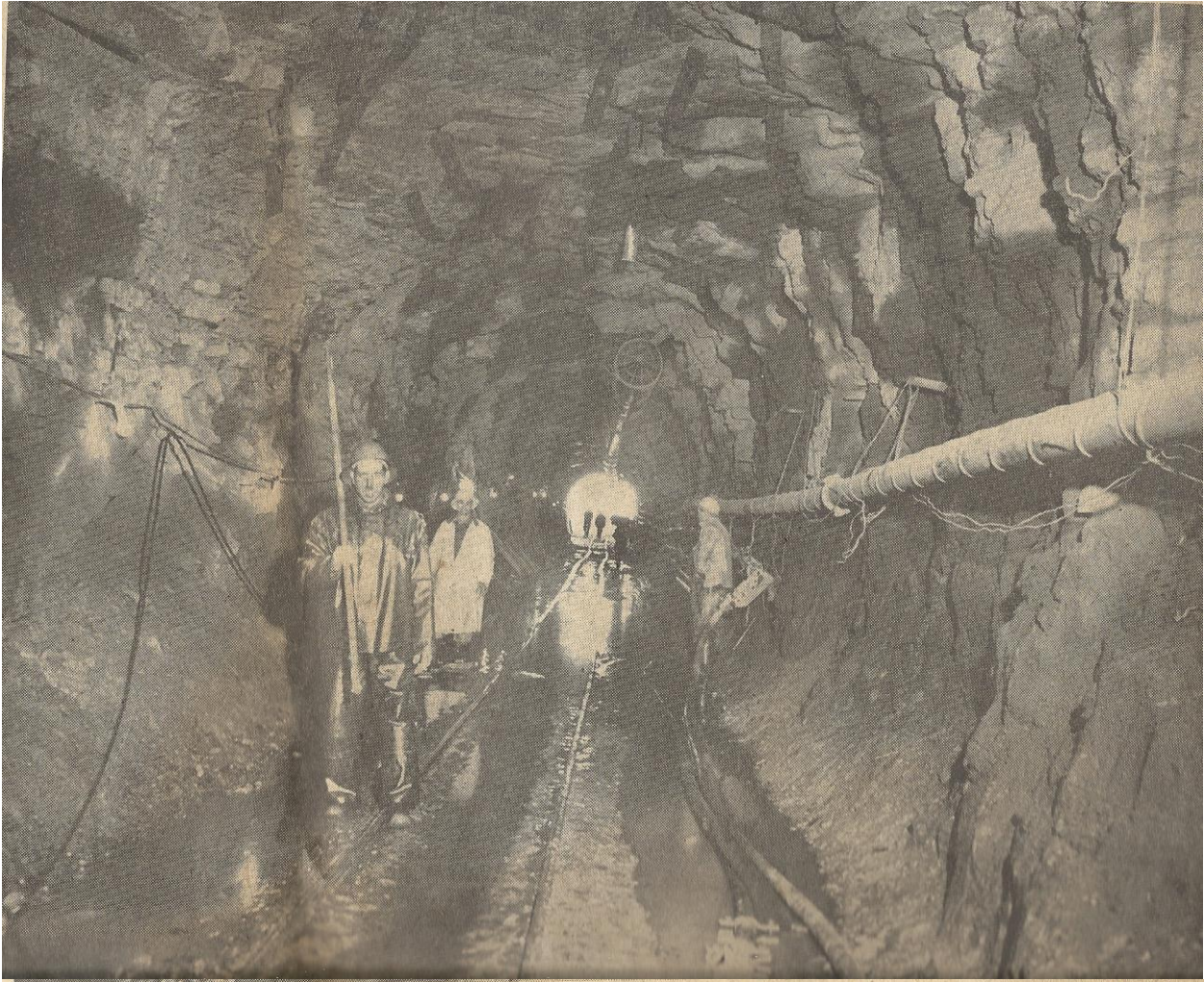


**MUCK EXPRESS**—Gail Knight, assistant engineer at the Intake Portal site, watches a diesel motor come in on the narrow gauge railroad. The motor hauls the cars which move out the blasted rock.

the, railroad, rock

# Man Blasts

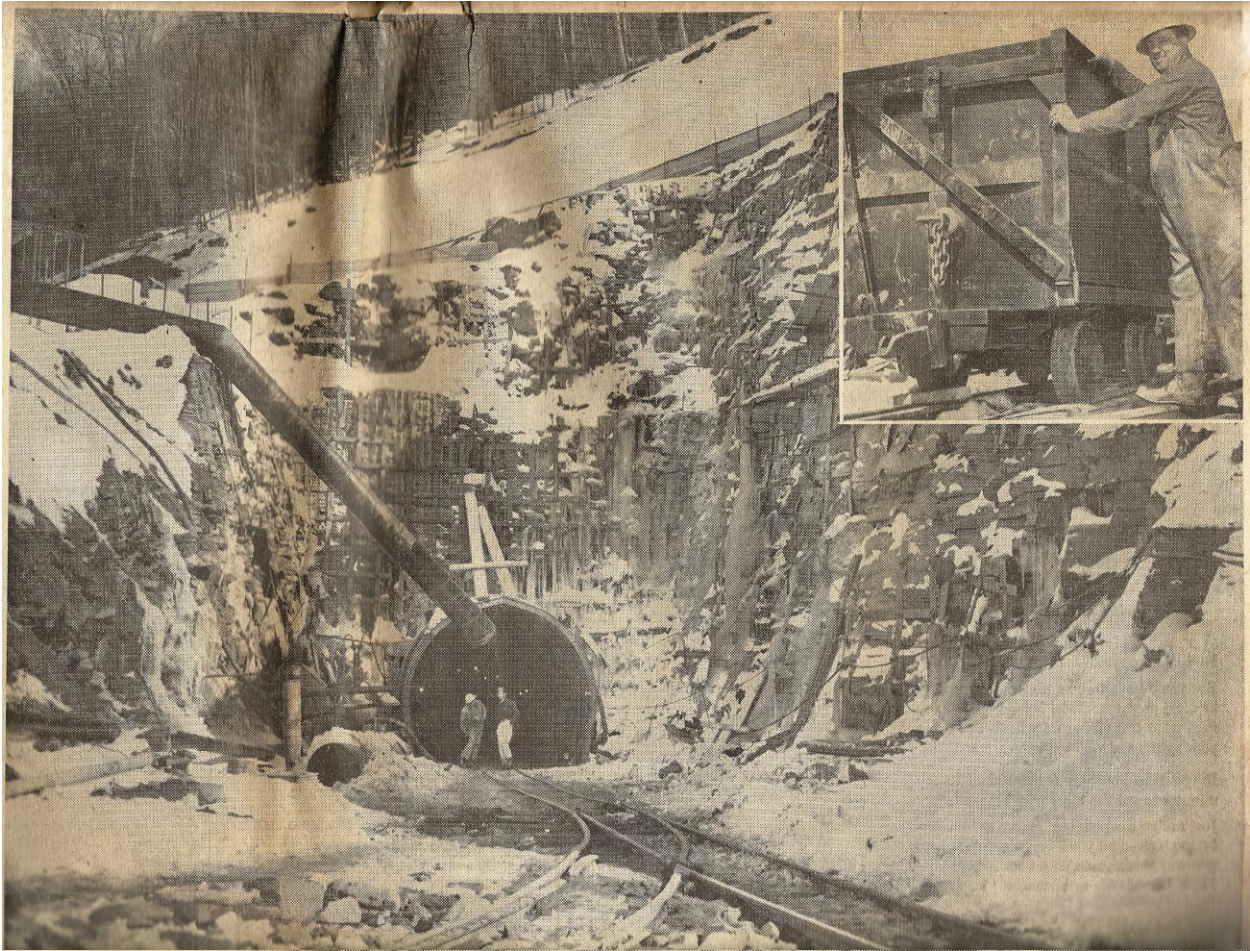
# 44-Mile 'River' Through Rock at Cannonsville



**EVENING SUN**—The 12-foot tunnel mouth, bright with late afternoon sun on a snowy day, looks small and lonely, even from 300 feet. Before these men finish up in four years, they will see that light as a pinprick from 15,000 feet. Man

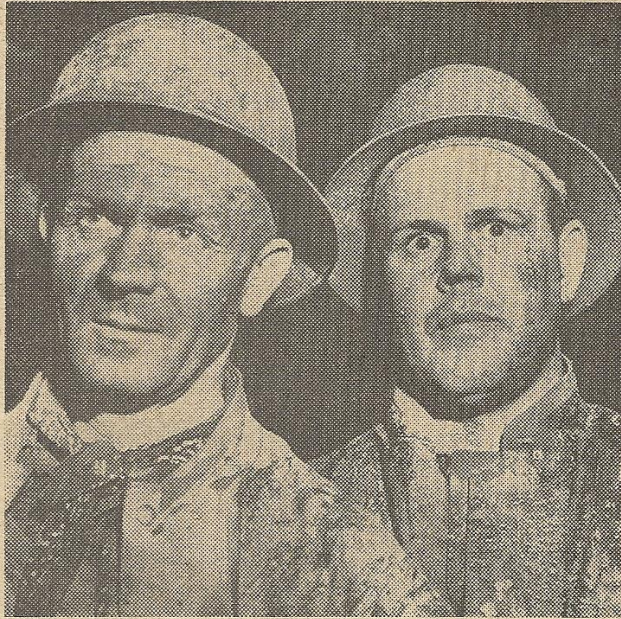
in the foreground, Bert Moore of Depos it, carries a wooden pole to knock down loose overhead rock. Water reflecting the light has seeped through the stone. Top and sides of tunnel are heavily braced with steel strips.

afternoon, Before, from



**INTAKE PORTAL, WEST BRANCH—ROOMY FOR WATER**—Gail Knight, right and Sparky Mathis, standing in the tunnel mouth, give perspective to the size of the 12-foot tunnel and the blasted out and heavily braced 45-foot portal. Large

pipe entering tunnel from upper left carries free air for ventilation. Muck trucks (inset, upper right; Mr. Mathis poses with one) enter tunnel drawn by a diesel motor on the tracks in foreground to carry out shattered rock fragments.



—Sunday Press Photos by Swierkosz.

**QUIET? WHAT'S THAT?**—Two chuck tenders (driller's assistants) wait only a few feet from six noisy drills to take up their tasks. Begrimed and silent amid the thunder, dust and water, they are Lynn Ackley of Franklin, left, and Al O'Dell of Walton.

## Big Tunnel to Send Water to New York

(Continued from Page 3 A)

York City Board of Water Supply knock off for the weekend when men of the graveyard shift come out to wash off the paste of water and powdered rock dust and the grime of their tools at 8 o'clock Saturday morning.

Tomorrow morning at 8, the day shift will take up the task again, hoping that graveyard shift will have another 70 or 80 feet to walk to get out of the tunnel 24 hours later.

★ ★ ★

**TUNNEL DIGGING** is more than dynamite and caps, a Sunday Press reporter and photographer found out last week during an afternoon visit to Intake Portal.

They followed the narrow gauge tracks of what looked like the world's cutest railroad—except for the death of a worker in a derailment last week, maybe it would be—and walked through the portal into a world of dripping gray water and relentless pounding.

At the far end of the tunnel, steel-helmeted men in rubber clothes slammed six heavy air hammers into the "soft" shale and sandstone.

Remember the last time you heard an air hammer chopping up an asphalt pavement?

Multiply that hammer by six, think of the sound bouncing around in a narrow chamber and imagine the hammers trying to shake solid rock to powder, instead of breaking up something easy.

Then you have some idea of the noise.

To the noise, add the frightening sight of a maze of steel supports, bolted to the tons of rock over your head, the ghostly gleam of a string of running lights alongside and the faraway look of sunlight at the portal.

Add the continual drip, splash and splatter of drainage water, the misty murk of rock dust, the wet gleam of pipes and hoses.

Then you have an idea of the working conditions in a "free air, hardrock tunnel."

★ ★ ★

**CLANCY O'DELL**, project manager for Drake-Grafe-Winston-Tecon-Conduit (collective title for the five contractors who bid in the \$90,000,000 project for a joint venture project) explained the blasting procedure to the reporter this way:

The drillers, pushing their hammers with 85 to 100 pounds of compressed air per square inch behind carbide bits, jar holes in about 50 places in the rock face.

Into the holes are placed charges of dynamite, about 6 pounds to a hole, or a total of about 300 pounds of high explosive.

A dynamiter wires the caps to delay fuses so that a series of seven or eight blasts—each involving six or seven charges—go off at calculated intervals, starting with a "zero delay" blast.

When the echoing and thundering die down, the men go back into the tunnel to clean up. Using a mechanical loader, they pile rock into a train of three or four "muck cars," 6½ tons of cubic rock to a car.

The train, pulled by a diesel motor, backs out of the tunnel. The 20 or 25 tons of rock are trucked to make fill at the site and to improve the road to the site from the bridge.

The tunnel has become 10 feet longer, as a result of the explosion of 300 pounds of dynamite and the crumbling of 78 tons of rock.

With the preliminary drilling, the setting of fuses and the cleanup "muck" removal, seven or eight series of blasts are par for the day.

★ ★ ★

**WHILE THE INTAKE** crew blasts eastward, other Drafe-Grafe-Winston-Tecon-Conduit crews are hammering through the rock in both directions from Shafts 1, 2 and 3. The shafts drop to the tunnel level at intervals of 30,000 feet or about 6 miles.

The eastbound Shaft 3 crew, at 20 miles from Intake Portal reaches the end of the joint venture contract, joining with forces of another group of contractors who will carry the tunnel to Merriam Dam on the Neversink.

How do the blasters know they will meet each other? Back sites are established by Board of Water Supply surveyors.

Using plumb lines resting in buckets of oil to prevent sway, surveyors sight on permanent landmarks and back sites, getting a line. The lines of sight are checked constantly.

"We could be wrong," said Mr. O'Dell, "but not by more than three or four inches out of line."

To the workers on the West Branch job, this is an easy, safe tunnel.

For one thing it is not to be compared with a tunnel under a big river, like the Holland Tunnel under the Hudson, where weight of the river and softness of the bottom make cave-ins a constant danger and working in forced air pressure a necessity.

★ ★ ★

**THE BIG AIR DUCT** which ventilates the West Branch tunnel contains free air. The rock, despite the formidable appearance of the steel braces, is not considered likely to collapse.

Men armed with long wooden poles, like grade school window openers, prowl the tunnel knocking down loose fragments.

Lines into the tunnel include a discharge pipe through which excess water is pumped out of the floor, a water line to the air hammers—used to dampen and settle rock dust in the

drills and after a blast series—and the compressed air line to the drills.

Electricity is used only for the lighting, which is not bright, especially at the business end of the tunnel, where sharp pebbles fly back with stinging force.

Mr. O'Dell expects the 20-mile contract he manages to be completed by 1960.

Face of the Cannonsville Dam, meanwhile, will be erected nearly 4 miles west of Intake Portal.

**WHEN THE RESERVOIR** fills behind the dam to its 91,250,000,000 gallon capacity, the tunnel will carry its share of 800,000,000 gallons of water a day to New York City.

Work on the Cannonsville dam is scheduled to begin later this year.

By that time, the professionals of the tunnel will be in so far that they won't come out during the dynamiting. They will back off 1,000 feet, light up their cigarets, wait for dust to settle and then go back again to their dripping world of drilling and muck trucks.

After the complete tunnel has been blasted out—a project likely to involve removal of 2,000,000 tons of rock and 3,500 tons of dynamite—the tunnel will be lined with concrete and ready to trundle that bathwater down to the Bronx and the rest of New York City.

"We don't expect any trouble in there," said Mr. O'Dell, "because we've got test borings that show this same kind of stuff—sandstone and shale—all the way. But if we do run into granite, we've got to go ahead."



**BLASTING 'River' Through Rock**



**Man Blasts 44-Mile 'River' Through Rock at Cannonsville**

**Big Tunnel to Send Water to New York**

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