

Chapter 14

ARSENAL OF THE ALLIES

“Last summer the repairs and maintenance of the lower six locks and dams on the Monongahela were declared to be important for purposes of national defense, thus placing this work in the same class as shipbuilding and cantonment construction,” said Horton W. Stickle, Pittsburgh District Engineer in 1918. “The Monongahela is unique in its present usefulness. I know of no other interior stream in this country which is giving the same direct defense and service in this war. This is a war fundamentally of transportation.”

The locks and dams on the Monongahela, Allegheny, and upper Ohio rivers, because they moved raw materials to armor and ordnance plants, were so important to supply of the Allies during the First World War that marshals and detachments of the Eighteenth Pennsylvania Infantry were stationed at the dams and lockmen were issued revolvers to deter sabotage. In early 1917 there had been an abortive attempt to destroy a navigation lock on Cumberland River, and suspension of navigation on the three rivers serving the heavy industry of the Pittsburgh District would certainly have been a blow to the Allies.

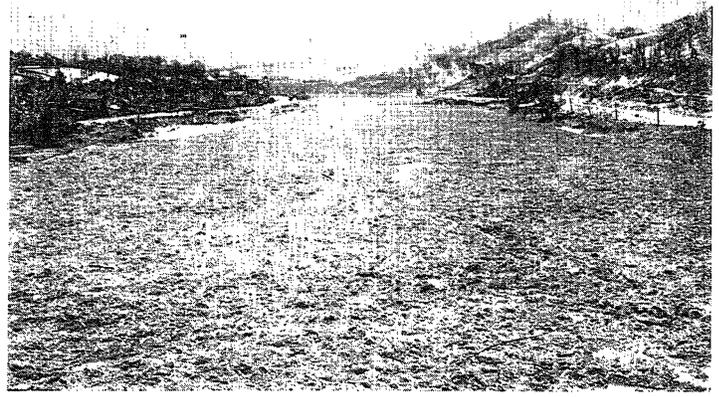
The British government ordered three million shells from Westinghouse Electric at Pittsburgh in 1914; orders from the French and Russian governments followed; and by the time President Woodrow Wilson brought the United States into the war about 250 plants in the headwaters district were turning out munitions and ordnance seven

days a week, winning the region the sobriquet “Arsenal of the Allies.” Of all munitions used by the American army during the First World War, about 80% came from the Pittsburgh District. Carnegie Steel produced cannon and armor; Alcoa turned out cans and containers; and Mesta Machine, National Tube, Standard Steel Car, and other firms furnished propulsion machinery for 350 ships and 36 destroyers. Traffic on the three rivers was vital to that production.

Prior to 1940, the Army Engineers handled seacoast fortification and combat construction while the Quartermaster and Ordnance departments directed military projects in the interior of the country. When George W. Goethals became acting Quartermaster General in 1918, he sought to centralize all military construction under the Corps of Engineers and establish a separate “Service of Supply” for military procurement, but the Army did not adopt those plans until the Second World War. The Engineer civil works districts, including Pittsburgh, were therefore not mobilized for military construction during the First World War.

At American entry into the war, Pittsburgh District Engineer Edgar Jadwin, native of Honesdale, organized the 15th Engineers, the “Pittsburgh Pioneers,” trained them at Oakmont on the Allegheny, and took them to France. There, he became advance engineer for General John J. Pershing and commanded 165,000 men building railways and improving waterways. (Jadwin became Chief of Engineers in 1926.) Joining Jadwin

Ice gorge on the Monongahela River, February 4, 1918



in France were Lieutenants William Arras and J. Milnor Roberts, sons of the senior engineers of the Pittsburgh Engineer District.

Since interior military construction was the responsibility of the Quartermasters, the Engineer civil works employees concentrated on expediting the movement of river commerce. The engineers often, however, submitted plans for dealing with the enemy to General William Black, Chief of Engineers. "Why not build reservoirs back of the lines in France," one engineer asked, "and connect them by pipeline to enemy trenches and flush out the Huns?" General Black replied that he had considered the idea, but fortifications were generally located atop hills and ridges, and water ran downhill. Tom Jeffries, senior engineer of the Wheeling District, asked General Black whether enemy aircraft might not be downed with electrified rays from searchlights, a sort of "laser beam." Black responded that aircraft usually flew too high and fast for electric beams to have effect.

Engineer officers were in short supply from 1917 to 1919. They were the first Americans to see action in France, first to suffer casualties, and the attrition of combat cost the Corps heavily. In addition, many Engineer officers directed new branches of the Army outside the Corps that were created to work with sophisticated weaponry: General Mason M. Patrick, who had built ponton bridges at Johnstown in 1889, became first chief of the Army Air Corps; "Goliath" Sibert became first chief of the Chemical Warfare Service; and General Harley B. Ferguson, who became District Engineer at Pittsburgh after the war, organized the Army Tank Corps. Because officers were busy elsewhere, civilians acted as District Engineers during the war years. William McAlpine was District Engineer at Louisville, Robert R. Jones at First Cincinnati, Benjamin Thomas at Second Cincinnati, and Anson B. McGrew at Nashville. The latter was sent to Nashville from Pittsburgh, where he had charge of harbor inspections and regulatory functions for many years.

Colonel Horton W. Stickle, one of Goethals' men in Panama before the war, was recalled from retirement to become Pittsburgh District Engineer upon the departure of Edgar Jadwin for France. When Stickle accepted command of the 216th Engineers in 1918, John W. Arras, senior engineer on the Allegheny since 1887, became District Engineer.

While they had no military construction or supply functions, the challenge of keeping materials moving on the rivers to supply war industry was sufficient to keep Colonel Stickle and John Arras busy. When the overburdened national railway system broke down in 1917, Stickle and Arras let the eleven movable dams in the District stay up in the winter of 1917-18 to prevent fuel shortages at the munitions and ordnance plants. That winter was the coldest on record up to that time. Ice packs swept continuously out of the Monongahela and Allegheny, taking a jumbled mass of river terminals and steamboats with them. The *Kittanning* and other District floating plant kept on the move, crunching open a channel and setting dynamite charges at ice gorges. And lockmen at the wicket dams had to maneuver them at temperatures as low as minus 19°, when a misstep and plunge into the river would have been sure death. The ice even breached Allegheny Dam 2, and Arras could not repair it until after the Armistice because workmen were in the Army or in the munitions plants.

After the Armistice in 1918, it was said, even by the U. S. Department of Commerce, that the First World War had been won on the rivers at Pittsburgh because those waterways had moved the raw materials which made the weapons used in France. In 1918, the Monongahela alone carried 16.5 million tons, more than the combined tonnage (15.3 million tons) of the Suez and Panama canals that year. Total river commerce in the Pittsburgh District in 1918 was 23,397,597 tons; and the total for the five war years, 1914-18, amounted to 98,857,078 tons.

General Lansing H. Beach, who as Division Engineer had been the sole Engineer officer in the

Colonel Herbert D. Vogel

Ohio River basin at one point during the First World War, was convinced that the waterways had been vital to the war effort. When he became Chief of Engineers in 1920, he told Congress the defense value of improved waterways had been the most important lesson of the war, and he said:

The interests of the Federal government in the construction of comprehensive road and interior waterway systems throughout the United States...is far greater as a measure of defense than for commercial reasons.... This statement is made advisedly, for the preservation of the life of the Nation is the central government's greatest responsibility in peace and in war, and hence every facility should be developed to allow a successful defense to be made. It fortunately happens that roads and waterways constructed solely to meet the needs of commerce are generally well adapted to the needs of defense, and the immediate interests of the people can be counted on to secure support for this great preparedness measure.

Two factors sparked interest in improvements to river navigation facilities: railway congestion created many problems in World War I; and it was found that waterways transportation could be expanded to meet any emergency since it was limited only by the speed at which locks could be operated. Canalization of the Ohio River was rushed to completion by 1929; and a nine-foot channel was available throughout its length in 1942, when it became extremely important to national defense. The Engineers were never allowed, however, to consider contributions to national defense when estimating the benefits of waterways projects, even though such benefits were sometimes credited to federal highway projects such as the interstate system authorized in 1957.

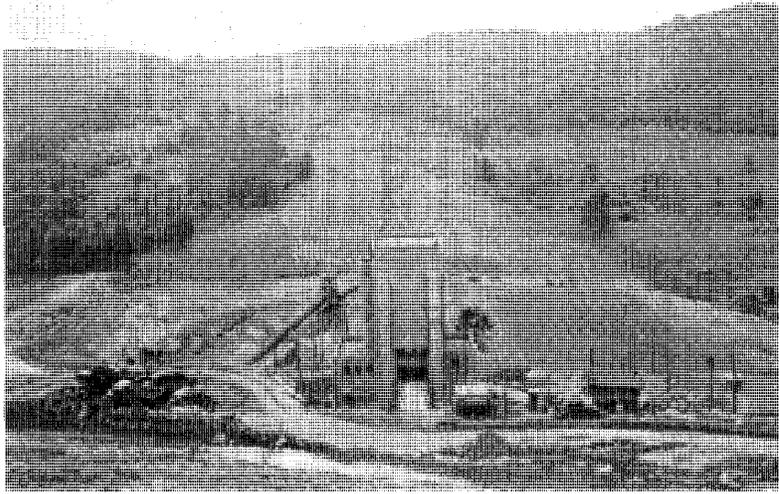
The Youghiogheny Dam Crisis "I want to point out first of all that since our last meeting we are operating under considerably different conditions," said Colonel Herbert D. Vogel in opening



the June 30, 1942, meeting of the Board of Consultants. "I would like to point out the problems the District is up against," he continued. "We are fighting now tooth and nail to get our jobs completed. I consider our No. 1 mission is to do everything possible to aid in winning the war; everything else we do is secondary to that."

Lining the conference table were William McAlpine, William Creager, and James Growdon, who had been with the Board of Consultants since 1936, and two new members: G. W. Hamilton, chief engineer for Samuel Insull, and geologist Charles P. Berkey of Columbia University, who had replaced William Gerig and Warren Mead. From the Washington and Cincinnati Corps offices came Colonel Lewis A. Pick, Bob Philippe, Ed Burwell, Ralph Bloor, and Edward McD. Moore.

Colonel Vogel had also assembled his top staff for the meeting, for it was to determine the fate of the Youghiogheny project. Seated at his right was portly Charles Wellons, acting chairman of the Board whose rare sense of humor and artistic talents had brightened many of its meetings. Next to Wellons were geology experts Shailer Philbrick and Bob Nesbitt, the redoubtable William Sidney, hydraulics master Emil Schuleen, the demanding operations engineer Jack Dodds, and Jim Neill, a neat, reserved fellow with, Vogel thought, a steeltrap mind. By 1942, with five big multipurpose dams completed, engineers on the District staff had about as much experience with dam design as the members of the Board of Consultants.



Youghiogheny River reservoir dam, June 9, 1942

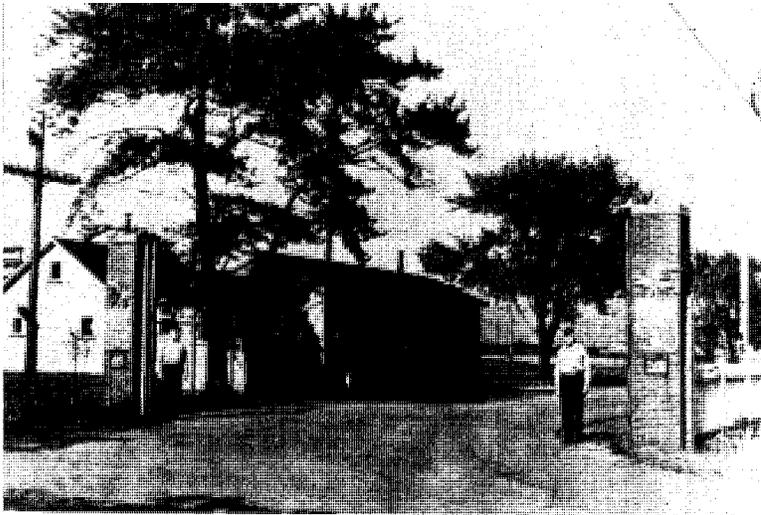
of hydroelectric power facilities at Youghiogheny and construction of upstream power dams at the Crellin, Swallow Falls and Sang Run sites to supply additional power for war production, but that plan had been vetoed because it would have diverted equipment and men from military construction jobs.

Colonel Vogel recapped the Youghiogheny situation for the Board. The shortage of fill materials for the dam embankment had been solved by locating the dam 1.2 miles above Confluence, Pennsylvania, designing a 310-foot vertical cut for the spillway through a bluff at the east abutment of the dam, and using the shale cut from the bluff in the dam. A 310-foot cut and use of shale, an easily fragmented rock formed of hardened clay, in a dam embankment were unprecedented, but tests at the District soils lab had shown shale could be safely used, and Philippe, Philbrick, and Nesbitt had made plans to move shale excavated from the 310-foot spillway cut into the dam, thereby saving at least \$200,000. The plans had been threatened when a 150-foot railroad cut through shale near Brilliant on the Allegheny failed and 100,000 cubic yards of materials had slipped down onto the railroad, for Philbrick and Nesbitt had based their design for the Youghiogheny spillway cut on that at Brilliant. William Creager of the Board saved the plans, however, by devising special provisions for drainage through the concrete lining the Youghiogheny spillway, thereby preventing water pressure buildup behind the concrete lining.

Contractor Herman Holmes had begun work on the outlet tunnel for Youghiogheny Dam in 1940 and a year later Hunkin-Conkey and Shofner, Gordon and Hinman companies, under the local direction of Gilbert P. Fleetwood, began cutting shale from the spillway and moving it to the dam. A few days after Pearl Harbor, Colonel Vogel had sent a security classified report to Washington urging installation

After reviewing the situation, Vogel told the Board the work on Youghiogheny Dam had reached a critical stage in June 1942. If the dam were not finished, a flood might strike that would damage industry in the headwaters district as much as an enemy bombing raid. On the other hand, finishing the dam in a hurry would rob ordnance plants, airfields, training cantonments, storage depots, and other projects the District was building of critical manpower, machinery, and materials. Furthermore, if the dam were not raised at a sufficient rate to top it out before the spring of 1943, a flood greater than could be passed through the diversion tunnel might go over the dam, and perhaps destroy it and much of the valley below. Is Youghiogheny Dam of sufficient importance to our war effort to warrant continued construction, he asked, and can we finish it before the floods come?

The engineers debated the grim gamble at great length, some taking one side and some the other, but finally agreed the danger of flood disaster to war industry was so great that work at Youghiogheny Dam should continue, if the contractor could top it out before the spring floods came in 1943. Jim Growdon thought the contractor could do it; William McAlpine was dubious. At last, Jim Neill, armed with a report from the Acting Head of the Project Section, John W. Ford, showing the chances of a flood overtopping the dam before it was completed were about two out of a hundred, said: "Let's give the contractor what he needs and get on with the job." With that, the Board concluded to move ahead if the contractor could get the parts he needed for his machinery, and when William Sidney agreed to see to the contractor's mechanical needs the Board adjourned.



Lordstown Ordnance Depot
National Archives

said: "Far be it from me to attempt weighing the relative ranks of a Congressman and a Brigadier, so I'll just wear this coat myself. Now let's get going." Both visitors got soaked.

Colonel Hall's personal quirk was apparent in his review of the Youghiogheny situation:

On the assumption that the protection given by the dam will assist the war effort, I have decided to concur with the consultants, and go ahead. If the Department does not like my decision there is still time to stop. The dam can be left alone and equipment moved to other fields of usefulness, and no vast amount of harm will be done; but this is the last chance the Department has to stop it. If the dam gets a very few feet higher it will not be possible to withdraw equipment, or indeed to refuse priorities required to replace damaged equipment. It will not be possible to delay the work for any cause, no matter how badly some military project might need the equipment. If the Department is not thoroughly prepared to see the Youghiogheny Dam through, it is better to direct work be stopped at once.

Charles Wellons, Herb Winn, Jim Neill, Paul Gettys, and Gilbert Fleetwood met contractors Floyd Shofner, S. E. Hunkin, and Dale Hinman at the Youghiogheny site a few days after the Board meeting and inspected the equipment. The contractors had power shovels gouging shale from the spillway and dumping it into crushers on the side of the bluff, from which the crushed rock was delivered by a long belt conveyor system (first use of belt conveyors for delivery of fill materials for a dam in the United States). The conveyors spilled the crushed shale onto the east dam abutment, from whence it was spread into place by dozers and carrying scrapers and packed by rollers at a rate of 18,000 cubic yards per day. About 3.5 million cubic yards would have to be placed before the dam was completed. Colonel Vogel sent that information along with a transcript of the Board meeting and his recommendation that construction of Youghiogheny Dam be continued to Colonel C. Lacey Hall, Ohio River Division Engineer.

Colonel Hall, Division Engineer throughout the Second World War, was an able technical engineer who distinguished himself in a dozen different posts, but who had a penchant for needling his superiors. He and Vogel once took a congressman and a general from Washington to inspect a Pittsburgh District military project, and when they arrived at their destination it was pouring rain. Lacey Hall, with raincoat on his arm, looked for a moment at the two guests who had no raingear, and

Chief of Engineers Eugene Reybold was a gambling man, who thought the danger of a flood stopping war production greater than possible loss of the dam, and he ordered the job done with dispatch. With 500 men operating machinery around the clock, the contractors built the dam to a point above the spillway elevation without problems before winter set in in late 1942 and had the dam ready to operate as a detention reservoir in 1943. Work then stopped because a critical steel shortage, caused by tank and ship construction, made it impossible to get steel for the Highway 40 bridge over the reservoir at Somerfield. Youghiogheny Dam was operated as a detention reservoir, holding floods for short times and then releasing them, until the bridge was finished in 1948 and impoundment of summer pools could begin. Built at a cost of \$10.2 million, Youghiogheny Dam prevented flood

"Pittsburgh Aerodrome"
National Archives

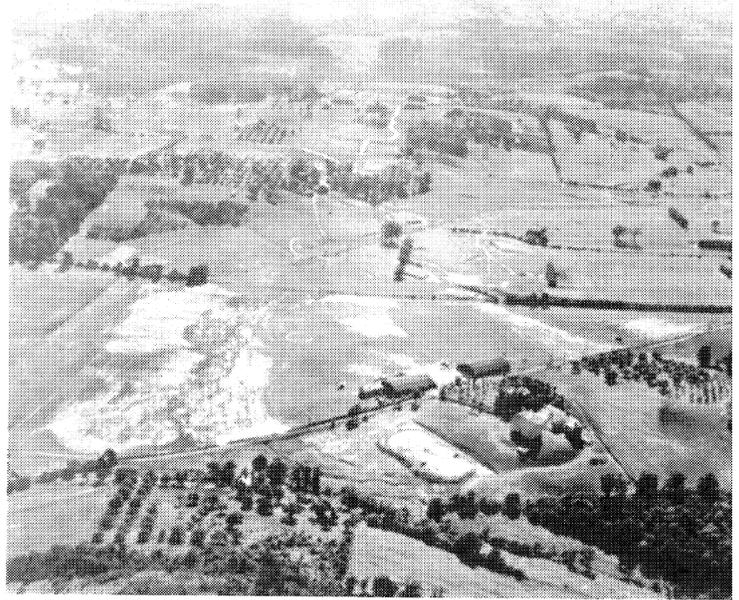
damages totalling more than eight times its cost during its first thirty years of operation, and through its summer releases made the Youghiogheny one of the most exciting whitewater canoeing streams in the country.

The Military Mission "There was strict censorship after Pearl Harbor of any mention of the weather on the radio," Herbert Vogel recalled. "I remember well that on early morning inspection trips, starting often at four or five o'clock, I would listen to the car radio to hear whether they were playing *You Are My Sunshine*, *Singing in the Rain*, or even *Jingle Bells*. It was as good as a formal weather report. It seems odd now, but people then were jittery and fearful of an air raid and that is why we were ordered to build airports in a hurry for fighter planes at Connellsville, Coraopolis, and Bradford."

In retrospect, fears of air attack on the industrial heartland might seem as groundless as the fears in 1863 that General Lee might turn west, but in 1942 when memories of Pearl Harbor and the Battle of Britain were fresh it was another story. And perhaps General Jimmy Doolittle's April 1942 raid on Tokyo from the carrier *Hornet* showed that Pittsburgh's fears of an air raid were not entirely chimerical.

The Pittsburgh District first got into the airfield construction business during the Second World War, but the Corps had some earlier associations with the business. Colonel John Macomb, who directed river snagging on the Ohio in 1866, had built the first "airfields," for the Balloon Corps of the Army of the Potomac during the Civil War; and General Mason M. Patrick of the Engineer Corps had become first chief of the Army Air Corps in 1917. Military airfield construction was handled by the Quartermasters prior to 1940, however, and they built the first military airfield at Pittsburgh.

Lieutenant Clifford Smith, Constructing Quartermaster, built an airfield on a 43-acre site in rugged terrain selected by the Air Corps in 1922



about 8 miles northeast of Pittsburgh. Smith and contractor Walter S. Rae had a tough job, for their horse-drawn scrapers could only scratch the hard yellow clay and they had to dynamite it into fragments for placement. Their water source for the concrete mixers was a stream that went dry that autumn, and water, along with all construction material, had to be hauled in wagons from Aspinwall. Smith was proud to report the job completed on November 18, 1922, with two corrugated iron hangars in place. Each building had been painted by hand: gray interiors, ivory window trim, green sides, and maroon roofs. And, for the benefit of fledgling aeronauts, PITTSBURGH AERODROME had been painted in four-foot letters atop the roofs. The first planes landed on January 1923.

The Quartermasters supervised airfield construction until October and November of 1940, when President Roosevelt transferred the work to the Engineers. The Pittsburgh District inherited the Connellsville airfield project at that time. The Connellsville field, begun in 1935 as a municipal W. P. A. project, had been converted to a military base by Quartermaster officers Albert J. Wick, J. H. Osterman, and M. E. Townes between 1938 and 1940. The Pittsburgh District sent engineer Howard P. McKown and assistants Joseph Statzula and Sophia Kauchuk to Connellsville to finish the job. They inspected contractor construction of a radio beacon range building, transmitter building, roads, fences, and utility lines supplementing the hangars, barracks, and administration buildings already in place.

After America entered the war, the District began airfields at Bradford in McKean County and in Moon Township in Allegheny County and a filter center in Pittsburgh for the First Interceptor Command of the Air Force.

The filter center, forerunner of radar systems for warning of enemy aircraft approach, was built in April 1942 on the 12th floor of the First National Bank building at 511 Wood Street in the Golden Triangle. Inspector Howard A. Kennedy supervised Landau Brothers Building Company who installed room partitions, utilities, and a balcony around the control room. Four switchboards, serving the four sectors of the First Interceptor Command, were located on the balcony to take incoming calls from civil defense plane spotters, who scanned the skies around the city and reported aircraft movements by phone. Paths of the aircraft were then plotted on a large map on the main floor of the center.

Construction of Bradford-Kane and Moon Township airfields also began in April 1942. Bradford field, completed that same year, served its purpose during the war, but was converted to a municipal field by the city after the war with less than happy results: safety problems did develop and two major accidents occurred within a short time. The District spent \$5.3 million leveling the 1,100 rugged acres in Moon Township supplied by Allegheny County and in building three runways, each a mile long, plus taxiways, hangar, control tower, and the barracks, mess halls, and repair shops necessary for military units. The contractor on that job could neither read nor write, and Colonel Vogel took care not to take advantage, but he needn't have bothered: the contractor could add dollars and figure profit percentages like a computer and was a superb mover of dirt, important because the work involved moving mountains and filling gorges. The field became the base of the 71st Interceptor Squadron and the 81st Airbase Squadron, and in postwar years was converted by Allegheny County into the Greater Pittsburgh International Airport.

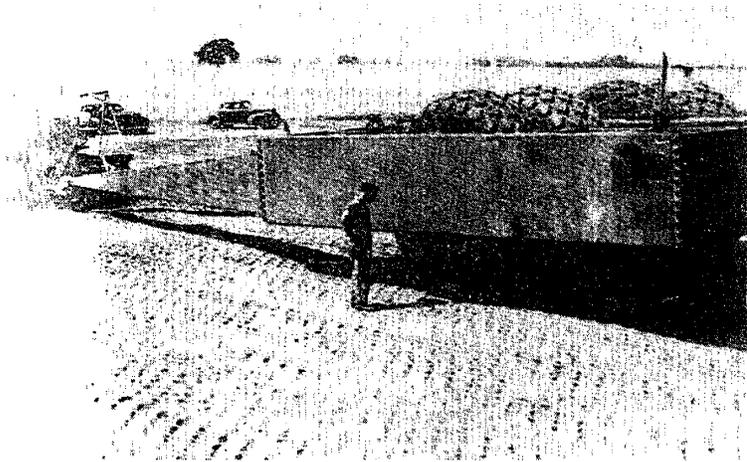
As airfield construction got underway, the Engineers began to try their hands at airfield design. Their first challenging design assignment involved development of storage facilities for aviation gasoline reserves. The District designed underground storage tanks camouflaged to resemble a farm, and such facilities were built in Hawaii and

elsewhere. Prewar experience with soils, foundations, and concrete mixes at flood control projects also came in handy in designing runways that could withstand the impact of heavy bombers.

At the Dayton, Ohio, municipal airport in late 1941, Bob Philippe rode in the bombardier's seat of a B-26 Martin Marauder while the pilot made repeated near-crash landings on a concrete airstrip, and through accelerometer readings, high-speed photography, and tire imprint measurements, proved that the greater the speed of landing, the lighter the load on paved runways, a finding that had major impact on airfield engineering. At Wright and Lockbourne airfields, engineers from the Pittsburgh and other Districts experimented with various asphalt and concrete pavements to determine how they would bear up under landings by planes weighing up to 150 tons. Since such giant aircraft were still being developed at the time, William Sidney designed for testing purposes a rig weighing two and a half times as much as the largest commercial earth mover and equipped it with interchangeable single, dual, and twin tandem wheels to duplicate aircraft weight and landing gear systems. Those studies and tests ended with establishment of a rigid pavement laboratory headed by Philippe at Mariemont near Cincinnati, with world leadership in airfield design for the Engineers, and with the use of heavily loaded super-fortress bombers during the final phase of the war in the Pacific.

As the Pittsburgh District's military workload burgeoned in mid-1942, Colonel Vogel sought Engineer commissions for his executive staff and succeeded fairly well, though accepting a commission at that time meant personal sacrifice. Experienced engineers were in demand for many high-salaried jobs, and it was to the advantage of the Corps to commission personnel and hold them at their jobs or at other required duties.

In the ensuing war years, assignments were very fluid. When Colonel Vogel became District Engineer, Major J. H. Quirk moved into direction of



Testing airfield pavement

the Engineering Division. Within less than a year, he was succeeded by Major William "Ike" English, who worked with a civilian counterpart, Jim Neill. Captain Herbert Winn headed the Construction Division, later to be succeeded by Captain Wilfred Bauknight. Captain Joseph W. Carlson, after initial service at Keystone Ordnance Works, was to become Chief of the Specifications Branch; and Major Jack Dodds continued as Operations Chief. Some of the field assignments included Captain F. E. Smith, Area Engineer for the Ravenna Ordnance Plant and Portage Depot, and later for the Lordstown Ordnance Depot; Major A. H. McCarnes for the Crile General Hospital in Cleveland; and Major Don D. Rait at the Newton D. Baker General Hospital in Martinsburg, West Virginia. Charles Wellons, Principal Engineer in 1942, was Lieutenant Colonel and Executive Officer in 1943. He was Acting District Engineer from December 1944 to October 1945.

The war wrought many changes at the District office. James N. Martin, the strait-laced Chief Clerk of the old school, more military it was said than the officers, retired in 1942, after service with the Corps since 1896. Responsible for accounting, personnel, and a hundred details of daily office work, the old Chief Clerks had perhaps the most "ulcerous" jobs in the Corps, and Martin was the last of his breed. Scott Harvey, a sparkplug with a sixth sense for short-cuts, was Martin's successor. When an officer died in an automobile accident, without leaving record of the combination to his safe in the District office, Harvey waited until the Army Inspector General visited the office and asked that the safe be opened. When Harvey said he could not open the safe, the I.G. asked what was in it, and Harvey replied he didn't know, but, confidentially, he thought it was where the District Engineer hid his booze. In short order, the I.G. found a safe-cracker to open the empty safe.

With military projects mushrooming throughout the District, work at Youghiogheny Dam and Johnstown underway, and construction beginning at Berlin and Mosquito Creek dams in the Mahoning River basin, District personnel climbed in 1942 to an all time high of more than 3400. Many men left the District to enlist in the armed services, and some, beginning with Lieutenant William J. Bloomgren, a surveyman who joined the Air Corps and died in a plane crash in 1942, never returned. And the District manpower shortage was alleviated with womanpower. Women had served the District since its beginning, but they were actively recruited in 1942. In their Veronica Lake and Rita Hayworth styles, the new employees were somewhat shocking to their older male colleagues. William E. Sidney, perhaps inspired by his parrot, issued a special memo to his office staff in 1942: "Your attention is invited to the circular letter of April 20, 1942, which states that use of paint for decorative purposes should be discontinued."

Things were done in a hurry during the war years. Verbal agreement was often made with contractors, who frequently began work before formal paperwork was concluded, and the District sometimes took unusual measures. As traffic supplying war industry on the Monongahela swelled, Colonel Vogel realized the operating machinery was sadly inadequate at some of the Monongahela locks. Jack Dodds knew where to find some donkey engines, so Vogel ordered them and had them installed, then asked for approval from his superiors. Weeks passed, river traffic accelerated, then word that the request for purchase of donkey engines had been disapproved arrived. Vogel got on the phone to Lacey Hall at Division, explained the engines were in place and there was no way in the world he could pay for them. Colonel Hall personally settled that matter with the Chief's office.

Colonel Hall did not always come out on top in his dealings with Washington. He was called to the Chief's office in 1942, where General Thomas Robins informed him that a special Manhattan Engineer District (to produce the atomic bomb) would be formed within Ohio River Division bound-



Lieutenant Colonel
Charles M. Wellons

aries but would report directly to the Chief, not through Division. "I object strenuously to an organization in my Division being outside my jurisdiction," said Colonel Hall. General Robins smiled sweetly and replied: "That's too damn bad, Lacey, but that's the way it's going to be." And so it was.

When President Roosevelt assigned all military construction to the Corps of Engineers in December 1941, the Pittsburgh District inherited from the Quartermasters a TNT plant at Meadville and several other projects. One was Camp Dawson at Kingwood on the Cheat River, where in July 1942 the District renovated the tent covered buildings, built a post exchange, battalion headquarters, latrines, mess hall, and infirmary and installed water wells, pumps, utilities and surfaced roads. Done in a month, the project supplied complete camp facilities for training 1300 men.

Colonel Vogel remembered the Keystone Ordnance Works at Meadville as his "meanest" job and the biggest headache acquired from the Quartermasters. He found mismanagement and irregularities there, including favoritism in awarding subcontracts. The plant had been located on marshy farmland, and slag from steel towns had to be trucked in to form roadbeds. To obtain and hold laborers, barracks had to be built at the site and free bus service furnished for commuters. In addition to the plant for TNT production, Area Engineer Lieutenant Colonel John J. O'Connor supervised construction of a self-contained city, with administration buildings, a three-truck fire department, cafeteria, hospital, first-aid stations, and heating, power, and water plants. At the outset of the war, TNT for bombs and shells was in short supply, but at Keystone Ordnance a "reverse nitration" process was used for the first time in the United States, which trebled TNT production and halved its cost.



Captain Wilfred Bauknight

The Pittsburgh District was also involved in construction of a shell-loading plant at Ravenna, Ohio, and Morgantown Ordnance Works on the Monongahela, which produced chemicals used by the Manhattan Engineer District. Other major projects included the Shenango Replacement Center about 6 miles southwest of Greenville, Pennsylvania, and an ordnance depot at Warren, Ohio.

For Lordstown Ordnance Depot, five miles south of Warren, the District designed wooden mobilization type warehouses with tarpaper roofing to conserve critical materials and speed construction. Bids for the job from responsible contractors, who apparently could not think in terms of short life structures, were high, and, though the District had qualms about it, the contract went to a movie theater operator whose bid was \$1 million less than his competitors. The contractor began work on April 30, 1942, and by November 14 had completed eight warehouses, each 960 feet long and 180 feet wide, eight open storage sheds, a motor pool shop, two administration buildings, cafeteria, sentry boxes, fire stations, infirmary, utility lines, and 31 miles of railroad track inside the depot. The contractor then went to Columbus and slapped a million dollar check down on the Division Engineer's desk. He told Colonel Vogel it was worth a million to see the look on Lacey Hall's face. Of course, the money was excess profits the contractor knew would be taken from him in any case. Though speedily and cheaply built, the project served well, except the 12-inch wooden stave watermains used to save metal; they would not hold water and had to be replaced.

The District was also ordered to locate and build two military hospitals, one north of Pittsburgh and the other near Cleveland. After map study, Colonel Vogel decided Butler, Pennsylvania, which had both road and rail service and was blessed with a healthy atmosphere, had potential so he drove to that city. As if in a dream, he found a new hospital on the north side of Butler, with complete kitchens, dental facilities, and laboratories. What's more, it was unoccupied and so new the hallways even had paper strips to protect the walls. He learned it had



Berlin Dam

been built as a State tubercular hospital by one administration but left idle by the succeeding administration. Next day, the Colonel went to Harrisburg, obtained release of the hospital to the Army, and put Bob Kline in charge of building more wards to increase bed capacity; then opened it for business.

Vogel also drove to Cleveland to inspect potential hospital sites recommended by reconnaissance teams. It rained heavily that day and he found every recommended site standing in water. But, on his drive back toward Cleveland, on the west side of town he saw from the window of the car a dry spot marked for a subdivision with a power line passing directly overhead. He went to the Mayor's office immediately, told him he wanted the site for a hospital, and the Mayor agreed on the spot. There, the District built Crile General Hospital.

By the end of 1942, military construction in the United States was under control and emphasis switched to construction in the combat theatres. Colonel Gilbert Van B. Wilkes succeeded Vogel as District Engineer in 1943, and Vogel went to the Southwest Pacific Theatre, where he was joined by Bob Kline, A. H. McCarnes, and Ike English for front line construction. A third of a century later, General Vogel recalled:

I remember my year as District Engineer as filled with extremely hard work over long hours. Rising during hours of morning darkness I had long distances to travel and many projects to keep on schedule. Even at night, it was necessary to check security measures. The results obtained would have been impossible without the superb assistance rendered by all members of my staff and employees of the District as a whole. Everyone felt the responsibility demanded by war and each contributed eagerly to the over-all effort. The District could well take pride in all that it accomplished.

Dams to End the Steel Shortage "Mr. President, you will surely recall crossing the Mahoning River two or three times during your visit to Youngstown's busy steel plants last fall," wrote Congressman Mike Kirwan in his May 1941 letter to Franklin Roosevelt. "The Mahoning River is now at the point of drying up after its flood waters threatened interruption of production in January. That river is 80% sewage, and we are called the 'wonder people of America' because we drink it and it doesn't kill us. I was foreman in a steel plant here for twenty years and can recall sending men to shunt sewage away from the water intakes."

Michael J. Kirwan was appealing to the President and Congress and to anyone who would listen in 1941 for quick action on Mahoning basin water troubles. He declared that repeated flooding interfered with steel mill production, that strong men collapsed from the stench of the polluted stream, and that low water flows hampered national defense. He said that steel mills used and reused the Mahoning so many times that both water taps in Youngstown homes delivered hot water, that ducks never landed on the Mahoning for fear of being cooked alive. People and industry in the Mahoning basin had built Milton and Meander Creek dams without a cent contributed by the Federal Government, though the Mahoning Valley paid more in taxes than some states. Floods and droughts in the Mahoning basin disrupted production of 10% of the nation's steel, essential to any defense program. "There is only one way to remedy this threatening situation," Kirwan told the President, "and that is by the immediate construction of Berlin and Mosquito Creek dams on the Mahoning and one of its principal tributaries."

Roosevelt had William A. Knudsen of the Office of Production Management investigate the Mahoning situation, and Knudsen agreed with Kirwan: mills in the Mahoning basin did produce 10% of the nation's steel and water problems were about as bad as Kirwan described them. "We accordingly," said

Clearing operations, Mosquito Creek damsite

Knudsen, "would welcome by any measure that might be taken to avoid any future shortage of water needed in the defense program, especially in the Mahoning Valley where so much of our steel is now being produced."

To help end the critical shortage of steel, on October 27, 1941, President Roosevelt approved construction of Berlin Dam on the Mahoning River upstream of the steel mills as a national defense measure. Ten days after Pearl Harbor, Congress supplied funds for the job; and by the end of 1941 the Pittsburgh District had Berlin Dam under contract with E. J. Albrecht Company, with completion scheduled for early 1943.

The Albrecht Company had built other projects for the Corps and had a reputation for fine work. At Johnstown, for example, District inspectors had observed that Albrecht was using expansion joint materials between concrete slab bank revetments that differed from specifications, and an argument had ensued. It ended with confrontation between Albrecht and District Engineer Ludson Worsham. Mr. Albrecht, who had a German accent, became angry during the conference, jumped from his chair shaking his fist and shouting: "I used dot material on Sardis Dam and by God, Colonel, if it's goot enough for General Moses it's goot enough for you!" Worsham, a quick-tempered fellow, was about ready to climb over his desk after the contractor when he realized the humor of the situation. The expansion joint material used at Sardis Dam in Mississippi was more expensive and of higher quality than that specified for the Johnstown revetment.

To speed the Berlin project, Payson Perrin and the District surveys branch used photogrammetry, stereo photography from aircraft, for mapping the reservoir area, which was among the first in the United States so mapped, and the Engineering Division worked out final project designs while construction was in progress. Albrecht built Berlin Dam, 96 feet high and better than a mile long, including the central concrete section flanked by earth embankments, and had it nearly finished by late 1942.



It appeared for a time that the District might have trouble getting the steel needed for the tainter crest gates to close the Berlin Dam spillway, and William Sidney devised a system of wooden stop logs to use in lieu of steel tainter gates, if the steel were not delivered. Colonel Vogel and Charles Wellons got on the phone to Washington, however, and won a top priority A-1-a rating from the Army-Navy Munitions Board for Berlin Dam as a defense project. The crest gates were delivered, installed, and in the spring of 1943 impoundment began. The entire storage of Berlin Dam was exhausted that year to keep the steel mills running, clearly demonstrating the need for additional storage capacity.

Mosquito Creek Dam, located northwest of Warren in Trumbull County, was built as a defense project in 1943 at what seems, in comparison with other dams, blazing speed; yet, the project had some unique design features. Built in a gently sloping valley where foundation rock was buried beneath a hundred feet of glacial deposits, the dam was a 47-foot high rolled earthfill about a mile long. The design protected against seepage by placing a filtered limestone rock foundation drain along the toe of the dam and a blanket of impervious materials in the old stream channel upriver from the dam. Most unique was the fact that the dam had no spillway! Normal flows passed through a pentagonal intake tower in the reservoir and conduits under the dam, and advantage was taken of a swampy depression near the upper end of the reservoir that would serve as a natural outlet or wasteway. Extreme flood flows would pass out of the reservoir through the depression into Baughman Creek, a tributary of Grand River, and eventually end up in Lake Erie.

Chief of Construction Captain Wilfred Bauknight, Alva J. Armstrong, head of the Civil Construction Section, and resident engineer Gilbert

P. Fleetwood directed contractor D. D. Mullett, who built Mosquito Creek Dam in record time. The contract for the dam and outlet works was awarded in July 1943, and the reservoir was ready for impoundment by January 1944. The contract for clearing timber from the reservoir went to Herman Holmes, and it required more money and manhours than did construction of the dam. Power chainsaws were not then available and the timber was felled by hand. Holmes had trouble finding workers and impoundment began before he finished the job. He brought in lumberjacks from Minnesota to keep ahead of the rising water and salvaged about 10 million board feet of lumber, hauling the logs out on tractors, trucks, and even horse-drawn skids.

Berlin and Mosquito Creek dams kept the Mahoning Valley steel mills running full blast during the last two years of the war, but it was apparent the growing Youngstown-Warren-Niles area would need additional water supply. The reservoirs supplied 99% of the river flow at Youngstown during the 1953 dry spell. At the close of the war, the Pittsburgh District began planning a third dam in the basin on Eagle Creek north of Newton Falls. Mike Kirwan met opposition on that project from Pennsylvanians who saw the reservoir as part of the proposed Lake Erie and Ohio River Canal. Senator Joseph F. Guffey of Pennsylvania told the House Flood Control Committee: "I am opposed to this dam because it is an adjunct to the canal that the Youngstown Sheet & Tube people in Youngstown are trying to get built to get their freight rates lowered." Despite Kirwan's protests that the project was for flood control and improved low flows, not for the proposed canal, the Pennsylvanians beat the Eagle Creek project.

Ships from the Arsenal of the Allies While boat whistles and factory sirens screamed, Mrs. Robert Hughes, wife of the Naval Officer in charge, shouted "Good Luck" and cracked a bottle of champagne against the PC-490, first of fifteen subchasers built at Neville Island during the Second World War. The crowd, drenched by heavy rain, cheered as the fast 165-foot craft scraped down the

ways on October 18, 1941, and splashed into the Ohio to begin its 2,000 mile trip to saltwater. The PC-490, fully equipped for combat with a 60-man crew, was the first warship built at Pittsburgh since 1865 and first of more than 300 submarine chasers, mine sweepers, destroyer escorts, LSTs, and even full size floating drydocks produced by Dravo and American Bridge for Admirals Ben Moreell and S. S. Robinson of the Navy during the war.

Of the 1,058 LSTs (Landing Ship, Tanks) built for the Navy during the war, 724 were completed at inland river ports. LST-1, a 327-foot long and 50-foot wide vessel, with 32-foot gunnels, 12-foot draft, and double doors in its bow, was launched at Neville Island on Labor Day, 1942. Coast Guard ferry crews, mostly rivermen in the Navy Reserve, took it to New Orleans where combat crews boarded to go to sea. Hundreds followed the first downriver and overseas to become the backbone of American amphibious assaults on enemy beaches. One LST spearheaded the Leyte landing and was lost on that distant beach in the Philippines four months after its launch at Pittsburgh. Frank Stocker, a Coraopolis native, was amazed when he boarded an LST in the Mediterranean and found aboard a calendar from the Coraopolis National Bank. Colonel Herbert Vogel wrote J. Smith Miller of Dravo in 1944 to comment:

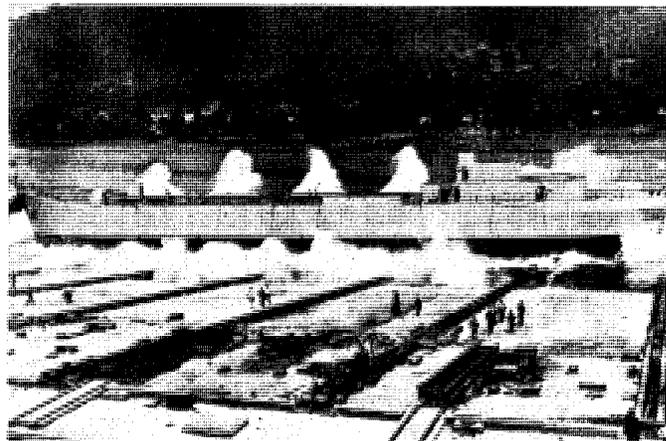
I just returned from New Guinea where I saw your big old ungainly, but thoroughly capable hulks drawn up along the beach disgorging great quantities of supplies from their yawning mouths. Every soldier knows the LST and the work it's doing and all gain courage from the knowledge that they have such monsters to back them up. The homely things are doing as much to win this war, if not more, than the glamorous items of equipment. When it's all over, we'll remember the 2½ ton dump truck, the bulldozer, the C-47, and the LST.

Oldtime steamboatmen were not entirely thrilled by wartime developments on the river. "This war's worse than the first one," said Captain Fred Way of

Sewickley. "The last war you could get on and off a lock, leastways; this time they look at a river fellow like he was an alien." Jack Dodds, speaking for the Pittsburgh District, explained that navigation locks were constantly guarded and trespass forbidden to prevent chance of interruption of traffic in service to the "Arsenal of the Allies." The grumbling of rivermen might have ceased, if Dodds could also have explained that a German agent, landed from a U-Boat on the Carolina coast and captured by the F.B.I., had on him detailed plans for one of the Ohio River locks and dams.

Why might the Germans have been interested in disrupting inland river traffic? Because the rivers had become a major shipping lane for petroleum. Enemy submarines sank about forty oil tankers passing through the Gulf of Mexico and around Florida and closed the ocean lanes, causing a daily oil shortage of 175,000 barrels on the eastern seaboard during March 1942. General Eugene Reybold and the Board of Engineers for Rivers and Harbors sent a special report to Congress urging diversion of petroleum shipments to the inland and intracoastal waterways, free from enemy attack. All available towboats and tank barges were pressed into that service and the Defense Plant Corporation hastily built 21 identical steam-prop towboats (DPCs) and scores of steel-framed wooden tank barges to move southern oil to Pittsburgh and east. That traffic and more, generated by railroad congestion and gasoline and rubber rationing, caused river commerce to swell during the war years, reaching a volume 233% greater than that of the First World War.

The Engineers, at their navigation locks, kept oil from Oklahoma, Monongahela coal, and other raw materials moving up and down the rivers to industrial ports, especially to Pittsburgh and vicinity, supporting unparalleled military production. Colonel Robert C. Downie, chief of the Pittsburgh Ordnance District, announced at the end of the war that, in addition to warships, tank armor, and aircraft components, area industry had produced 53 million artillery shells, or better than 50% of the heavy artillery ammunition used in Europe, about



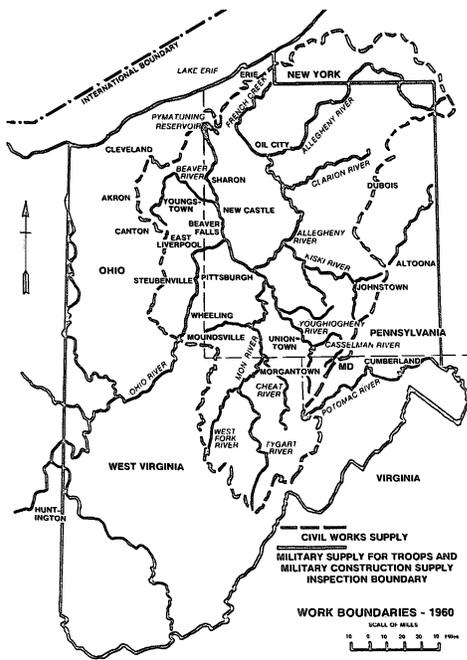
Launching LST 1 at Dravo boatyard, Neville Island
Western Pennsylvania Historical Society

783,000 tons of bombs, approximately half of the Army's heavy cannon, and 95 million tons of steel, which was 30% of national wartime production. "Victory was won in Europe and in the Pacific in 1945," said Colonel Downie, "but that achievement has been due, in a large part, to the miracle of production in this great Arsenal of Democracy."

It Can't Be Done But Here It Is Military supply procurement for the Corps of Engineers during the First World War was handled by the General Engineer Depot in Washington, D. C. At the peak in 1918, 200 officers, 700 enlisted men, and 600 civilians worked in rooms at the Depot Building at 14th and U Streets. In each room, prominently displayed, were placards displaying the slogan of Engineer supply: IT CAN'T BE DONE BUT HERE IT IS.

Many of the supplies needed by the Engineers in France came from Pittsburgh District steel mills, and Pittsburgh Testing Laboratories performed the inspection work for the Corps at area plants. The Engineer District was not involved in military supply work at that time, though for years it had inspected materials fabricated at Pittsburgh for civil works projects. In 1914, for example, Anson B. McGrew, who also had charge of regulatory functions for the District, inspected 9,200 tons of steel and metal products sent from the Pittsburgh vicinity to other Districts. In 1924, decentralized Engineer Procurement Districts were set up at Schenectady, Philadelphia, New York, Chicago, San Francisco, and Pittsburgh.

The Pittsburgh Procurement District was responsible for all of the Ohio River Division except northern Illinois and Indiana. Its commanders were Colonel H. L. Beach, 1924-25, Colonel J. W. Hallock,



Industrial mobilization planning and procurement for bridges, boats, landing mat, buildings and metal items

Industrial mobilization service planning for all Corps of Engineers items
Material Inspection
Contract Administration

the Second World War. Personnel in the Purchasing office jumped in a two-month period from 12 up to 65 men and women, working in cramped quarters four and five nights a week, and weekends too, to fill orders for military supplies always, it seemed, demanded "yesterday."

1925-1937, and Colonel Rodney H. Reese, assisted by Captains John F. Ploeger and P. A. Agnew, from 1937 until the Procurement Districts were merged with the Engineer organizations.

During the Second World War, the Military Supply Division of Pittsburgh District was created to furnish Engineer troops with vital equipment. The Division negotiated contracts, inspected production, and arranged delivery for Engineer materials produced in the Pittsburgh, Wheeling, and Youngstown industrial centers. To support Engineer combat units in Europe and the Pacific, the supply organization procured 1,475 Bailey bridges, which were steel panel bridges that could be assembled with manpower alone, about 33,000 ponton bridge floats, and enough steel and plywood treadway to build a single hundred-mile long bridge. For military construction projects, the division supplied some 25,000 canvas and glass fabric water tanks, 2,500 steel fuel tanks, 2,000 miles of culvert pipe, and 14,000 miles of four and six-inch pipes. To support the Corps' airfield construction mission, astronomical quantities of aircraft landing mats were delivered: 350 million square feet of steel mat, 12 million square feet of aluminum mat, and 125 million square feet of welded wire mat.

During the 1946 demobilization, military supply work moved to the Ohio River Division, which had relocated from Columbus back to riverside at Cincinnati. But during the Korean War this mission was assigned to the District Supply and Procurement Division under Wilfred Bauknight to procure bridges, pontoons, landing mats, prefabricated buildings, and metal products for the Engineers in Korea. C. W. Blankenbuehler and Meryl Watt of the Supply Division remembered the Korean emergency as even more demanding and hectic than that of

On a typical inspection trip in 1951, Wilfred Bauknight looked over production of metal tubing at Mahoning Valley Steel, landing mats at National Gypsum Company, sheet steel at Niles Rolling Mill, Bailey bridges at Commercial Shearing and Stamping, highway forms at Hetzel Steel Form Company, and hose and belting at Republic Rubber Company. He inspected fire extinguisher charges at Pittsburgh Plate Glass, insulated pipe at Ric-Wil in Barberton, Ohio, trucks at Euclid Road Building Company, cranes at Browning Crane in Cleveland, heavy duty trailers at Rogers Brothers Company, and boat oars at the Swanson Factory in Albion; clamshell buckets at Erie Steel, crane parts at Bucyrus-Erie, generators at Marathon Electric, hose at Goodyear Tire, and well-drilling rigs at the Star Machine Company in Akron. After which, he returned to a pile of paperwork at the Pittsburgh office.

"The missile age is contributing considerably to the 'aging' of District personnel," Bauknight complained in 1961. He meant that the work of the Supply Division had actually increased during the late 1950's as the armed forces tooled up for the new missile weaponry. In some years, the workload of Pittsburgh Supply Division exceeded the work volume in some Engineer civil works districts. Area offices for supply were opened at Buffalo, New York and Cleveland, Youngstown and Massillon, Ohio.

At the end of 1960, Bauknight and his staff were administering more than ninety missile supply contracts, worth more than \$40 million and all extremely urgent. Inspection work ranged from simple nuts and bolts to 90-ton cryogenic vessels for handling liquids at minus 300° F. The vessels were a maze of plates, piping, and valves that had to be surgically

clean of contamination. Bauknight borrowed workers from the District Construction Division to keep up with the job, and sent thirty people to special schools in California and Kansas, where they were trained for efficient inspection of complex missile equipment. In 1963, the Army reorganized military supply functions and thereupon the Pittsburgh District lost Bauknight and the military supply mission, by transfer to the Army Materiel Command.

Civil works supply activities remained at a high level in the Pittsburgh District, because from the outset of the space race the Pittsburgh-Wheeling-Youngstown industrial triangle was a focal point for supply of materials needed by NASA. The Corps of Engineers had a special District at Cape Canaveral (Kennedy) that built the launching pads for Alan Shepherd, John Glenn, and other astronauts who were building a bridge to the moon.

For the Manned Spacecraft Center at Houston, the District supply office furnished space-simulation chambers manufactured by Chicago Bridge at Greenville, Pennsylvania, for astronaut training, and the largest (6,700 h.p.) electric motor and generator ever built, by Westinghouse for the flight acceleration facility at Houston. Other items supplied for the space program by the District included steel fabricated at American Bridge for the vertical rocket launch assembly structures, flame deflectors for the Saturn rockets made at Blaw-Knox, and high-pressure vessels, fittings, and pipes turned out by Pittsburgh-Des Moines Steel at Warren, Ohio, and Neville Island, by Babcock-Wilcox at Barberton, Ohio, and by the Struthers-Wells plant at Titusville, Pa. When Neil Armstrong placed his footprints on the moon in July 1969, the men and women of the Pittsburgh District, who glued themselves to their television sets that night to anxiously watch that giant step, took immense pride in the role they played in winning the space race.

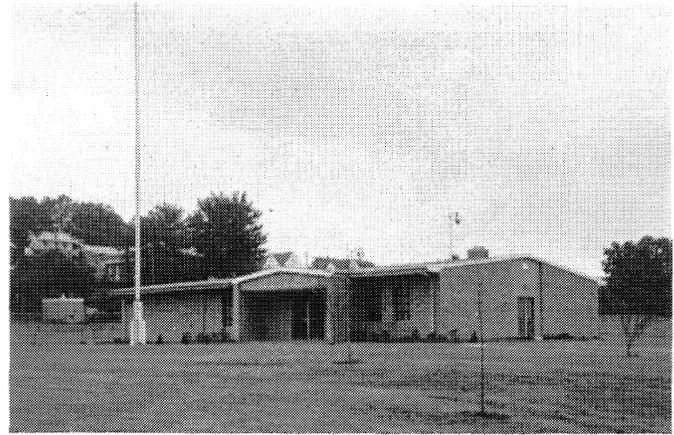
As Circumstances Might Require In 1946, military construction work in the Ohio River Division was centralized at the Louisville District, but hospitals for returning veterans were needed and

General Omar Bradley, head of the Veterans Administration, asked the Corps of Engineers to build eighty hospitals throughout the nation. The Pittsburgh District was made responsible in 1946 and 1947 for building three of those hospitals: a general hospital at Altoona and a general and a neuropsychiatric hospital at Pittsburgh. The Engineers located the sites, awarded contracts to architect-engineering firms for design, and negotiated construction contracts. The general hospital at Altoona, smallest of the three, was completed in July 1950 at a cost of \$5.7 million and turned over to the VA. The Neuropsychiatric Hospital and General Medical Hospital at Pittsburgh followed in short order. The designs were thought so well done that other Engineer Districts used the plans, adapting them to different terrain as necessary.

When the Cold War warmed in Korea in 1951, the Pittsburgh District was again mobilized for military construction. In November of that year, Wilfred Bauknight moved into the supply and procurement area and Jacque Minnotte became Chief of the Construction Division. As part of the massive emergency buildup for the counterattack toward the 38th parallel, the Engineers at Pittsburgh began "retreading," as the expression went, facilities at the ordnance plants at Morgantown, Ravenna, and Meadville, meaning renovation of the existing plants and construction of additions. At Youngstown and Greater Pittsburgh airfields, originally built as fighter interceptor bases, the District installed facilities for refueling and rearming the big bombers and cargo planes of the Strategic Air Command and the Military Air Transport Command.

In April 1952, a column of soldiers and heavy equipment, the first elements of the Pittsburgh Air Defense Command, rumbled through the streets of McKeesport toward Pittsburgh to set up a ring of 90mm antiaircraft guns on twelve sites selected by the Engineers. District Executive Assistant Frank Stocker recalled the antiaircraft sites were chosen in such a hurry that their locations were identified relative to the red, orange, or green belts of a Gulf

U.S. Army Reserve Center, Brookville, Pa.



Missile Master and support facilities, Oakdale, Pa.

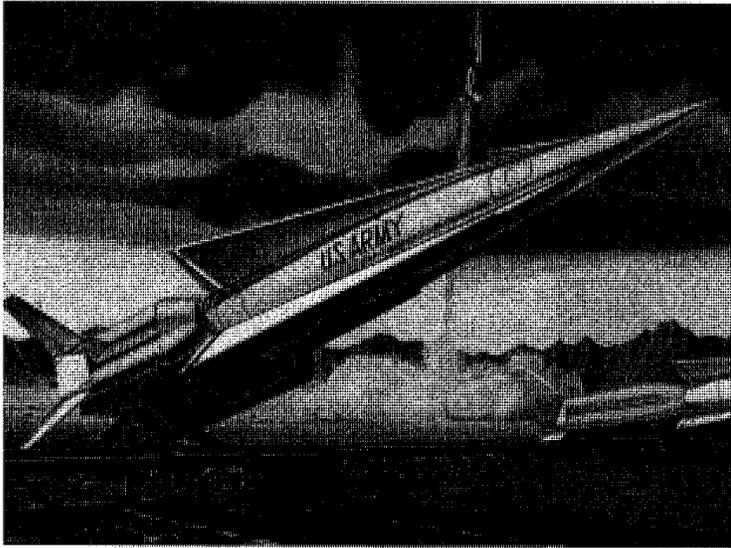
Oil highway map. The “ack-ack” boys lived in tents during the winter of 1952-53 and coordinated the air defense system through ground observers on hilltops and skyscrapers, while the Engineers built permanent gun sites and installed a radar system. Joe Renouf, as Resident Engineer, nursed these projects through the winter for occupancy in late February 1953.

The “brinksmanship” policies of Secretary of State John Foster Dulles during the first Eisenhower administration seemed to make surprise air attack an even greater threat, and in 1954 the NIKE surface-to-air missile, which resembled a telephone pole with fins, was added to the defensive arsenal. The Pittsburgh District located twelve NIKE launching and control sites around Pittsburgh and eight around Cleveland. At a cost of around a million dollars per site, the District hastily built three underground missile storage structures, personnel shelters with 6.7-foot cinder walls and heavy blast doors to withstand shock waves, missile-assembly test buildings, generator buildings, latrines, administration buildings, and access roads. Because it was necessary that the troops, known as the “Buck Rogers” boys, be no more than ten minutes from their missiles, housing and necessary electric, water, and sewerage facilities were later added.

In 1959, the system became more elaborate when sophisticated NIKE-HERCULES missiles were placed at six sites and a Missile Master, a fire direction center and headquarters for the 31st Artillery Brigade, was built at Oakdale. Work on the Missile Master, under local direction of resident engineer Ralph Patt, involved construction of an operations building for radar and communication paraphernalia, big radar towers, a power generator building, plus support facilities: barracks, messhall, warehouse, repair shops, heating plant, utilities, and roads.

The Missile Master control center and six missile batteries were operational by late 1960. The 3rd Missile Battalion of the First Artillery manned the batteries at Elrama, Irwin, and Herminie south and east of Pittsburgh; and the Duquesne Greys (2nd Missile Battalion, 178th Artillery, Pennsylvania National Guard) manned the batteries at Coraopolis, West View, and Dorseyville north and west of the city. Army Family Housing units were constructed in the vicinity of eight of the Pittsburgh sites.

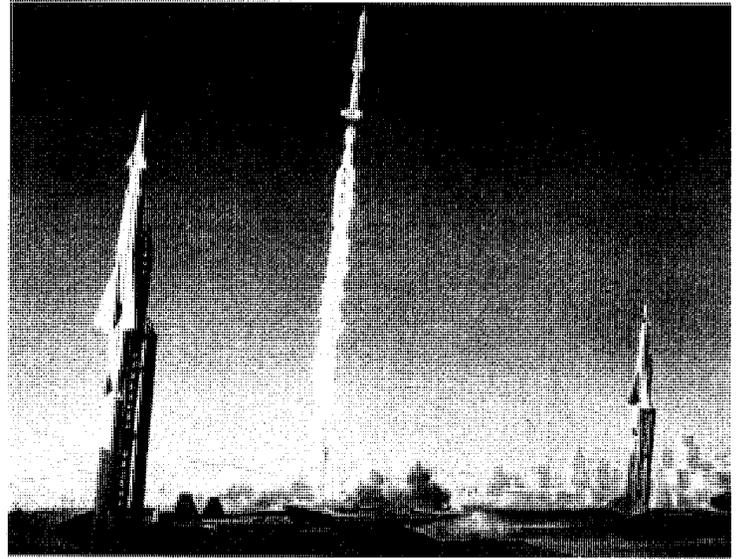
The Pittsburgh District also became responsible in 1955 for construction of Army Reserve Centers, for reserve unit training, throughout the area. The Engineers first finished construction of reserve



Douglas Army Ordnance Nike-Hercules

centers at Uniontown and Washington, Pennsylvania, and Akron and Canton, Ohio. Reserve centers typically had classroom and office space, assembly buildings, maintenance shops, paved parking areas and access roads, and were built for permanent use with tile-covered concrete floors, brick-faced block walls, and beautifully landscaped grounds. By 1961, the District had completed or had under contract the Army Reserve Centers at Akron, Bellaire, Cadiz, Canton, Cleveland, Geneva, Painesville, and Warren, Ohio; at Altoona, Brookville, Butler, Clearfield, Du Bois, Farrell, Franklin, Greensburg, Indiana, Johnstown, Meadville, New Castle, New Kensington, Oil City, Punxsutawney, St. Marys, Uniontown, and Washington, Pennsylvania; and at Weirton and Wheeling in West Virginia.

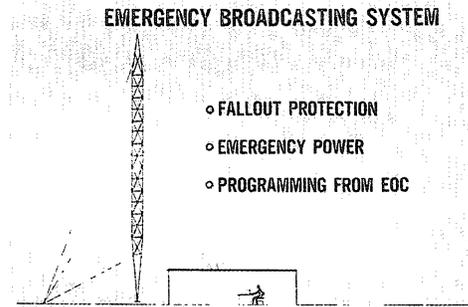
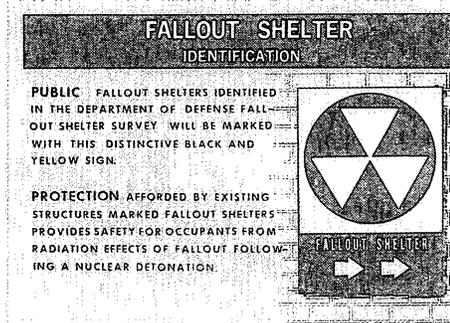
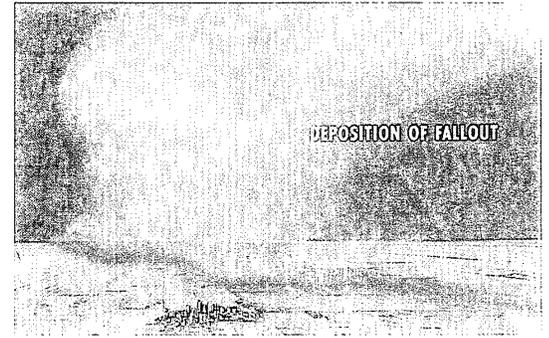
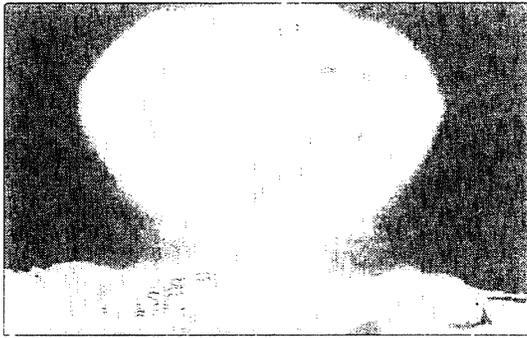
Military construction by the District ended in 1961 when the Chief of Engineers made an effort to reduce administrative costs through consolidation of military functions. Among the twelve Engineer Districts that lost military construction was Pittsburgh, when such work in the Ohio River Division was centralized at Louisville. For the same reason of economy, further consolidation occurred in 1970 and the military projects in the Pittsburgh area were thereafter handled out of the Baltimore District.



"Nike" Missile

Survival Insurance "The history of this planet, and particularly the history of the twentieth century, is sufficient to remind us of the possibilities of an irrational attack, a miscalculation, an accidental war, or a war of escalation," declared President John F. Kennedy in his special message to Congress on May 25, 1961. "It is on this basis that civil defense can be readily justifiable as insurance for the civilian population, in case of an enemy miscalculation." The abortive Bay of Pigs invasion had failed the previous month and the President was planning a visit to the Berlin wall and talks with the stout Soviet Nikita Krushchev. He placed the Office of Emergency Planning for civil defense under the Secretary of Defense and appealed to Congress for funds to build fallout shelters, stock them with survival necessities, and establish a warning system.

Because the Corps of Engineers was in close contact with local authorities, the President selected it to perform most of the urgent civil defense work; and the Pittsburgh District became responsible for 25 western counties of Pennsylvania. As a result of an unconventional organizational setup, the District reported to the Navy Bureau of Yards and Docks at Philadelphia, which in turn reported to the North Atlantic Division of the Corps of Engineers at New York. The job involved locating and preparing fallout shelters and planning post-attack rescue,



damage assessment, debris clearance, mass burials, radiation detection, and recovery.

The Pittsburgh District sent engineers George Cingle and Bert Maher to Fort Belvoir for a fallout shelter survey technique course, held a seminar at the Fort Pitt Hotel for local architect-engineer firms, and in October 1961 established a Civil Defense Support Branch headed by Frank Stocker, who was assisted by Bert Maher, Quintin Witt, Frank Fetchak, Tom DeLong, and Dave Rhodes. That staff and representatives of twelve architect-engineer firms took crash courses, described as an “unholy mixture of descriptive geometry and new math,” at Fort Belvoir and elsewhere to learn fallout shelter analysis. The object was to locate structures with sufficient shielding to minimize radiation doses, then mark them as fallout shelters and stock them with survival supplies.

Under contract, the twelve architect-engineer firms examined some 16,000 structures in the 25 county area and selected and marked the best sites as fallout shelters. Stocker and his men negotiated contracts with radio stations for emergency warning systems and worked with local and county authorities in devising master plans for community shelters and post-attack operations. Interest in the civil defense effort peaked during the Cuban “missile crisis” of October 1962, then languished during the Viet Nam war and further decreased when President Richard Nixon’s “detente” policies seemed to reduce the risk of atomic war. The Pittsburgh District had finished its basic civil

defense mission when the job was transferred to the Naval Facilities Engineering Command at Philadelphia in November 1968. Dave Rhodes became an employee of the Navy and continued work on civil defense out of the Pittsburgh District office until June 1975, when nuclear attack defense planning was consolidated at Olney, Maryland.

As survival supplies in fallout shelters deteriorated, they were seldom replaced, for they could have no value...until they were needed. The Soviets, on the other hand, pursued a continuing civil defense effort that won them an ace up the sleeve in the diplomatic poker game known as the Strategic Arms Limitation Treaty (SALT) talks. President Kennedy in 1961 had described civil defense as survival insurance that might never be needed, “but insurance which we could never forgive ourselves for foregoing in the event of catastrophe.”

The end of civil defense support made the Pittsburgh District again a strictly civil works organization. It had responded effectively, however, to the urgent construction missions of 1942 and 1951, to the esoteric engineering challenges of ordnance and airfield and missile projects, and to intensive demands for military supply and civil defense support. District personnel took great pride in their response during the historic defense emergencies that had occurred while the District had a military mission, and they were convinced the record of their achievements showed they were qualified to handle future emergencies as circumstances might require.