# They Kept 'Em Rolling:

## THE TOOELE ARMY DEPOT, 1942 - 1962

BY

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Since the outbreak of World War II, United States Department of Defense installations in Utah have become increasingly important to the state's economy. These installations (and they do not include the defense-supported missiles industry) employ more than 22,000 persons, have an annual payroll of almost $127 million, and purchase approximately $27 million worth of products annually from Utah businesses. An estimated 8 per cent of all income in Utah is generated directly by these establishments.[1] This is more than the income from Utah's trade, more than the income from all state and local government expenditures, and more than the income from all of Utah's agriculture. If these federal enterprises were suddenly withdrawn from the Utah scene, not only the 22,000 installation employees, but countless others who rely upon their incomes for their livelihood, would be adversely affected.

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[1] Compare 1956 estimates and data in "Defense Industry in Utah," *Utah Economic and Business Review,* XVII (September, 1957), 2–3. Another recent estimate states that defense payrolls, military and civilian, account for 6.7 per cent of Utah's total personal income, *U.S. News & World Report,* February 19, 1962, p. 40.

TABLE 1

DEPARTMENT OF DEFENSE INSTALLATIONS IN UTAH, 1961

(Source: Information Supplied By Each Base)

| *Installations* | *Year Established* | *Average Number Employed* | *Annual Payroll* | *Local Purchases of Goods* |
|---|---|---|---|---|
| Fort Douglas | 1862 | 509 | $ 2,513,645 | $ 770,690 |
| Hill Air Force Base | 1939 | 13,381 | 81,643,978 | 6,763,000 |
| Utah General Depot | 1941 | 3,033 | 16,304,194 | 12,477,022 |
| Dugway Proving Grounds | 1942 | 2,058 | 10,082,000 | 4,045,000 |
| Tooele Ordnance Depot | 1942 | 2,395 | 12,770,498 | 2,293,526 |
| Clearfield Naval Supply Depot | 1942 | 620 | 3,300,000 | 50,000 |
| Supersonic Military Air Research Track (Hurricane Mesa) | 1954 | 44 | 303,000 | 180,000 |
| TOTAL | | 22,040 | $126,917,315 | $26,579,238 |

In addition to an abundance of room, a major reason for the establishment of a relatively large number of important defense installations and depots in Utah is the central location of the state in the West. Equidistant from the three major West Coast shipping centers of Seattle, San Francisco, and Los Angeles, and connected with them by transcontinental rail, highway, and air routes, northern Utah is an ideal central distribution point.

## ESTABLISHMENT OF THE TOOELE ORDNANCE DEPOT

In 1920, at the end of World War I, the United States Army constructed an arsenal in Ogden as an ammunition depot to store much of the permanent reserve of the Ordnance Department. While the Arsenal soon reverted to an inactive caretaker status, it came to be regarded as a key center of Army supply in the West. Thus, in the buildup of national defense that followed the outbreak of World War II in Europe, the War Department determined to expand the facilities of the Ogden Arsenal. Army investigators found, however, that the possibilities of enlarging the site were severely limited — by the Wasatch Mountains on the east, Great Salt Lake on the west, the city of Ogden on the north, and Salt Lake City on the south. Within this rectangle the Arsenal "was immediately hemmed in by a neighboring airfield, main trunk highways, and fertile farm and orchard lands." The Army's alternative, in the months of feverish expansion after the attack on Pearl Harbor, was "to carry out the long-planned expansion of Ogden" by acquiring a tract of about 25,000 uninhabited acres near the town of Tooele.[2]

[2] Harry C. Thomson and Lida Mayo, *The Ordnance Department: Procurement and Supply, United States Army in World War II* (Washington, 1960), 375–76. The Ogden Arsenal remained throughout World War II one of the largest Army "retail" depots in the West, with a peak employment of more than 6,000 in 1943. In 1954, the Arsenal, which had become known as the Ogden Ordnance Depot, was consoli-

Army records list several reasons for the location of an Army ordnance depot at Tooele.[3] Tooele's inland location gave it an advantage over such well-established installations as Benicia Arsenal, near San Francisco, which was not further enlarged because of its vulnerability to attack by sea and air. Far away from the West Coast, nestled in a narrow valley between the Stansbury and Onaqui mountains on the west and the Oquirrh Range to the east, Tooele was an ideally defensible site. Moreover, the sandy loam upon which the Depot was to rest was formed geologically in such a way that the soil absorbed shocks — a necessary feature in case of accidental detonation or bombing.[4] Located on the edge of the Great Salt Lake Desert, Tooele also possessed a dry climate, lessening the danger of rust and corrosion to ammunition, artillery pieces, and vehicles in storage. The mean annual precipitation at Tooele is only 8 inches and the relative humidity is generally under 30 per cent, where 40 per cent is considered the maximum for safe storage of ordnance materials.[5]

The land on which the Depot was located lay 4 miles south of the town of Tooele, and was obtained in the spring of 1942 by the United States government acting through the district engineer, at a total cost of $94,221. Of the 24,728 acres designated for the Ordnance Depot, 8,153 acres belonged to the State of Utah. Other lesser owners included Peter and Howard J. Clegg and William H. Bryan, of Tooele; George E. and Edna P. England, of Salt Lake City; and the Grantsville Soil Conservation District.[6] Used primarily for grazing sheep, and in one portion for growing crops, the site was constantly harassed by sand and dust storms. Indeed, "oldtimers" declared that on one day all the topsoil would blow north, and on the next day was all blown back. Even the sagebrush and scrub cedars did not prevent frequent shifting of the land.

By March 23, 1942, Major George A. Howarth, the area engineer and a former Tooele resident, had moved into a small temporary office about one-

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dated with the Tooele Ordnance Depot, and the land was assigned to nearby Hill Air Force Base, *ibid.*, 353, 362, 373, 379–81, 387–91, 461. Also, Constance M. Green, Harry C. Thomson, and Peter C. Roots, *The Ordnance Department: Planning Munitions for War, United States Army in World War II* (Washington, 1955), 38, 60–64.

[3] Mr. Marshall A. Grode, public information officer, Tooele Ordnance Depot, has Historical Reference Files, in which are found some of the quarterly historical reports for the period before 1945, and statements of the mission and accomplishments of the Depot. Mrs. Karma C. Woodward, the base historian, has an Historical Data File with a summary of the Depot accomplishments during World War II; a folder entitled "Depot History, from March 23, 1942 to September 2, 1945" (hereafter referred to as Folder 42–45); and "Tooele Ordnance Depot, Tooele, Utah: Historical Summary for 2 September 1945 to 1 July 1951." The latter is a compilation of historical summaries furnished by each of the divisions at the Depot. Also valuable are the quarterly and semiannual historical reports, which are reasonably complete since 1951. Unless otherwise noted, the writers have based this article on the quarterly and semiannual historical reports and summaries.

[4] "From 1942 to 1947" (Folder 42–45).

[5] "Background of Tooele Ordnance Depot" ([Tooele], n.p., April 19, 1959).

[6] "History of Tooele Ordnance Depot, October 16, 1942," signed by Major E. R. Lower (Folder 42–45). "Tooele Ordnance Depot, Assets as of 31 December 1960," furnished by Mrs. Woodward. "Miscellaneous Record Book E," 311–13, 387–88, 423–29, and "Record Book 3Z," 369–70, 375–80, 412, 492 (County Recorder, Tooele).

fourth mile from the Tooele-Grantsville road. On April 2, he was joined by the first commanding officer, Major Edgar R. Lower, who had been civilian chief clerk of Savanna Ordnance Depot Proving Grounds, Illinois. Within 6 months most of the key personnel, including senior clerks, chief of the mail and records section, fiscal officer, utilities officer, post signal officer, property officer, plant security officer, and executive officer, had arrived. The first officer of the day received his assignment on September 16, 1942, and the base may be said to have commenced its activities on that date. Supplies began to arrive in anticipation of the completion of construction.

Construction in this Sahara of the West was no minor problem. The job was too big for one contractor. Four contractors, Peter Kiewit Sons, of Omaha; Morrison-Knudsen, of Boise; Ford J. Twaits, of Los Angeles; and Griffith Company, of Los Angeles, formed a corporation called Inter-Mountain Contractors and won the prime contract for $26,724,598. As soon as they broke ground in June of 1942, the sand seemed to emerge from the earth like Moses' plague of flies. Dust became so dense that the contractors were forced to shut down operations for several days to prevent head-on collisions, though construction equipment had been operated at midday with all lights burning. At one stage in the construction, a wind of over 80 miles per hour blew 32,000 square feet of roofing from the utility area. Despite these difficulties and war-created shortages of manpower and materials, the contract was completed by January, 1943.[7]

By the end of World War II, the Depot had 902 igloos, including almost 100 which were constructed of reinforced concrete and covered with 2 feet of earth and gravel, for storing high explosives; 12 above-ground magazines for the storage of small arms ammunition; 31 warehouses, each with a capacity ranging from 200 to 500 carloads; a $1 million tank repair shop; and artillery and automotive equipment repair shops. The buildings enclosed 112 acres of floor space, and the storage section covered an area of 8 square miles, divided into 8 blocks 1 square mile each. The administrative area included a hospital, prisoner-of-war camp, 29 barracks for troops, and a 1,080-unit Lanham Housing Project (TOD Park) with a shopping center, post office, and elementary school. All told, the Depot included approximately 60 miles of railroad, 130 miles of road, 30 miles of boundary fence, and 25 miles of protective fence inside the reservation. Construction required almost 300,000 cubic yards of concrete and 40 million board feet of lumber.[8]

[7] The contract called for 2,350,000 square feet of warehouse space, 1,600,000 square feet of storage igloos, 124,000 square feet of storage magazines, and 4,500,000 square feet of gravel-surfaced, open-air storage space.

[8] Letter from Major Myron R. Gillette to Commanding Officer, Baltimore Sub-Office, 2 February 1945, in Historical Reference Files — T.O.D. Missions, Dec. 1942–July 1944, Mr. Grode. Also O. N. Malmquist, "More than $52,000,000 spent on Tooele County War Plants," *The Salt Lake Tribune, The Magazine,* July 11, 1943, p. 4.

During the construction of the Ordnance Depot, the Defense Department also ordered the construction of a storage depot for Chemical Corps toxics on 19,364 acres of land 20 miles south of Tooele in Rush Valley. Named Deseret Chemical Warfare Depot, the storage facility included 140 igloos, 2 magazines, 7 warehouses, 32 toxic sheds, and several transitory storage shelters. Total area of the Tooele and Deseret depots was 44,092 acres.[9]

## The Mission of Tooele Ordnance Depot

In the middle of the construction activity, on December 8, 1942, the Army assigned Tooele Ordnance Depot its first mission, which was to store vehicles, small arms, and fire control equipment for export; and overhaul and modify tanks and track vehicles and their armaments. In general the order designated Tooele as a back-up depot for the Stockton Ordnance Depot and Benicia Arsenal, both in California.[10] Later, in July, 1943, Tooele was designated as a reserve storage depot for tank and combat vehicle tools and equipment. Still later, in November, 1943, TOD became the supply center for materiel required by the Ogden Arsenal.[11] Service to the Ogden Arsenal was improved by the establishment of a round-robin shuttle service featuring the use of huge ten-ton trailer vans. As a "wholesale," rather than "retail," depot, TOD was expected to make up the bulk of its shipments in carload lots. Millions of board feet of lumber

[9] "Background of Tooele Ordnance Depot."

[10] "Mission: Tooele Ordnance Depot," in Historical Reference File — T.O.D. Missions . . . , Mr. Grode. The Army maintained the following types of ordnance storage facilities during World War II: ammunition depots, ordnance general supply depots, back-up storage, Army general depots, war aid depots, holding and reconsignment points, and motor bases. The Tooele Ordnance Depot was originally established as an ammunition depot, Thomson and Mayo, *The Ordnance Department,* 384.

[11] As with much of our military terminology, materiel is a French term denoting "the aggregate of things used in carrying on the business."

*Storage igloo under construction.*

were required for dunnaging, crating, and maintaining the thousands of military items shipped overseas and elsewhere from Tooele.[12]

To complete the mission of rebuilding the vehicles and artillery pieces, the Defense Department ordered Major Lower to establish a maintenance shop. As Major General Levin H. Campbell said on a tour of inspection: "Its strategic position . . . is such that if untoward events should occur on the Pacific Coast, the depot with its Maintenance setup will be invaluable to the operation of our Forces." [13] The repair phase of Depot activity was progressively intensified as TOD was ordered to completely rebuild and overhaul half-tracks, medium tanks, and light tanks — a task which the Depot was often able to accomplish in less than a day. In addition to combat vehicles for the troops, TOD was often asked to prepare tanks and other vehicles for mock battles in connection with War Loan drives and military celebrations in the West.

The Ordnance Department also authorized TOD to rebuild, modify, and reclaim 75 mm. howitzer motor carriages, and artillery pieces including antiaircraft artillery up to 155 mm. Between May and September, 1944, for example, the Maintenance Section overhauled 325 light tanks and fifty 75 mm. howitzer carriages. The Depot later expanded its functions to include the repair of optical instruments (telescopes, height finders, aiming circles, and binoculars) and the reclamation and salvage of useless or obsolete weapons, ammunition, and vehicles.

The assignment of new functions and the consequent expansion of the work force required additional construction. The main entrance and underpass were completed and dedicated on July 14, 1943. New structures included a $110,000 base hospital, a 100,000 gallon water tank, and a coal yard. By the end of the war, an average of more than $800,000 per year was being spent on the repair of buildings.[14]

New responsibilities necessitated the training of new workmen, nearly all of whom were recruited locally, and the reorganization of departments. Nevertheless, even at this early stage, the installation became noted for efficient and economical operation — a factor which led to the assignment of additional responsibilities and eventually to the position of major ordnance supply center in the West.

## Depot Activities During World War II

After the Normandy invasion and the raid on Japan, in June, 1944, Depot personnel regularly broke records in attempting to keep supplies rolling to the

[12] Dunnage is loose material, mostly lumber, laid among articles in shipping to prevent damage.

[13] "Second Quarterly Historical Report — 1943," Historical Reference Files, Mr. Grode.

[14] "Tooele Ordnance Depot" (Folder 42–45).

troops. In a 5-day period in July, some 141 carloads of materiel were shipped from Tooele. By December, the speed in handling materials was over 4 times as great as it had been in the previous year. Only 23 cars stood in the railroad yards longer than 3 days. By September, 1944, the commanding officer announced that TOD would be required to handle some 85,000 tons of materiel per month, as against the 12,000 tons which it had averaged in previous months. This was nearly achieved when 807 carloads of materiel, with an average of 80,000 pounds per carload, came into the Depot the following month. By June, 1945, the Depot was receiving more than 110,000 tons and shipping almost 2,700 tons per month, for a total of more than 112,700 tons.

Although there were difficulties in obtaining parts and equipment, "Yankee ingenuity" solved many problems. The hoists which the Combat Maintenance Section needed for lifting heavy subassemblies were not available, so the section solved the problem by constructing their own. The Motor Transport Section designed a special gauge to test the adjustment on electric brakes and a trailer for transporting electric forklifts in the ammunition area.[15] One employee in Field Service Maintenance, Merrill Johnson, designed a modification of the carriage of a 90 mm. gun, permitting a reduction in the over-all installation time for the carriages from 440 man-hours to 225. A work-simplification survey saved 150,000 man-hours by designing more efficient ways to do particular jobs.

Since not all ammunition, vehicles, and guns could be repaired, the Depot sought the most efficient and economical methods of salvaging obsolete and worn-out materiel. In June, 1943, a furnace was built for popping small arms primers, and this was replaced early in 1944 with a new popping furnace. During the first 3 months of 1944, almost 3,000 tons of small arms brass were demilitarized and made available for salvage. Unfortunately, old brass was not much in demand at the time, and a new storage area had to be constructed. Nevertheless, in the spring of 1944, TOD sold to United States Smelting, Refining, and Mining Company 1,100 tons of surplus tank hulls. Prisoners-of-war were detailed to use acetylene torches to cut the armor plate to prescribed sizes. Eventually, local outlets for both ferrous and nonferrous metals were found. Another major by-product of the salvage operations was wood from the crates and dunnage.

Some of the scrap and salvage was more valuable to the Armed Forces than the income from its sale to TOD. Solder, an item most difficult to obtain during this stage of the war, was used in the manufacture of ammunition box liners. Thus, TOD's Reclamation Branch developed a furnace to melt the solder from

[15] "History of the Tooele Ordnance Depot, April 1, 1943–July 1, 1943," Historical Reference Files, Mr. Grode.

the liners, collect it, and make it available for use. The Depot required that, where feasible, all liners be returned for salvage operations. In addition some ammunition brass was processed, resized, and returned for reloading.

All of the brass did not find its way back to the arms factory, and some of it served a dual purpose. A special shipment of brass was loaded, sent to the Pacific front, fired at the Japanese, returned to Tooele, reclaimed, and sent out again for further use. On October 2, 1944, the officers who sat down to dinner at the officers' club at the Depot were surprised to find near their plates a small card with a metal object attached. These objects, they learned, were pennies which had been minted at San Francisco and Denver with a special shipment of brass from Tooele fired at the enemy in the Pacific.

Throughout the war the necessity of high production and shortage of skilled manpower made it imperative that the administration concern itself with employee morale. The shortage of housing was a constant irritant, as was the lack of transportation and recreational facilities. Inter- and intra-plant bus service was introduced, and when the 30 buses were shipped overseas, makeshift buses were made from semi-trailers. Some of the problems were solved by the TOD Employees Benefit Club, which was organized shortly after the installation opened. Through this club, car pools were organized, meal books were sold, and cash loans were made to the employees. The importance of the Depot's work was brought vividly to the attention of the employees when local theaters showed without charge a series of movies entitled "Why We Fight." This, together with the War Loan drives and awards of ribbons and cash for meritorious service and suggestions, effectively maintained morale. By June, 1944, the Depot reported 100 per cent participation in the Payroll Savings Plan, with an average deduction of more than 16 per cent.

A Civil Service directive which prohibited direct recruitment (in order to avoid competitive bidding for skilled labor) made TOD's problem even more complex, for unlike private industry the enterprise was forced to rely on an outside agency (Civil Service Commission) to supply its personnel. In the spring of 1943, this prohibition was temporarily lifted, and the Depot was able to recruit 60 ungraded workers from New Mexico. This proved to be only a temporary solution because of the unusually high turnover of these workers.

Practically all departments experienced manpower shortages during 1943. The Ammunition Section hired women, although no restrooms had been provided for women and the shortage of transportation facilities was an added inconvenience. Eventually, women were hired to drive most of the buses and taxis; even today women drive all the taxis at TOD.

### Solving the Manpower Shortage

In an attempt to correct the shortage of workers in materiel-producing jobs, Washington ordered cuts in administrative personnel, and the Depot sought to hire teachers and students during summer vacations. These measures never really solved the problem, and many shipments were behind schedule. In the fall of 1943, the Depot hired high school students on Saturdays and weekdays from 4 to 8 P.M., to help repair vehicles and crate material for shipment. Early in 1944, the federal manpower authority again granted permission to hire personnel in New Mexico, additional women were hired, and the Depot instituted a comprehensive training program to upgrade the work force. Hundreds of checkers, stenographers, drivers, forklift operators, mechanics, and supervisors learned their jobs through this training.

Also, early in 1944, German (and later Italian) prisoners-of-war were assigned to the Depot. They cut wood and metal for salvage, cleaned and stacked dunnage, worked on vehicle repair and maintenance, drove trucks, and took care of the lawns. While the productivity of the POWs was low because of the lack of incentive, a number of them possessed job specialties which were particularly useful, as for instance the expert typewriter repairman who serviced all Depot typewriters. The prisoners required close supervision and were subject to the rules of the Geneva Convention, which forbade certain types of labor, but humane treatment resulted in satisfactory work output and few complaints. The prisoners were guarded by the Security and Safety sections, which also patrolled and guarded the Depot fences and checked all persons entering and leaving. Besides an M-3 tank, a reconnaissance car, scout car, jeep, and foot guards, the K-9 Corps was used for a short time, but later abandoned because it was difficult to train personnel to work with the dogs.

Probably the most successful recruitment program was among Japanese-Americans. Torn from their West Coast homes and placed in tarpaper-covered barracks in 10 "war relocation centers" in Utah and 6 other states, these industrious "second-class citizens" were permitted to relocate in Tooele and other centers of war production activity. Most of those at Tooele were recruited from the Gila and Colorado River Relocation centers in Arizona and the Heart Mountain Relocation Center in Wyoming. To insure a friendly reception, members of the Personnel Section, together with prominent citizens from Salt Lake City and Tooele, explained to the public the need for their contribution to the war effort. It appears that they were well-integrated into the community, and citizens of Tooele still tell of the diligence and industry of these Americans. By the end of 1944, 300 new families had been added to the original 80, and many of them remained after the war and still live in Tooele.

Data on employment during this early period are difficult to find; they are not available at the Depot for the years before 1945. In March, 1945, there were employed 1,823 civilians; 1,946 American military personnel; 981 prisoners-of-war, of whom 883 could work; and 199 soldiers of an Italian Service Unit, for a total of 4,949 persons. According to other figures, the total number employed at TOD during the war varied from a low of 2,695 (1,400 civilians, 295 servicemen, and 1,000 prisoners-of-war), to a high of 4,856 (2,000 civilians, 1,500 servicemen, and 1,356 prisoners-of-war).[16] Because of this and other defense employment in the area, the population of the city of Tooele rose from 5,000 in 1940 to an estimated 14,000 in 1945.

TABLE 2

CIVILIAN EMPLOYMENT AND EARNINGS AND LOCAL EXPENDITURES OF TOOELE ORDNANCE DEPOT, 1942–1962

(Source: Compiled from historical and financial data furnished by Tooele Ordnance Depot. Employment and payroll do not include military personnel or prisoners-of-war.)

| *Year* | *Average Employment* | *Average Annual Payroll* | *Purchases of Local Goods and Services* |
|---|---|---|---|
| 1942–1944 | 1,400–2,000* | n.a. | n.a. |
| 1945 | 1,719 | n.a. | n.a. |
| 1946 | 1,000* | n.a. | n.a. |
| 1949 | 1,565* | $ 4,296,864* | n.a. |
| 1950 | 2,250* | 6,898,500* | $ 2,083,525 |
| 1951 | 5,000* | 15,746,640* | 2,800,000* |
| 1952 | 4,950 | 16,948,800* | 2,602,621 |
| 1953 | 4,253 | 15,034,355* | 1,528,060 |
| 1954 | 3,096 | 12,339,964 | 1,435,646 |
| 1955 | 2,849 | 12,281,345 | 1,323,240 |
| 1956 | 2,526 | 11,131,369 | n.a. |
| 1957 | 2,412* | 10,863,713 | n.a. |
| 1958 | 2,297 | 11,933,091 | 1,582,000 |
| 1959 | 2,249 | 12,215,894 | 2,060,000 |
| 1960 | 2,148 | 11,546,312 | 1,777,034 |
| 1961 | 2,800* | 15,000,000* | 4,000,000* |
| 1962 | 3,200* | 18,000,000* | 12,000,000* |

* Estimates

n.a. = not available

In addition to the Ordnance Corps, other military units assigned to the Depot included the Corps of Engineers, which was allocated space in a warehouse for an engineer redistribution center; the Air Force, which used TOD as a

[16] *Deseret News* (Salt Lake City), December 14, 1946; "Background of Tooele Ordnance Depot"; "Tooele Ordnance Depot" (Folder 42–45).

site for training ammunition companies; and the Signal Corps, which had the responsibility of providing communications to the base. One necessary action of the latter was the attachment of a recording device to the telephone system to monitor all outgoing calls. Employees thought twice before calling their wives and girl friends when they knew the message was being recorded.[17]

Various physical difficulties were encountered at the base. In August, 1943, a severe storm flooded the railroad tracks, rendering them impassable for 36 hours, and submerged the floors of 42 igloos. (Culverts were installed under the railroad tracks to prevent such accidents in the future.) Not until personnel at Utah State University anchored down the soil by planting drouth-resistant grasses did the area cease to be troubled by sand and dust storms and shifting of the soil. Soil-building and soil-conserving activities of the Depot included the "planting" of 500 pheasants, and many antelope, deer, and buffalo. By June, 1945, a 15-ton crop of alfalfa was harvested on the formerly barren sand dunes.

As the war pushed on toward completion, TOD processed ever-greater amounts of goods for distribution to the Armed Forces. During 1943, it received and shipped 2,794 carloads of ammunition; 4,268 carloads were handled in 1944; and in 1945, 7,743 carloads had been processed by August. All told, during World War II, TOD received and shipped 40,946 carloads of ammunition supplies and salvage items, including 8,362 carloads for other agencies; and 548 less-than-carload lots. More than 1,625,000 tons of materiel were shipped and received by TOD during World War II.

[17] *Ibid.*

*Tank rebuilding area.*

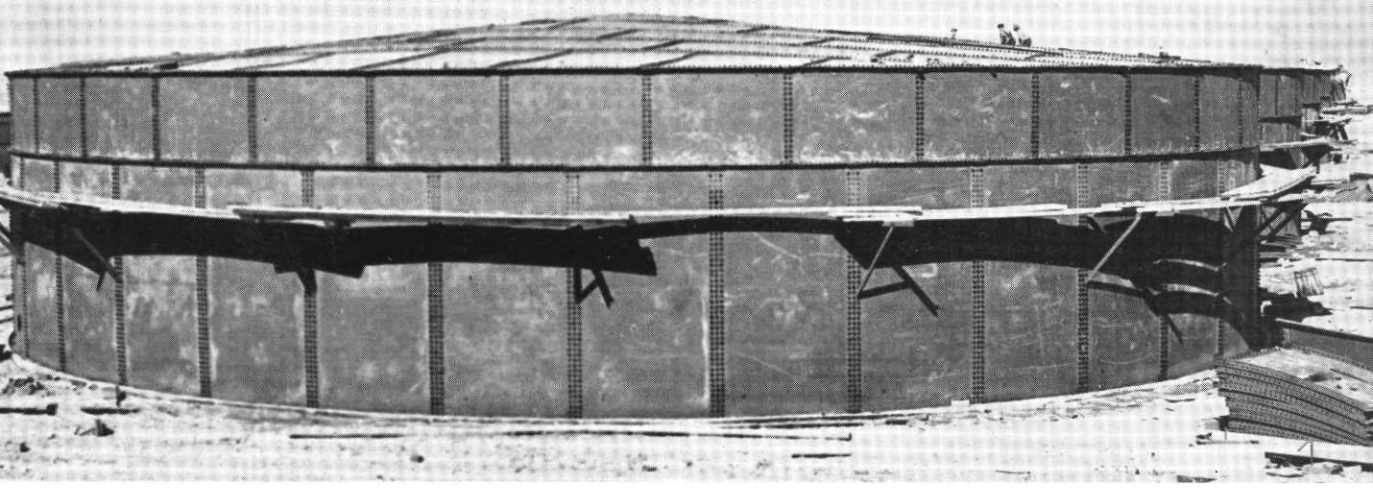
In addition the Depot overhauled 997 major auto vehicles, 1,347 major artillery pieces, and salvaged 896 tanks. Within a period of less than 3 years, the proceeds from the brass salvage of the Depot totaled almost $10 million. Since the goods sold as war surplus brought prices averaging less than 10 per cent of their original cost, the size of the operation is readily appreciated.[18]

## The Interwar Period

After victory in Europe was achieved in June, 1945, the amount of materiel processed by the Depot increased because the "big push" to achieve victory in the Pacific Area was more closely related to TOD's functions. When the war with Japan was concluded 2 months later, however, a letdown occurred; everyone wanted to leave his defense job. The war was "won"; there was a universal desire to get the boys home and return to normal.

After World War II, TOD received the assignment, for both the Western United States and the Pacific Theatre, of returning war materiel either to stock or to surplus disposal. Between May 1 and August 31, 1946, TOD processed 4,676 tons of returned materiel, of which only 868 tons were returned to supply channels. During the war the most efficient day of operations had seen 89 carloads received and shipped, but on the single day of September 13, 1945, 107 carloads of materiel were handled. While the receipt of returned materiel rose 20 per cent, the market for salvage was flooded. TOD found it necessary to stockpile supplies for which it had no storage facilities. Sprinkling systems were installed in the warehouses to control fires; workers removed ramps from store-

[18] "Depot Accomplishments, 25 August 1945," Historical Data File, Mrs. Woodward.



*Above, the storage "silo" completed and filled with dry nitrogen gas.*
*Left, tanks being prepared for storage in portable gasoline "silo."*

houses to open more space; and there were many suggestions from employees having to do with solving the space problem.[19]

Because the storage facilities were inadequate for the Herculean task, contractors built new storage sites. In November of 1947, they constructed a storage area called the Tank Farm, consisting of 125 portable gasoline tanks with 38-foot and 55-foot diameters. After the tanks were constructed, "the most unique and extraordinary canning project in the country" began. When filled with dry nitrogen gas, the tanks could be used for storing anything from a high-speed tractor to a heavy tank.[20] Another method of storage was called the Strippable Film Project. A web of cellulose tape enclosed the object, and it was sprayed with a plastic material to complete the covering. Into these types of long-term storage the Depot placed 256 gun tractors, 159 tanks, 35 armored cars, and 44 trailers.

Another activity in the first years after the war was the disposal of certain obsolete and unusable buildings. With the removal of the troops, the tent area and recreation buildings were deactivated; the Army took over the TOD Park housing project; and a number of excess buildings were sold or demolished. The 29 prisoner-of-war barracks were sold as war surplus.

During 1946 and 1947, as receipts of salvageable surplus materiel mounted, the administration ordered all small arms and artillery brass sold by negotiated sale. Late in 1945, for example, the Depot was able to negotiate the sale of some 5 million pounds of nonferrous scrap to the International Smelting and Refining Company. The sale price of $330,000 was about one-half of what the scrap would have brought during World War II. In December, 1945, alone, sales of scrap, small arms brass, and boxes totaled $44,262. By 1949, the Salvage Department had reduced the backlog of surplus materiel to the point that operations could be consolidated and restricted to a smaller area. The site of the old pris-

[19] "Historical Summary, 1945–51." Unless otherwise noted, the ensuing information is from this summary or from the quarterly and semiannual historical reports and summaries.

[20] *Deseret News,* December 14, 1946.

oner-of-war compound, with its double-wire enclosure, made an ideal location for this activity.

The enormous amounts of materiel and lack of storage space made it imperative that the unserviceable ammunition be destroyed as quickly as possible. Complaints at the rapid-fire detonations came in thick and heavy from irate citizens of Grantsville and Tooele. Considerately, the Depot moved these operations to Dugway Proving Grounds and Wendover Air Force Base, on the western boundary of Utah, where as much as 150 tons of ammunition were exploded at one time without complaint. The cases of exploded brass were scooped together by a bulldozer and melted down in a furnace. Workmen loaded the residue of different metals on railroad cars for shipment to the smelters until the demand of the latter was saturated. By 1950, TOD had completed the segregation of the ammunition into serviceable and unserviceable ammunition, and 40,000 tons of small arms ammunition were demilitarized.

The costs of storage caused the Depot administration to give more emphasis to the demilitarization of property than to obtaining the maximum from its sale. Thus, there was a contrast between the careful demilitarization of a 20-pound cluster fragmentation bomb and that of a motor gun carriage M-10. From the bombs, employees educted 250,000 tons of TNT, dried it, and packed it for future use. The "new method" of demilitarizing the gun carriages, on the other hand, sounded like something out of a frogman novel: "One mine is placed at each corner inside the chassis; one against the turret and one against the transmission. Simultaneous detonation results in the complete and satisfactory demilitarization of these vehicles." [21] Fortunately, as backlogs were reduced more financially remunerative methods of demilitarization were developed.

With so many items going into storage and being sold, reconditioning and shipping operations were at a high peak. In 1946, more than 44,000 tons of materiel left the Depot, and more than 2,000 came in; during 1947, TOD received 46,962 tons and shipped 30,225 tons. TOD's fully equipped machine shop for the reconditioning of subassemblies such as transmissions and motors included conveyor lines, an air-conditioned paint shop, and a degreasing unit. The Deseret Chemical area also had ammunition reconditioning facilities. Improvements in the shops and facilities included a device to remove the platform from a 90 mm. gun by one man in 6½ minutes, whereas it had originally taken two men 19 minutes to do the job. The Depot also installed a portable machine for testing front axles of 40 mm. guns.

These devices helped alleviate the employee shortage caused by the letdown after V-J Day, but the repatriation of the POWs in 1946 and the mustering out

[21] "Historical Summary, 1945–51," p. 6.

*TOD employees removing dry weeds and grass from bomb storage area.*

of the soldiers more than offset any advantage which might have been given by reorganization and development of better equipment. Since many of the mill and smelter workers in the area were on strike, they could be used, but when the strike was settled in July, 1946, the labor shortage became more acute. By August, the Depot had found it necessary to employ 51 Mexican nationals during a 30-day lull between the tomato and sugar beet crops. Unsuccessful attempts were also made to get the Department of Agriculture to approve the release of 50 more.

When the immediate postwar missions of storage and salvage had been largely completed, the Depot reduced its work force. Reductions of 225 persons in 1947 and another 400 persons in 1949 were largely accomplished by simply not replacing those who resigned. These contractions left many of the apartments in the war-spawned TOD Park vacant. By June, 1948, when the Department of the Army took control of the facilities from the Federal Public Housing Administration, only 580 of the original 1,080 units were available for occupancy. The Army replaced the wartime plumbing fixtures with standard fixtures and

instituted a regular cleanup garbage service and vermin and rodent control. By 1951, of the more than 4,000 families which had lived in TOD Park, only 70 had lived there for 5 or more years.

## The Korean War

On June 25, 1950, communist North Korean troops poured over the 38th parallel into South Korea. While the subsequent American involvement in the war did not alter TOD's formal mission, it changed the major emphasis. Whereas the major mission had been storage and salvage, the items in storage were now uncrated and shipped to the West Coast or to other depots.

Perhaps the most easily appreciated measure of the increased activity during the Korean War was the increase in personnel. In July and August of 1950, there were 1,147 new employees hired at the base, and the influx of personnel during 1951 required the opening of the civilian barracks until, by mid-1951, 335 men lived in 7 barracks. More than 200 of these were Navajo Indians from New Mexico and Arizona. Most of these did not speak English, and often their only contact with the community was through a social worker. Unlike the Japanese-Americans during World War II, the Navajos did not adjust to their new environment rapidly. Many were unused to living in houses with plumbing facilities, and their quarters often suffered from lack of care.

As during World War II, labor shortages once more appeared. Whereas only 1,565 employees passed through the gates each morning in the first quarter of 1950, by the end of 1951 more than 5,000 were employed. The highest employment in Depot history came in January, 1953, when 5,359 civilians worked at TOD. Once more, as in World War II, training programs were instituted. Contracts were signed with the University of Utah, Utah State University, Weber College, Montana State, and Idaho State to train TOD personnel, and interested employees could attend classes ranging from typing to Spanish.

Because of the rapidly expanding labor force, the housing shortage once more became critical. By June, 1952, there were 142 families on the TOD Park waiting list, and if there had been any hope of getting a unit many more would have applied. Some of the employees who had come to Tooele with little or no money or furniture were forced to live in tents or shacks without proper sanitation facilities. When city or county officials took steps to close the hovels in which they lived, the employees and their families had no place to turn. While some houses were "available," they were not occupied because employees lacked the down payment. Builders were afraid to build rental units because of the ephemeral nature of the defense industry. Even in TOD Park, 47 buildings lay vacant because no money was available to renovate them.[22]

[22] "Seams Burst in Little Boom Towns [Part II, Tooele, Utah]," *Business Week*, October 13, 1951, p. 74.

At the height of the Korean War, the rebuilding of major items exceeded the total production for all of the second World War. During 1952, 2,691 artillery pieces were rebuilt compared with 1,347 during World War II; and 4,178 combat and transport vehicles were rebuilt, compared with 1,893 in 1942–45. Production of secondary items was also significant. In 1952, the Secondary Item Repair Shop completed rebuilding of 4,380 engines and 843 transmissions, along with other subassemblies.[23]

TOD's mission had changed from primarily a storage depot to a manufacturing enterprise devoted to producing, rebuilding, and repairing machines of war. Nevertheless, shipping and storing were still important functions. In 1952, TOD received 19,193 tons of ammunition, demilitarized 10,209 tons, and shipped 38,363 tons. When the tanks and guns in the Tank Farm were released for shipment they were found to be in excellent condition. Unfortunately, the small arms ammunition which the Depot had stored outside did not fare as well. The severe winters and sweltering sun had removed the markings from many of the cases, thus complicating the problem of stock control. The tracer ammunition had also suffered deterioration.

Clearing these items from the 63 miles of railroad tracks and shipping them to the front lines required a great amount of rolling stock, the value of which in 1952, was $556,000. This included 3 diesel electric engines, 13 flatcars, 14 boxcars, and 2 tank cars. During the second half of 1952, the Depot yards received 36,030 tons of materiel by rail and shipped 41,263 tons. Just as before, disposal of surplus and obsolete materiel went on. During the first half of 1952, 2,500 tons of scrap were sold for $107,365, and $6,339 worth of old crates and dunnage was sold.

The Depot's stimulus to the local economy is noteworthy, particularly after February, 1950, when TOD began to do its own purchasing of local materials. From February to December, 1950, the Depot purchased $2,083,525 worth of goods and services from local merchants. At first a pickup truck was sent to Salt Lake City to make daily purchases; later, in 1951, a purchasing office with two full-time buyers opened in the city. In the first 6 months of 1951, $1,796,020 worth of supplies was purchased in local markets, and for 1952, the figure was $2,602,621. These purchases, made for reasons of good economics, served also to foster community good will. Purchases of supplies and services on the local market have varied between $1 million and $2 million in the years since 1953.

Although the Tooele facility had originally been designed for temporary service of 5 years, the Korean War and the realities of the Cold War made it necessary to put the older buildings in a better state of repair. Warehouses in the combat storage area were made "permanent" by the addition of asbestos shingles

[23] Totals computed from semiannual historical summaries for 1952.

and siding. In the second half of 1952, more than $572,000 was expended on Depot maintenance and improvement.

### Since the Korean War

When the Korean War ended in 1953, the United States was committed to a policy of containing communism. While there were cutbacks in the labor force as the intensity of the war effort subsided, it was clear that the enterprise would not be completely abandoned. During the period of cutback — the Depot had 1,027 fewer employees in June, 1953, than in the preceding January — the Salt Lake employment area registered a labor surplus and workers felt a measure of insecurity. During 1954, the number of employees dropped from 3,482 in January to 3,129 in June and to 2,675 by the end of the year. Even though the employee strength had risen to 3,140 by June, 1955, most of the increase came because of the assimilation in 1955 of the functions of Ogden Arsenal and the combining of the Deseret Chemical Warfare Depot into TOD. (Deseret Chemical was redesignated Deseret Depot Activity.) By December, 1955, the force had again been cut to 2,732, even with the new functions. An important activity of the Depot was the sponsoring of seminars in installation skills. Later in 1958, a center for the summer training of ordnance reserve units was opened and Tooele became an official U.S. Army Ordnance Training Center. Several hundred reservists from many units in the East went to Tooele each summer to work on production lines in on-the-job training programs.

Simultaneous with reductions in staff TOD instituted "Operation Drano" to eliminate excess stocks. Usable materiel was placed in dehumidified storage tanks equipped with doors which could be opened without destroying the doors.

Despite the emphasis on storage, the production of rebuilt items continued. As examples of this activity, the Secondary Item Section completed 219 engines in March, 1953; 483 radio harnesses and 575 radios were rebuilt in the second half of 1954; and there was a continuous output of reconditioned artillery weapons, combat vehicles, and transport vehicles. In 1955, the Depot turned out 38 heavy artillery pieces, 160 ground weapons, and 506 vehicles, while 665 combat vehicles were prepared for service in 1957.[24]

During the Korean War the Tooele installation had made conscientious efforts to introduce concepts and techniques of scientific management and industrial engineering. Cost and performance standards were set up, and a regular management analysis of Depot activities was instituted. One tangible result of this concern was the development in 1957 of IROAN — "Inspect, Repair Only

[24] Computed from semiannual historical summaries for 1955, and the "Second Semiannual Historical Summary, 1956."


TOOELE ORDNANCE DEPOT
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As Necessary." Whereas before, the complete disassembly and physical inspection had destroyed many components which might have been reused, a pre-shop inspection and function testing of the vehicles showed which parts needed repair. These tests were followed by repair, inspection, and painting. In a typical 3-month period under the "old" system the Combined Maintenance Division had reconditioned 123 jeeps at a unit cost of $1,179. Using the IROAN method the division was able to process during a similar period 720 jeeps at a unit cost of $765. More than 3,000 jeeps were rebuilt under this arrangement during the first half of 1959. The division used the IROAN method on 169 M-47 tanks during the first half of 1958, and where the unit cost had been $14,233 under the old method, it was reduced to $8,133 with IROAN.

These cost-reducing techniques not only enabled TOD to obtain additional assignments and missions, leading to a permanent expansion in its activities, but the TOD-developed IROAN was officially adopted by the Ordnance Corps nationally, and scores of officials from various installations throughout the country were sent to Tooele to learn the process for use elsewhere.

Other activities at TOD during the years after the Korean War have included the receipt and shipment of ammunition and the destruction of obsolete bombs and ammunition. During the last half of 1954, employees destroyed 80,484 rounds of 57 mm. shells, 190,426 rounds of 75 mm. projectiles, 24,350 rounds of 75 mm. high explosive shells, 6,355 of the 100-pound cluster fragmentation bombs, 515 of the 500-pound cluster bombs, and 85,827 rounds of 37 mm. shot. From these operations 1,260 tons of brass, 15 tons of lead-antimony, and many tons of iron and steel were recovered.

All of this was done with virtually no loss of life. Indeed, the first fatal accident in Depot history occurred in September, 1953, during the feverish post-Korea activity. An operator of a 76 mm. ammunition gauging machine did not notice that one round was already in the gauge. When he attempted to insert a second round the nose of the second hit the primer of the first and the resulting explosion killed 2 operators, injured 15 workers, and precipitated a 3-week shutdown. Because of its excellent safety record over the years, considering the danger involved in its operations, TOD has received the Department of Army Award of Merit, the Certificate of Merit for Safety of the Ordnance Department, and the Federal Safety Council Award of Merit.

Sales of scrap continued to return money to the Depot to help pay for its salvage operations. In the first half of 1954, 9,400 tons of scrap were sold for $372,704; wood sales totaled $21,426; and the value of materiel disposal was $693,184, for a total of more than $1 million. The sale of salvage has averaged between $1,800,000 and $2 million during the years since the end of the Korean conflict.

During the post-Korean period TOD began a new operation which is one of the most interesting and creative on the Depot today. Late in 1954, the Defense Department established at TOD the Office of the Ordnance Ammunition Command, National Field Service. The mission of this division was enlarged in 1956 to include the design, standardization, and manufacture of all ammunition equipment for the entire United States ordnance system. This included designing equipment to maintain, renovate, modify, and demilitarize all types of ammunition. In 1959, this Field Service was redesignated the Ammunition Equipment Division and made a permanent part of TOD. Its operations constitute a major phase of Depot operations today.

An example of the activities of the Ammunition Equipment Division is the development of a method of washing and reclaiming from bombs the explosive "Comp. B" — a mixture of 59 per cent RDX, a British explosive; 40 per cent TNT; and 1 per cent beeswax. It had been generally believed that Comp. B, because of its high density, could not be educted. Using research findings of the Intermountain Research and Engineering Company and the University of Utah, the division developed a large washing and educting system, and the first batch of 2,500 tons of Comp. B returned $200,000 above the cost of research and development. Comp. B is now used widely in strip and hardrock mining.

With the cutbacks in personnel after 1953, the administration took steps to dismantle the substandard TOD Park housing. In 1954, only 484 of the 675 rentable units were in use; and in 1956, only 165 units were occupied. A 1961 order directed that 162 occupied and rehabilitated apartments in TOD Park be removed and sold as surplus by July, 1962. This deadline was extended to 1963 because of the rapid swelling of the work force.[25]

## Recent Activities and the Future

Tooele Ordnance Depot has grown and developed through the rapid expansion during World War II and the subsequent contraction — through the Korean War peak and the following curtailment of operations. Since the Korean War, TOD has assimilated Deseret Depot Activity, taken over the functions of the Ogden Arsenal, and become the major ammunition equipment design center for the nation's Ordnance Corps. An announcement in March, 1961, made these functions seem only secondary, for Tooele was destined to become the headquarters for one of the greatest ordnance installations in the world.

Essentially, the announcement dealt with the decision to close down a number of important Army ordnance and supply depots in the West, and to consolidate their functions at TOD.[26] During the first half of 1962, the Tooele Depot

[25] *Deseret News*, February 7, 1962.
[26] *Salt Lake Tribune*, May 11, 1961.

took over distribution of ordnance general supplies for the State of Utah formerly handled by Pueblo Ordnance Depot, Colorado; and the general supply distribution mission for the Sixth U.S. Army in the states of California, Nevada, Washington, Oregon, Montana, and Idaho, plus the overseas customers in Alaska and the islands of the Pacific formerly assigned to Mount Rainier Ordnance Depot and Benicia Arsenal. Additional missions transferred from Benicia Arsenal include rebuilding of tires, guided missiles, and ordnance test equipment and calibration of electronic devices. Many of the civilians employed at Benicia Arsenal and Mount Rainier Depot have been transferred to Tooele; both depots will be completely deactivated in 1964.[27]

It is expected that by 1964, the Tooele Depot will have approximately 4,000 employees, compared with the 2,040 employees at the time the expansion program was announced in the spring of 1961. Although TOD will still not have as many employees as during the Korean War peak, its employment is expected to remain relatively stable at the new high peacetime level. About 1,500, or 80 per cent, of the new employees are expected to be Utah residents.[28]

One-third of TOD's employees now commute from the Salt Lake and Utah county areas, and it is possible that many of those transferred from Benecia and Mount Rainier will prefer a larger urban area to a small community like Tooele. Whatever the impact of TOD's new expansion on the city of Tooele, its influence on the Wasatch Front economy will be undeniable, and the growth of TOD makes it increasingly more important to the defense of the nation.

In any event the Tooele bastion is established as the strategic hub of the United States Army in the West. Beginning in 1962, TOD was one of 3 basic supply centers in the United States designed to service specific geographic areas. TOD's mission now includes the Western United States and the Pacific and Far Eastern areas. With the consolidation of the Army's technical services in 1962, the name of Tooele Ordnance Depot was changed to Tooele Army Depot.

As a part of the consolidation and expansion, TOD acquired a new $1.5 million "brain center," largest of 6 in the nation.[29] Known as the Western Stock Control and Data Processing Center, it processes orders for war materiel and supply requisitions from troops throughout the Western States, Alaska, Hawaii, and Army stations scattered over the Pacific Theatre and in the Far East. Named RAMAC, the electronic brains are the nucleus of the new large office division, staffed by more than 400 persons, inaugurated in January, 1962. The electrical and electronic data processing equipment includes over 50 machines and related equipment, and is provided under a contract with International Business Ma-

[27] Letter from Karma C. Woodward to Leonard J. Arrington, July 17, 1962.

[28] *Salt Lake Tribune,* March 31, April 19, 22, 26, May 3, 20, July 22, November 23, 1961, April 12, 1962; *Deseret News,* November 25, December 16, 1961.

[29] *Deseret News,* January 5, 8, 10, 1962.

chines Corporation. Crammed with millions of facts, descriptions, inventories, and data about TOD's own stocks of munitions, vehicles, and spare parts, and of inventories of arsenals throughout the nation, the center now handles requisitions and issues of defense materiel and supplies at the rate of 65,000 orders per day. Its lightning-rapid action makes possible instantaneous handling.

With the closing of the Naval Supply Depot at Clearfield, Utah, in 1962, TOD's expansion and potential for future growth assumes ever-greater significance. The Defense Department estimates that while the changeover to TOD will cost $13 million it will ultimately save the nation $28 million per year. Moreover, the expansion of Tooele will mean at least a $5 million a year greater expenditure added to the already $20 million which TOD injects into the Utah economy every year — an increase of almost 26 per cent. It is also probable that Utah's spectacular new missiles industry will receive a further shot in the arm by this expansion, as may the rapidly growing local metals industry.

The presence of TOD and other military installations in the state has also given Utah businessmen the "inside track" on bidding for military contracts relating to the manufacture of conventional as well as to missile-age equipment and parts. TOD now maintains four "million dollar boards" filled with invitations to bid on manufacturing jobs for thousands of different types of Army equipment and parts.[30]

Originally established during the early days of World War II as a temporary reserve ammunition depot for the much larger Ogden and Benicia arsenals, the Tooele Ordnance Depot has not only survived the many reductions in such facilities, but has absorbed the workload of these and other once prominent installations to become the major Army ordnance supply center in the West. In this respect the expansion of TOD has paralleled the growth of Ogden's Utah General Depot, which, in like manner, has become the major center for the Quartermaster Corps in serving troops in Western United States, the Pacific Islands, and the Far East. In the case of TOD, there can be no doubt that this position "at the top of the heap" has come because of its good performance — reliability, high productivity, and economy — in handling the many missions assigned to it.

[30] *Ibid.*, October 25, 1961.

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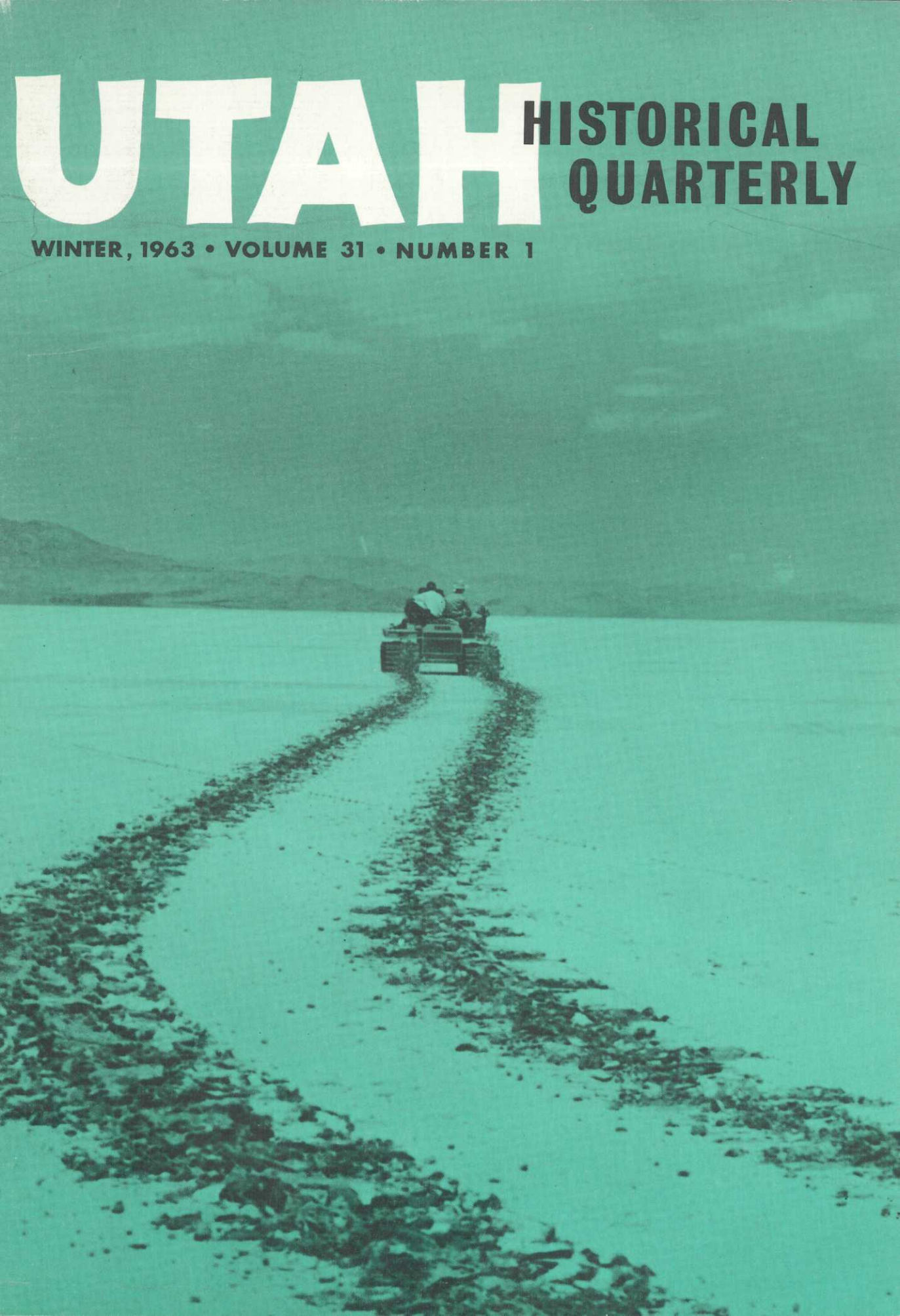

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*Tracked vehicle following Donner-Reed trail across the Great Salt Desert.* COURTESY DAVID W. EVANS & ASSOCIATES