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STRATEGIC MATERIALS IN WORLD WAR II

The occupation of Manchuria by the Japanese in the 1930's led to the creation of the puppet state of Manchukuo, in which the exploitation of coal, iron, wheat, and timber were priority activities. Later invasion of southeast Asia by the Japanese was prompted by their needs for rubber, tin, tungsten, petroleum, rice, vegetable oils (coconut, palm, tung), and other materials. The occupation of Ethiopia and Libya by the Italians was likewise caused by their desire for raw materials. The eastward expansion of Germany and their desire to reacquire colonies lost in World War I was sparked by the need for raw materials. In the latter part of the 1930's, as Britain and France rearmed, they placed orders in the United States for both military materiel and for raw materials. Despite all these warning signals, U.S. preparation for war was totally inadequate. Prewar estimates of military requirements led to a limited stockpile program that was initiated in 1939 by Public Law 117, 76th Congress. However, the pre-World War II stockpile was concerned almost exclusively with imported materials such as natural rubber and tin. The status of the stockpiles at the start of World War II is shown in Table I, which indicates the objectives were small, and that even these were far from being attained in most cases.

Table I. The Status of Selected Major Metals and Minerals in the Pre-World War II Stockpile Program.

Material	Stockpile Objective as of June 1941 (Short Tons)	On Hand in Stockpile as of Jan. 1, 1942 (Short Tons)
Chromite	1,950,000	320,000
Copper	500,000	69,000
Lead	100,000	18,000
Manganese ore	3,696,000	572,000
Tin	271,000	56,000
Tungsten ore	29,000	7,000
Zinc concentrates	150,000	89,000

In World War II the United States and its Allies faced a combination of nations which were generally deficient in supplies of most basic raw materials essential to war. Germany, Japan, and Italy had few colonies and but slight raw material wealth within their own borders. In the first years of the war sinking of Allied shipping exceeded new construction (see Figure 1), and United States imports of raw materials from Africa and the Western Hemisphere were severely threatened. The United States was forced to uneconomical expansion of domestic sources of raw materials. For example, the synthetic rubber program was necessitated by failure of the Allied nations to stockpile sufficient natural rubber, although

the world sources of natural rubber were in the hands of the Allied Nations throughout the prewar period. At the start of the war domestic mine production was accelerated, and maximum rates were achieved in the early war years which, in the face of losses of skilled labor, insufficient supplies of machinery and equipment, and inadequate reserves of developed ore, could not be maintained. United States mine production of copper exceeded one million tons in 1942 and 1943, but by 1945 had fallen below 800,000 tons. United States mine production of lead reached almost 500,000 tons in 1942 but declined steadily to less than 400,000 tons in 1945, while United States mine production of zinc which had reached nearly 770,000 tons in 1942 fell to less than 620,000 tons in 1945 (see Figure 2). Table 2 demonstrates the degree to which the United States was forced to rely upon imports in war, although the nation had been virtually self-sufficient in these materials in the preceding period of peace. The significance of imports in meeting needs of all metals and minerals in World War II is shown in Table 2. It is to be noted that most metals or minerals for which importing to the extent of 25 percent or more was required are now included in the stockpile program.

TABLE 2 **The Dependence of the United States on Imports of Metals and Minerals in the War Years 1942, 1943, and 1944.**

0% to 25% Imported	25% to 50% Imported	50% to 75% Imported	75% to 100% Imported
Aluminum	Arsenic	Antimony	Asbestos#
Natural Asphalt#	Copper	Celestite	Beryllium#
Barite*	Ilmenite	Gold	Chromite#
Bauxite	Kyanite	Manganese	Cobalt
Boron*	Lead	Sheet and Punch Mica	Columbium#
Bromine*	Mercury	Platinum	Corundum#
Cadmium*	Peat	Rutile	Cryolite#
Calcium Chloride*	Iridium	Silver	Diamond#
Cement*	Vanadium	Tin @	Natural Graphite
Clays*	Zinc	Tungsten	Monazite#
Coal*			Nickel#
Emery*			Natural Nitrates#
Feldspar			Palladium
Fluorspar*			Osmium, Rhodium, and Ruthenium
Natural Gas*			Quartz Crystal#
Gravel*			Radium#
Gypsum			Tantalum#
Iron Ore*			Zircon#
Lime*			
Lithium*			
Magnesite*			
Magnesium*			
Scrap and Ground Mica*			
Molybdenum*			
Petroleum*			
Phosphate Rock*			
Potash*			
Pyrite			
Salt*			
Sand*			
Selenium			
Stone*			
Sulfur*			
Talc, Pyrophyllite, and Soapstone*			
Vermiculite*			

* indicates that less than 10% was imported

@ the remainder came from secondary recovery

\# indicates that more than 90% was imported

Even before the U.S. entered the war, the control of shipping was perhaps the most important factor in allocating supplies of materials from the African colonies of the Allied Nations and from Latin America and other accessible sources. Ships were assigned to move high priority cargoes of materials and manufactures, and the withholding of shipping controlled less essential economic activities. During World War II price controls were in effect in the U.S., and foreign suppliers of raw materials were usually paid off at the controlled prices because many foreign sources were subsidiaries of vertically integrated U.S. firms. Further, Allied shipping controls kept foreign nations from trying to obtain exorbitant prices. However, where necessary to expand production, at home or abroad, the Reconstruction Finance Corporation (RFC), chartered earlier in the depression, made necessary contracts through several subsidiaries including the Defense Plant Corporation, the Defense Supplies Corporation, and the Metals Reserve Company. The Foreign Economic Administration assisted in procuring foreign materials. War plants, including materials production, were eligible for rapid tax writeoffs authorized by Section 124A of the Internal Revenue Code. War plants received priorities for materials, energy, labor, and machinery, and a special mining machinery division was established in the War Production Board.

The need for domestic metal production was so severe in the early part of World War II that the U.S. Government deliberately closed the gold mines in an attempt to force skilled western hard-rock miners into western base metal mines, and the U.S. Army returned drafted miners to civilian status to resume work in the western metal mines. Forced-draft production of several less satisfactory domestic substitutes for imported agricultural materials was also required: for example, domestic abaca to replace Philippine abaca in hawsers, milkweed floss to replace Far Eastern kapok in life jackets, and atabrine to replace quinine as an antimalarial drug. The Jamaican bauxite deposits were discovered by accident by British soil scientists who were seeking to expand food production on the island.

Adequate supplies of energy were essential to the successful prosecution of the war. Coal was still a major sources of energy as well as an important metallurgical reducing agent as coke used in steel and other metal production, and also a source of coal-tar chemicals used in plastics and explosives. Fortunately the U.S. Government had been deeply involved with the coal industry prior to the start of the war, because in the depression the Bituminous Coal Commission had been created to form regional coal cartels to establish minimum prices and limiting production quotas. These government-industry cartels were quickly converted by the Solid Fuels Administration for War to establish maximum prices, production expansion programs, and allocations to priority uses. Despite labor unrest, coal production rose 6 percent from 643 million tons in 1942 to 684 million tons in 1944. As for petroleum we "floated to victory on a sea of oil" as government-industry cooperation through the Petroleum Administration for War mobilized every phase of the industry: exploration, production, refining, and rail, barge, and tanker transportation. Despite a whole series of domestic price and other controls, from 3.9 million barrels per day (bbl/d) in the first quarter of 1942,

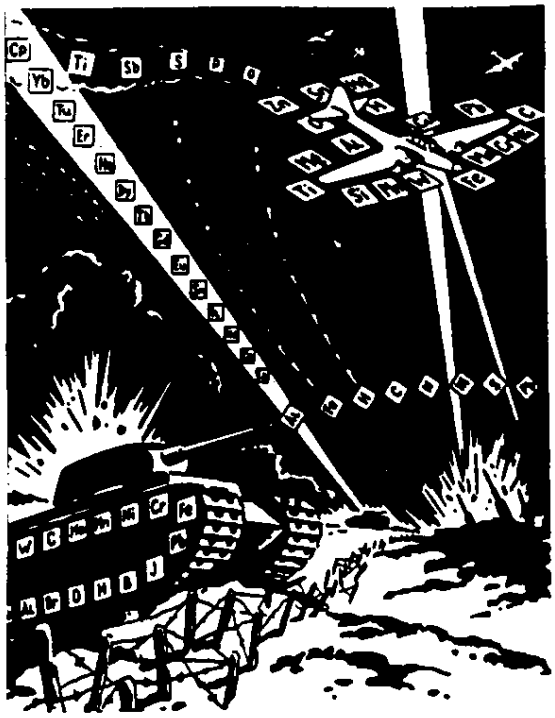
domestic crude oil production rose 23 percent to 4.8 million bbl/d in the first quarter of 1945. Other Western Hemisphere oil production also rose 22 percent from 0.9 million bbl/d in 1940 to 1.1 million bbl/d in 1944. Availability of gasoline rose 20 percent from 2.0 million bbl/d in 1942 to 2.4 million bbl/d in 1945. Petroleum was also required for butadiene feedstocks for the synthetic rubber industry and the alcohol distilling industry was mobilized and expanded to provide ethanol for butadiene for synthetic rubber production. U.S. natural gas production rose 31 percent from 4.5 trillion cubic feet (tcf) in 1942 to 5.9 tcf in 1945.

The U.S. Gross National Product rose 23 percent from $462 billion (in 1972 dollars) in 1942 to $569 billion (also in 1972 dollars) in 1944. Raw steel production, basic to defense, peaked at 90 million tons in 1944, refined copper peaked at 1.5 million tons in 1943, and aluminum peaked at 1.0 million tons also in 1943. Table 3 details military items produced, and the following pages provide more details on mineral commodities of current interest.

* * *

The Soviet World War II experience was summarized by Nikolai A. Voznesensky, Deputy Premier of the U.S.S.R. and Chief of the State Planning Commission, as follows:

"The creation of reserves in production and distribution, in production capacity and in finished goods, and in manpower and in machinery, is a most important sign of mature planning and production organization. The Soviet government, and especially Comrade Stalin, ascribe exceptional significance to the accumulation of state commodity reserves. A program for the accumulation of state and mobilizational reserves, and especially of oil products, ferrous metals, and foodstuffs, was worked out and carried out prior to the Patriotic War under direct instructions from Comrade Stalin. Experience has shown that in modern warfare victory depends upon the possession of reserves of production capacity, manpower, raw materials, and other commodities. * * * At the start of the Patriotic War these state commodity reserves, including foodstuffs and fuel, were moved to the eastern regions of the USSR. State reserves rendered great help to the Soviet Army and to the economy of the USSR during the Patriotic War."



Soviet chemistry textbook illustration, 1948

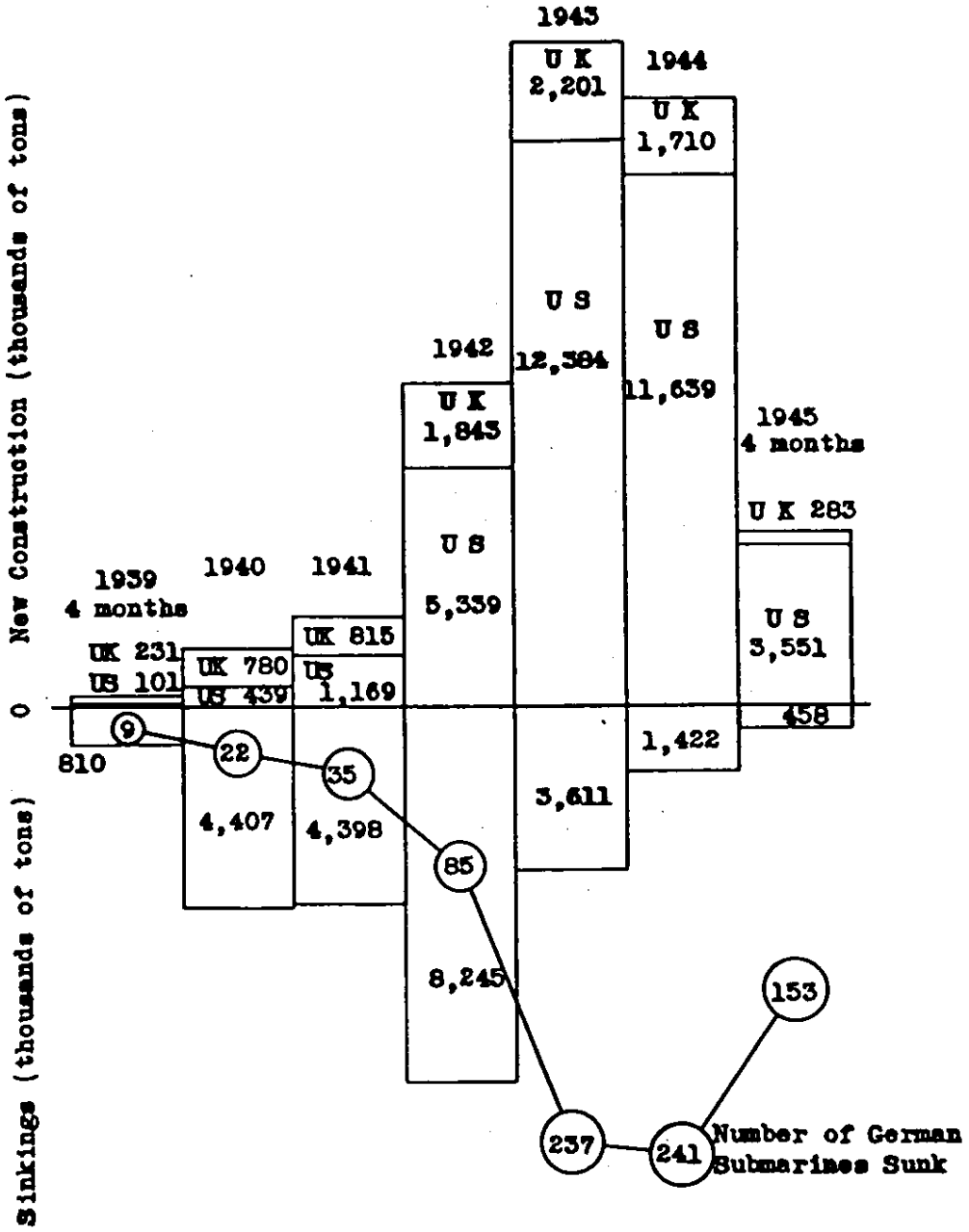
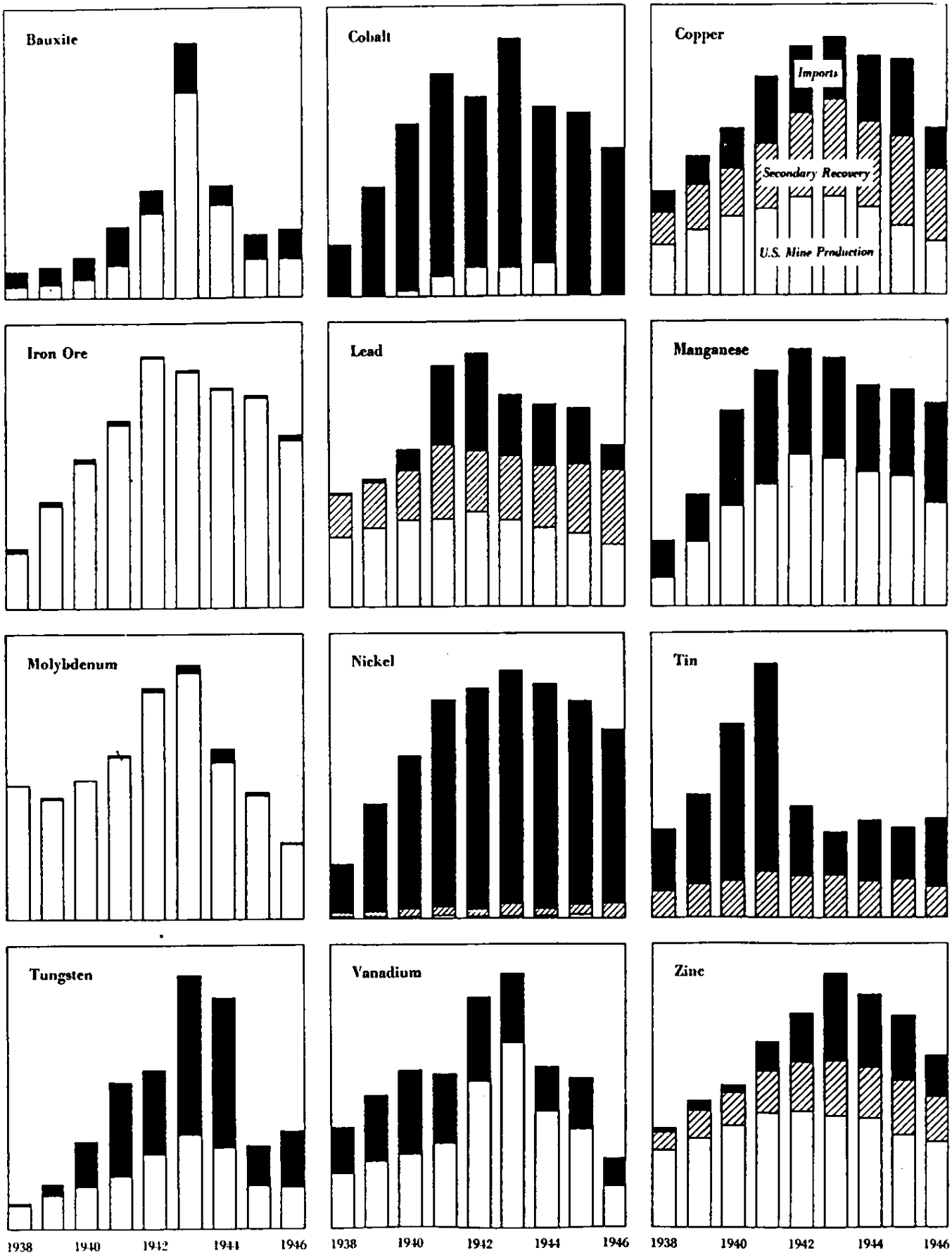


Figure 1. The Battle of the Atlantic in World War II - Vessels Sunk Compared to New Construction.



U.S. Imports (black), Secondary Recovery (crosshatched) and Mine Production (white) of 12 Important Metals and Ores

Table 3

PRODUCTION OF SELECTED MUNITIONS ITEMS-
July 1, 1940–July 31, 1945 (1945 preliminary)

ITEM	UNIT	July 1, 1940, through December 1941	1942	1943	1944	Jan. 1, 1945, through July 31, 1945	Cumulative July 1, 1940, through July 31, 1945
Aircraft:							
All military airplanes and special purpose aircraft..	Number	23,240	47,836	85,898	96,318	43,137	296,429
	Airframe weight (1,000 lbs.)	94,966	275,949	654,616	962,441	486,304	2,474,276
Total combat	Number	11,106	24,864	54,077	74,135	35,157	199,339
	Airframe weight (1,000 lbs.)	68,151	216,419	548,674	825,794	413,827	2,072,865
Bomber	Number	4,738	12,627	29,355	35,003	15,042	96,765
	Airframe weight (1,000 lbs.)	45,958	162,492	422,942	609,229	298,131	1,538,752
Heavy, long range	Number	0	0	92	1,161	2,188	3,441
	Airframe weight (1,000 lbs.)	0	0	4,426	55,835	105,696	165,957
Heavy, 4-engine, medium range.	Number	357	2,576	9,393	14,884	3,767	30,977
	Airframe weight (1,000 lbs.)	7,541	60,916	224,189	353,522	89,788	7,359,576
Patrol	Number	441	890	2,340	1,840	1,288	6,799
	Airframe weight (1,000 lbs.)	6,100	14,186	35,639	31,943	24,768	112,636
Medium	Number	483	3,270	5,411	5,228	1,586	15,978
	Airframe weight (1,000 lbs.)	6,251	42,803	75,519	72,648	21,252	218,473
Light	Number	3,457	5,891	12,119	11,890	6,213	39,570
	Airframe weight (1,000 lbs.)	26,083	44,589	83,187	95,288	56,627	305,774
Fighter	Number	5,578	10,769	23,988	38,873	19,478	98,686
	Airframe weight (1,000 lbs.)	20,183	48,808	121,850	215,536	113,079	519,456
2-engine	Number	211	1,323	2,246	4,733	2,010	10,523
	Airframe weight (1,000 lbs.)	1,587	10,462	18,349	42,902	19,085	92,385
1-engine	Number	5,367	9,446	21,742	34,140	17,468	88,163
	Airframe weight (1,000 lbs.)	18,596	38,346	103,501	172,635	93,994	427,072
Reconnaissance	Number	790	1,468	734	259	637	3,888
	Airframe weight (1,000 lbs.)	2,010	5,119	3,882	1,029	2,617	14,657
Total transport	Number	696	1,984	7,012	9,834	4,135	23,661
	Airframe weight (1,000 lbs.)	4,967	18,248	55,496	113,618	66,997	259,326
Heavy	Number	8	116	536	1,865	1,959	4,484
	Airframe weight (1,000 lbs.)	295	2,667	12,605	45,080	46,806	107,453
Medium	Number	365	1,236	2,906	4,927	1,431	10,865
	Airframe weight (1,000 lbs.)	3,730	14,051	33,978	59,715	17,586	129,060
Light	Number	323	632	3,570	3,042	745	8,312
	Airframe weight (1,000 lbs.)	945	1,531	8,919	8,826	2,605	22,826
Total trainer	Number	11,167	17,631	19,939	7,577	1,247	57,561
	Airframe weight (1,000 lbs.)	21,486	39,293	47,061	19,060	3,267	130,167
Total communication	Number	271	3,174	4,377	3,691	1,983	13,496
	Airframe weight (1,000 lbs.)	362	1,870	2,957	2,649	1,671	9,509
Total special purpose aircraft.	Number	0	183	493	1,081	615	2,372
	Airframe weight (1,000 lbs.)	0	119	428	1,320	542	2,409

PRODUCTION OF SELECTED MUNITIONS ITEMS—Continued

July 1, 1940–July 31, 1945 (1945 preliminary)

Item	Unit	July 1, 1940, through December 1941	1942	1943	1944	Jan. 1, 1945, through July 31, 1945	Cumulative July 1, 1940, through July 31, 1945
Army guns and equipment:							
Heavy field artillery (complete equipment).	Number	65	647	2,660	3,284	1,147	7,803
Spare cannon for heavy field artillery.	do	0	0	323	3,601	4,321	8,245
Spare recoil mechanisms for heavy field artillery.	do	0	0	120	2,035	1,882	4,037
Light field and antitank guns.	do	4,705	20,536	19,096	7,685	4,345	56,367
Tank guns and howitzers	do	6,787	43,368	34,711	19,991	11,735	116,592
Guns for self-propelled carriages.	do	0	8,811	13,155	2,981	2,113	27,060
Bazooka rocket launchers	do	0	67,428	98,284	215,177	95,739	476,628
Mortars	do	9,518	10,983	25,781	24,842	39,224	110,348
Heavy	do	2,508	6,242	10,176	10,722	7,790	37,438
Light	do	7,010	4,741	15,605	14,120	31,434	72,910
Machine guns	do	87,172	662,331	829,969	798,782	302,798	2,681,052
Heavy	do	57,563	347,492	641,638	677,011	239,821	1,963,525
Light	do	29,609	314,839	188,331	121,771	62,977	715,527
Submachine guns	do	216,811	651,063	686,410	347,463	186,192	2,087,939
Rifles (excluding carbines)	do	357,496	1,425,926	2,723,696	1,400,608	616,898	6,522,624
Carbines	do	5	115,813	2,959,336	2,088,697	886,000	6,049,851
Pistols and revolvers	do	71,854	322,830	843,236	1,016,931	489,744	2,744,595
Portable flame throwers	do	23	2,799	5,676	21,059	10,660	40,217
Gas masks	do	3,761,730	4,286,525	9,002,634	6,813,754	2,712,654	26,577,297
Helmets (ground)	do	324,000	5,001,000	7,649,000	5,704,000	3,940,000	22,618,000
Naval guns:							
5-inch and over	Complete assemblies	213	966	1,912	3,363	1,239	7,693
3- and 4-inch	do	317	2,505	6,593	4,652	218	14,285
20-mm, 40-mm, and 1.1-inch.	do	915	31,833	51,626	45,710	12,547	142,631
Army ammunition and bombs:							
Ground artillery ammunition.	Short tons	57,476	678,203	799,850	1,447,016	1,262,140	4,244,685
Heavy field, weight	do	42,949	303,895	274,529	507,584	637,155	1,766,112
Light field, tank, and antitank, weight.	do	14,527	374,308	525,321	939,432	624,985	2,478,573
Heavy field, rounds	Thousand rounds	873	6,209	5,537	9,668	11,285	33,572
Light field, tank, and antitank, rounds.	do	2,165	70,881	86,025	85,639	48,985	293,695
Mortar shells	Short ton	1,974	35,002	70,928	141,729	125,876	375,509
Bazooka rockets	Thousands	0	155	1,945	7,422	5,700	15,222
Small arms ammunition	Million rounds	1,177	9,798	19,800	6,578	4,232	41,585

PRODUCTION OF SELECTED MUNITIONS ITEMS—Continued

July 1, 1940–July 31, 1945 (1945 preliminary)

Item	Unit	July 1, 1940, through December 1941	1942	1943	1944	Jan. 1, 1945, through July 31, 1945	Cumulative July 1, 1940, through July 31, 1945
Naval ships (new constructions).[1]	Number	1,344	8,035	18,434	29,150	14,099	71,062
	Thousand displ. tons	270	847	2,562	3,223	1,341	8,243
Combatants	Number	47	128	537	379	110	1,201
	Thousand displ. tons	162	431	1,402	1,047	518	3,560
Landing vessels	Number	995	[2] 6,902	[2] 16,005	27,388	13,256	64,546
	Thousand displ. tons	8	[2] 211	[2] 706	1,513	467	2,905
Patrol and mine craft	Number	111	715	1,156	590	189	2,761
	Thousand displ. tons	12	117	199	160	44	532
District craft	Number	182	235	543	521	395	1,876
	Thousand displ. tons	39	43	94	128	122	426
Auxiliaries and other	Number	9	55	[3] 193	272	149	678
	Thousand displ. tons	49	45	[3] 161	375	190	820
Total Maritime Commission ships.	Number	136	760	1,949	1,786	794	5,425
	Thousand DWT	1,551	8,090	19,296	16,447	7,855	53,239
Standard cargo	Number	77	49	156	124	73	479
	Thousand DWT	757	444	1,519	1,209	772	4,701
Emergency cargo	Number	7	597	1,238	826	369	3,037
	Thousand DWT	72	6,402	13,361	8,927	3,994	32,756
Liberty	Number	7	597	1,238	722	122	2,686
	Thousand DWT	72	6,402	13,361	7,798	1,314	28,547
Victory	Number	0	0	0	104	247	351
	Thousand DWT	0	0	0	1,129	2,680	3,809
Other dry cargo (excluding AKA).	Number	15	14	36	94	138	297
	Thousand DWT	148	89	124	392	642	1,395
Standard tankers	Number	37	62	252	229	120	700
	Thousand DWT	574	999	3,481	3,739	1,954	10,747
Military types	Number	0	19	125	375	90	609
	Thousand DWT	0	63	330	1,928	492	2,813
Transport attack, APA	Number	0	0	7	141	26	174
	Thousand DWT	0	0	44	775	122	941
Cargo attack, AKA	Number	0	0	0	52	32	84
	Thousand DWT	0	0	0	355	140	495
Other military	Number	0	19	118	182	32	351
	Thousand DWT	0	63	286	798	230	1,377
Other types	Number	0	19	142	138	4	303
	Thousand DWT	0	93	481	252	1	827

[1] Excluding small, rubber, and plastic boats.

[2] Excluding Maritime-constructed LST's—15 in 1942 and 60 in 1943.

[3] Excluding 2 Maritime-constructed APA's.

Table 3 cont.

PRODUCTION OF SELECTED MUNITIONS ITEMS—Continued

July 1, 1940–July 31, 1945 (1945 preliminary)

Item	Unit	July 1, 1940 through December 1941	1942	1943	1944	Jan. 1, 1945, through July 31, 1945	Cumulative July 1, 1940, through July 31, 1945
Army Ammunition and Bombs—Continued							
Land mines	Thousands	0	1,332	11,420	9,155	2,347	24,254
Grenades, all types	do	1,222	15,977	24,981	40,654	27,136	109,970
Aircraft bombs (Army and Navy).	Short tons	45,000	630,000	1,548,000	1,953,000	1,646,000	5,822,000
General purpose and demolition.	do	42,000	493,000	1,005,000	956,000	1,068,000	3,564,000
Incendiary	do	0	38,000	176,000	407,000	235,000	856,000
Fragmentation	do	0	10,000	67,000	453,000	289,000	819,000
Armor piercing and other.	do	3,000	89,000	300,000	137,000	54,000	583,000
Naval ammunition:							
Gun ammunition and rockets.	do	35,192	100,589	277,300	524,058	408,932	1,346,071
Surface fire	do	15,659	38,082	65,724	168,056	126,967	414,488
High capacity	do	0	2,286	32,897	105,421	101,973	242,577
Armor piercing	do	15,049	23,185	21,055	39,229	13,022	111,540
Common and special common.	do	245	9,922	6,128	12,746	2,362	31,403
Illuminating	do	365	2,689	5,644	10,660	9,610	28,968
Antiaircraft	do	19,533	62,090	202,951	292,213	147,751	724,538
Rockets	do	0	417	8,625	63,789	134,214	207,045
Torpedoes, all types	Number	2,319	4,524	15,599	24,015	6,804	53,261
Depth charges	do	17,152	140,886	147,340	169,652	53,915	528,945
Marine mines	do	41,380		45,054	24,516	5,507	116,457
Combat and motor vehicles:							
Tanks	do	4,203	23,884	29,497	17,565	11,184	86,333
Armored cars	do	0	191	9,067	5,509	1,671	16,438
Scout cars and carriers	do	7,883	16,892	37,977	18,874	6,817	88,443
Tank chassis for self-propelled guns.	do	0	3,100	9,035	2,934	949	16,018
Trucks	do	208,034	647,342	648,404	620,532	331,652	2,455,964
Heavy-heavy (over 2½ tons).	do	9,108	24,593	39,872	55,306	31,857	160,736
Light-heavy (2½-ton)	do	64,975	190,779	202,994	230,645	149,485	838,878
Medium (1½ and under 2½-ton).	do	50,136	148,753	141,912	87,468	22,143	450,412
Light (under 1½ tons)	do	83,815	283,217	263,626	247,113	128,167	1,005,938
Tractors	do	111	14,886	34,250	47,356	23,184	119,787
Communication and electronic equipment.	Million dollars	253	1,512	3,043	3,739	2,119	10,666
Radio	do	122	823	1,471	1,393	608	4,417
Radar	do	49	365	913	1,430	974	3,731
Other	do	82	324	659	916	537	2,518
Field and assault wire (included in "Other").	Thousand miles	226	906	968	1,608	1,555	5,263

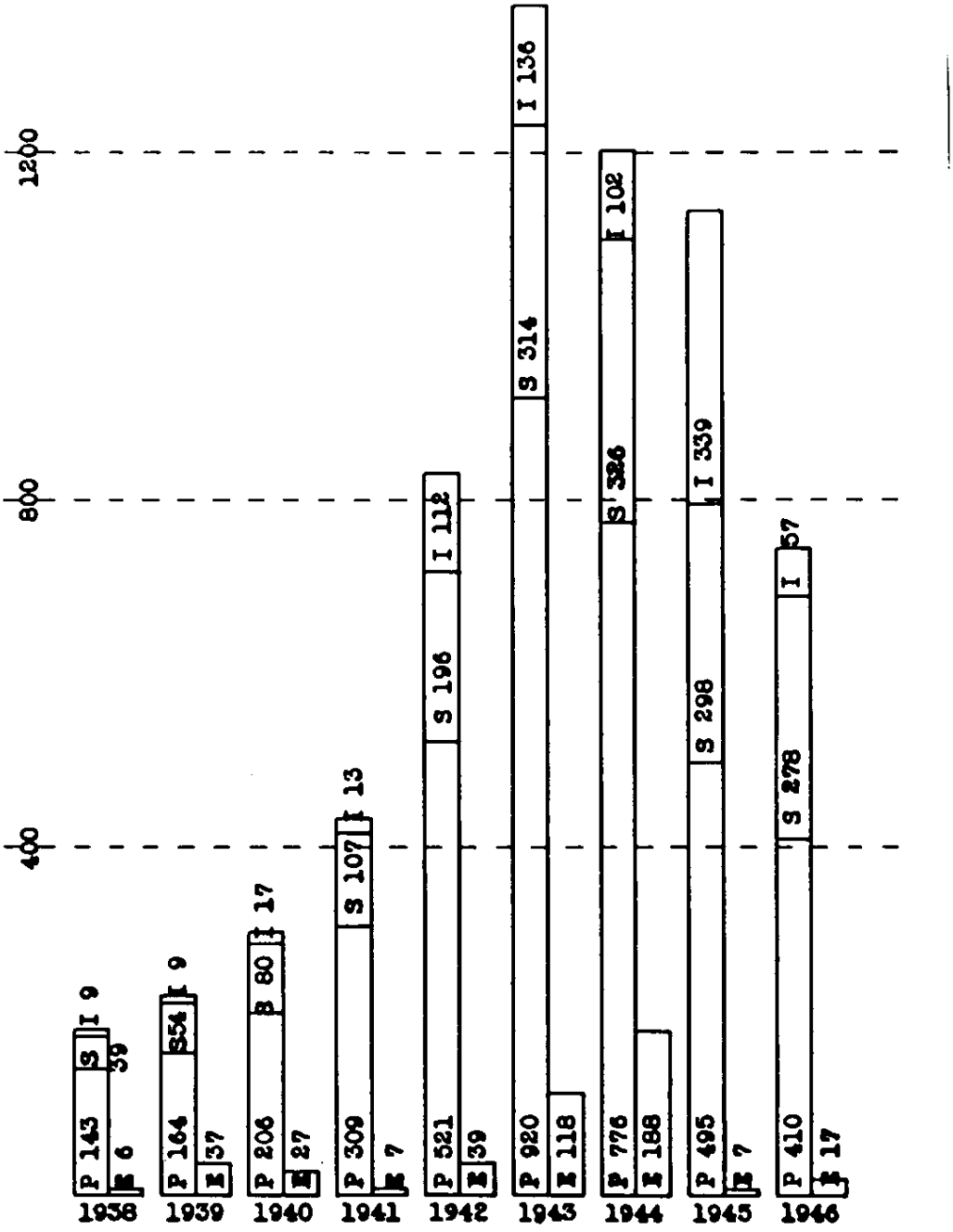
PRODUCTION OF SELECTED MUNITIONS ITEMS—Continued

July 1, 1940–July 31, 1945 (1945 preliminary)

Item	Unit	July 1, 1940 through December 1941	1942	1943	1944	Jan. 1, 1945 through July 31, 1945	Cumulative July 1, 1940, through July 31, 1945
Other equipment and supplies:							
Clothing (Army):							
Boots, service combat	Thousand pairs	0	147	605	12,653	12,940	26,343
Drawers, cotton shorts	Thousands	27,041	36,121	32,940	46,658	34,660	177,420
Jackets, field M–1943	do	0	0	275	7,470	5,263	13,008
Trousers, wool serge, olive drab	do	9,351	10,487	13,669	8,673	10,227	52,407
Overcoat, wool melton, olive drab	do	2,705	5,857	5,025	538	1,786	15,911
Socks, wool, light and heavy	Thousand pairs	38,368	29,651	60,606	73,212	57,933	259,770
Equipage (Army):							
Bag, wool sleeping	Thousands	0	0	253	5,749	2,819	8,821
Blanket, wool M–1943	do	8,528	13,706	15,265	5,983	8,512	51,994
Tent, squad M–1942	do	0	0	18	229	506	753
Tent, shelter-half	do	203	11,299	3,621	3,803	5,746	24,672
Medical supplies (Army):							
Atabrine tablets	do	(1)	[2] 97,900	1,317,500	2,171,752	834,000	4,421,152
Sulfadiazine tablets	do	(1)	135,994	675,697	463,306	306,565	1,581,562
Sodium penicillin (100,000 oxford units)	Thousand ampules	(1)	(1)	[2] 72	10,276	12,621	22,968
Navy clothing:							
Shoes, leather, black, low	Thousand pairs	845	3,229	6,351	10,206	4,825	25,456
Overcoat, kersey	Thousands	297	1,017	1,601	1,331	475	4,721
Drawers, nainsook, shorts	do	3,728	11,085	28,664	23,231	26,732	93,440
Trousers, blue	do	761	2,237	5,017	3,232	828	12,075
Jumper, blue dress	do	401	850	2,264	2,163	530	6,208
Shirts, chambray	do	857	5,203	12,757	19,063	15,246	53,126

[1] Not available.

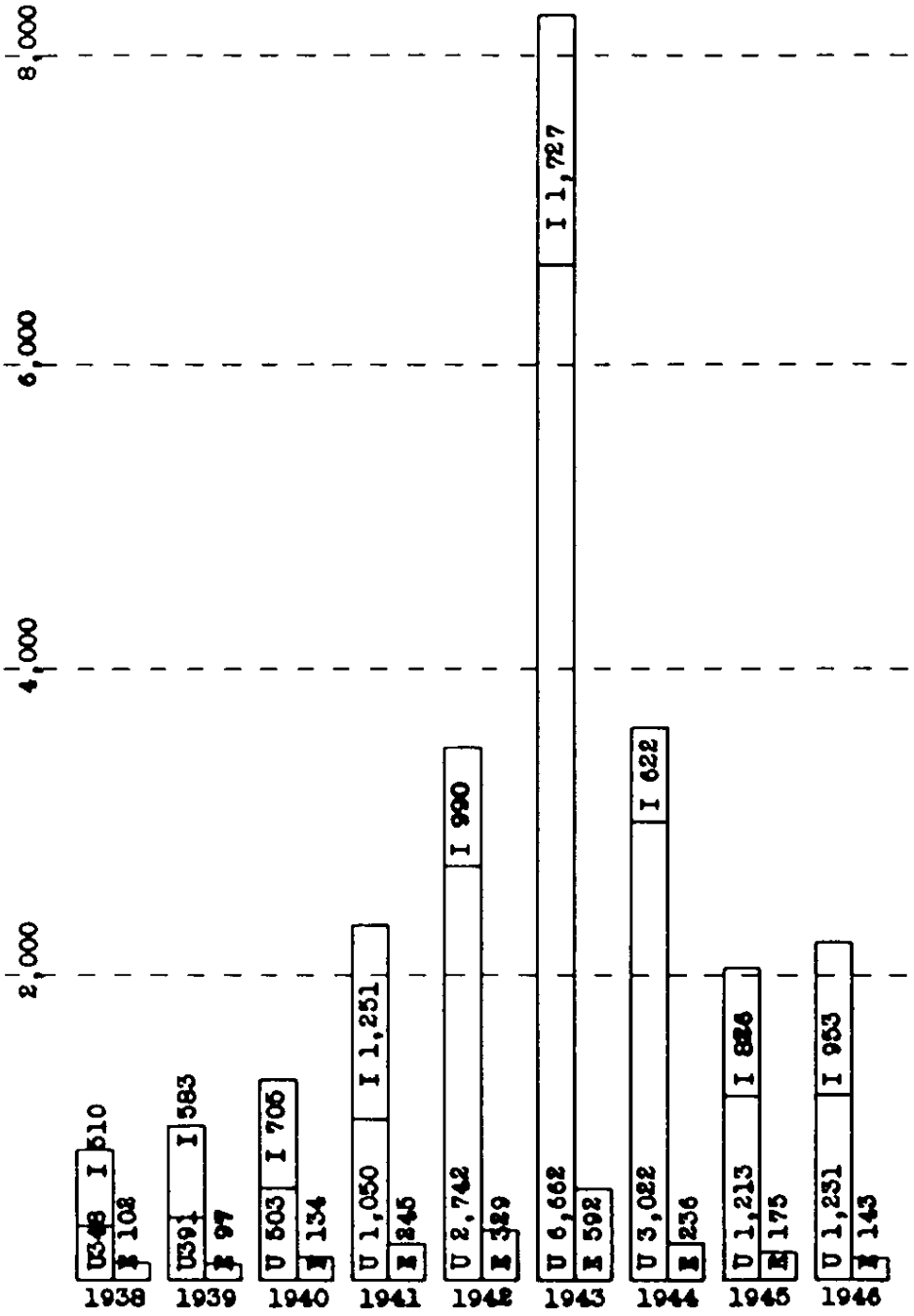
[2] Fourth quarter.



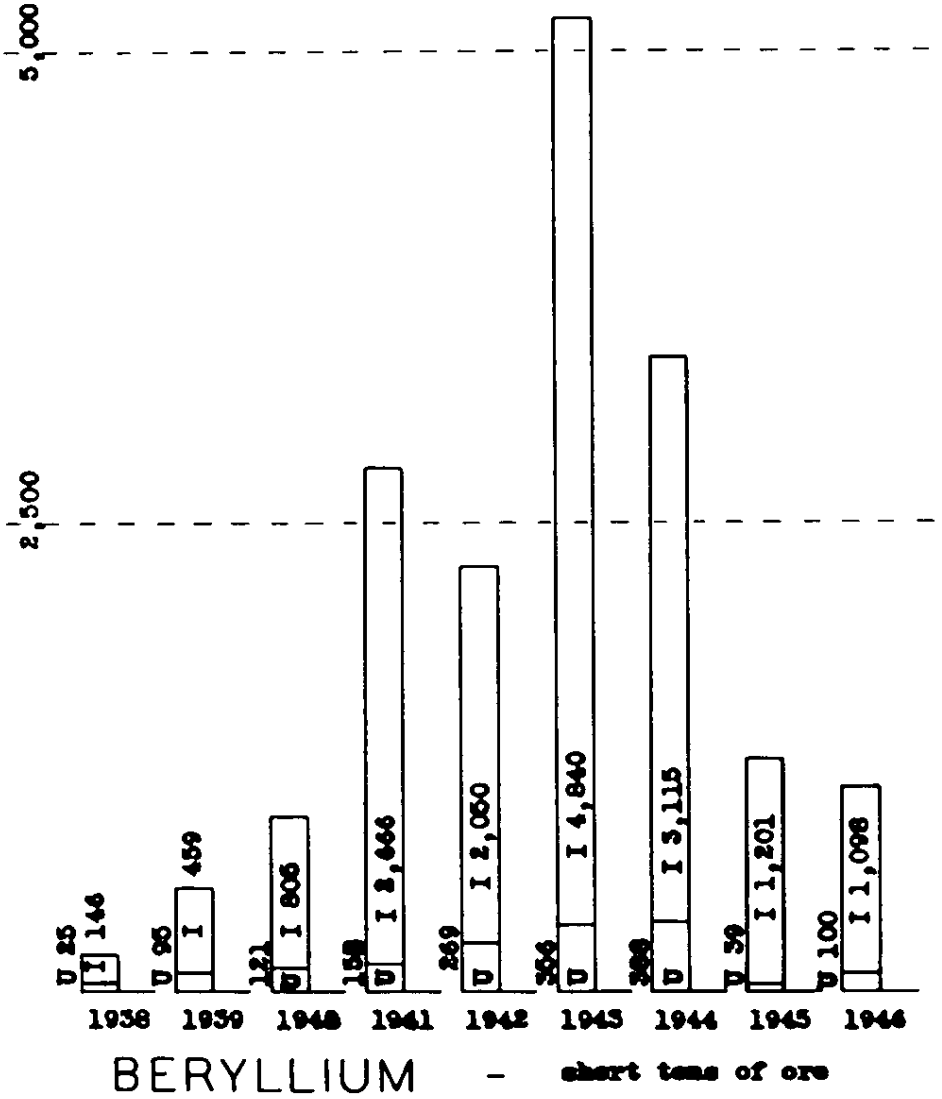
ALUMINUM - **thousands of short tons of metallic aluminum**

Note: *In using this and the following figures care must be observed in that specifications and units in some cases may not be directly comparable to current stockpile units.*

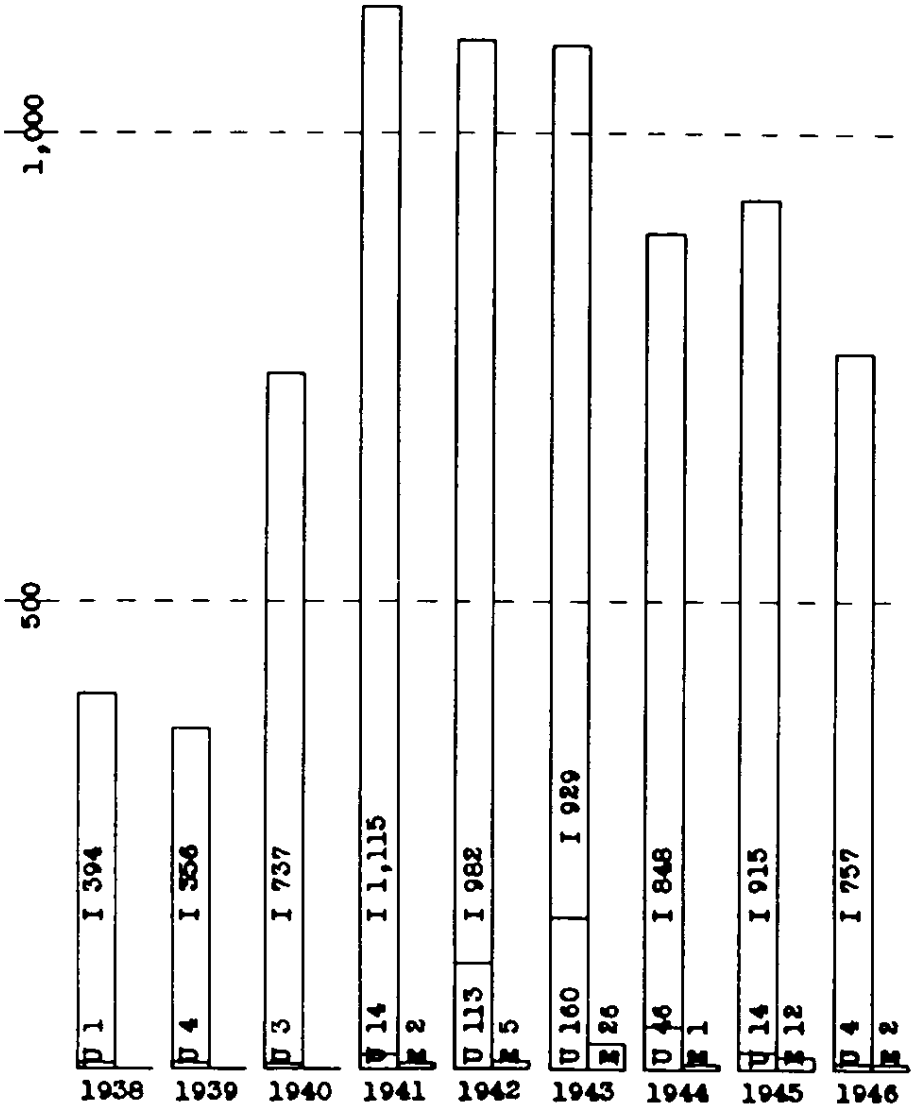
Key:
- *M - Mine Production: actual mine figures.*
- *P - Production: not actually specified as mine production.*
- *U - Used or Sold: figures available only on a material used or sold basis, rather than a production basis.*
- *S - Secondary: material recovered from scrap or other secondary sources.*
- *I - Imported.*
- *E - Exported.*



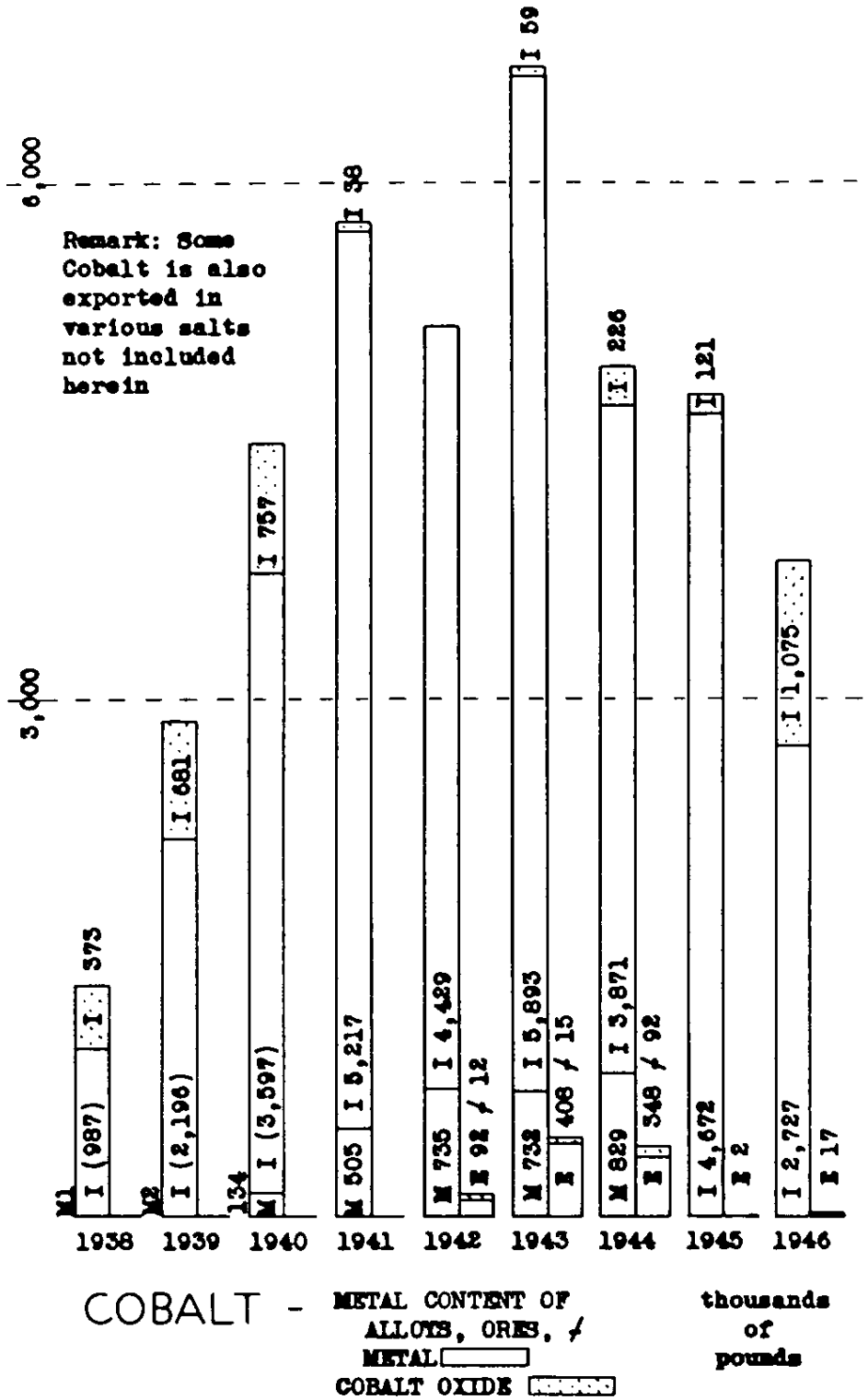
BAUXITE - thousands of short tons, dried bauxite equivalent

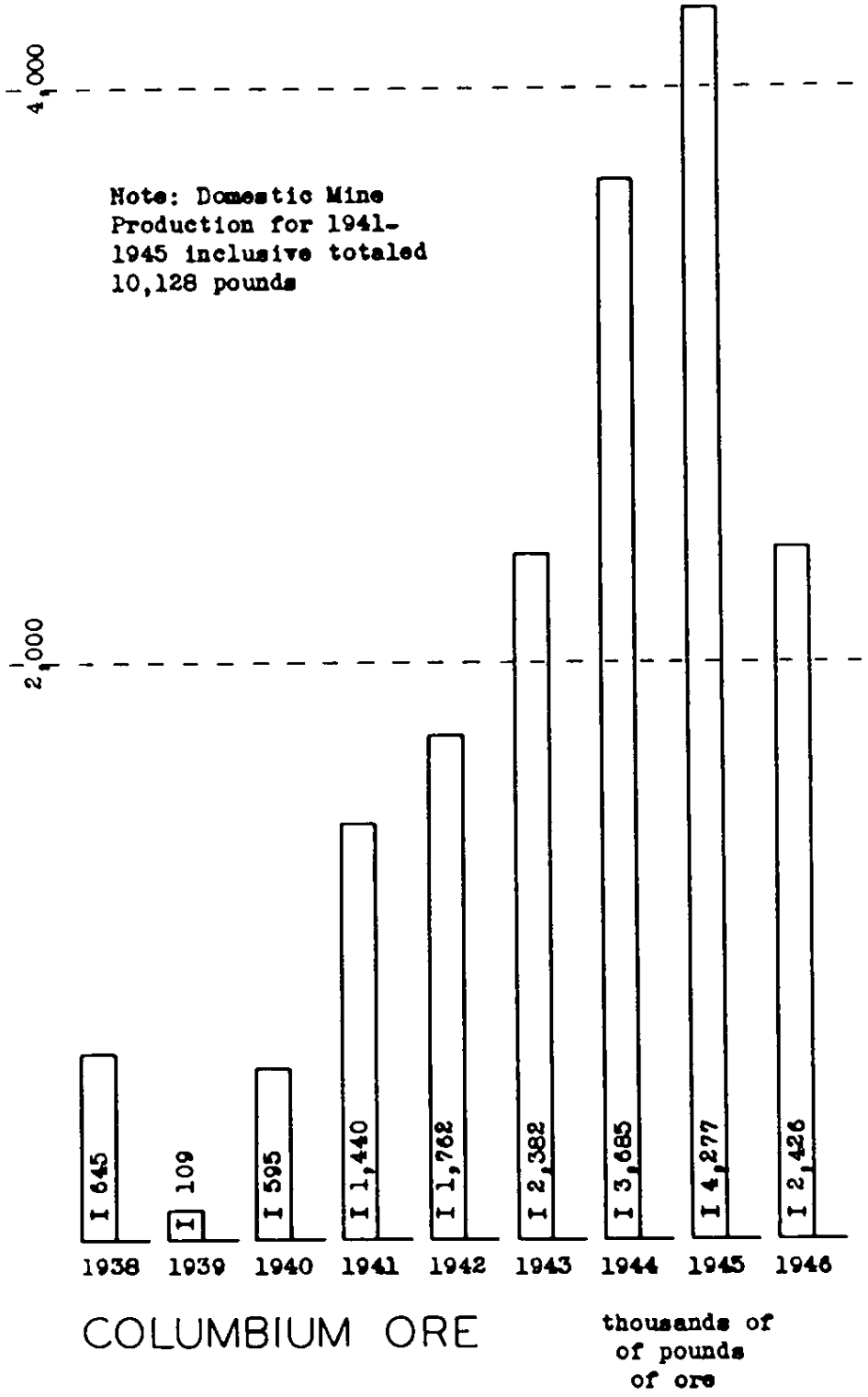


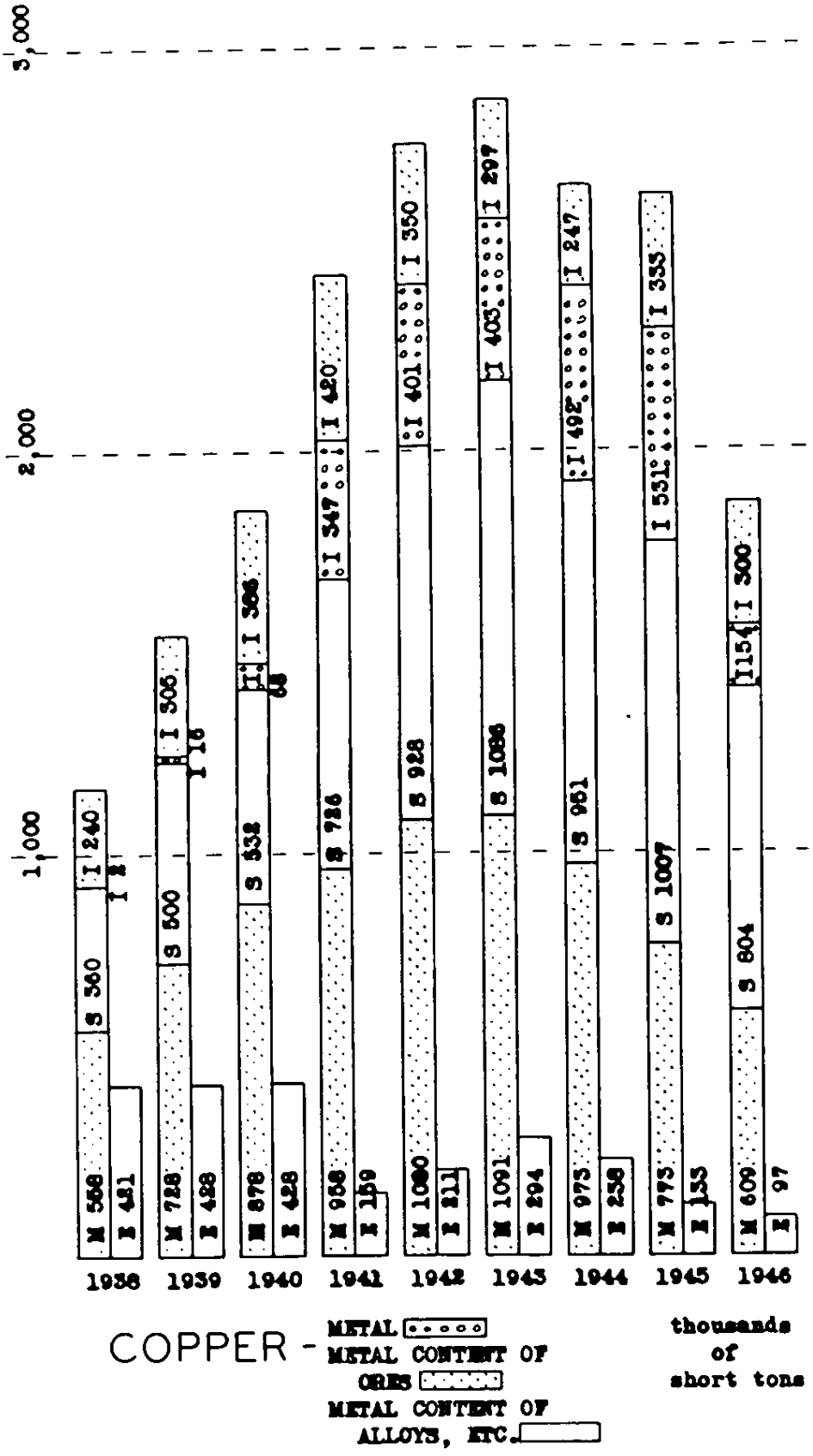
BERYLLIUM - short tons of ore

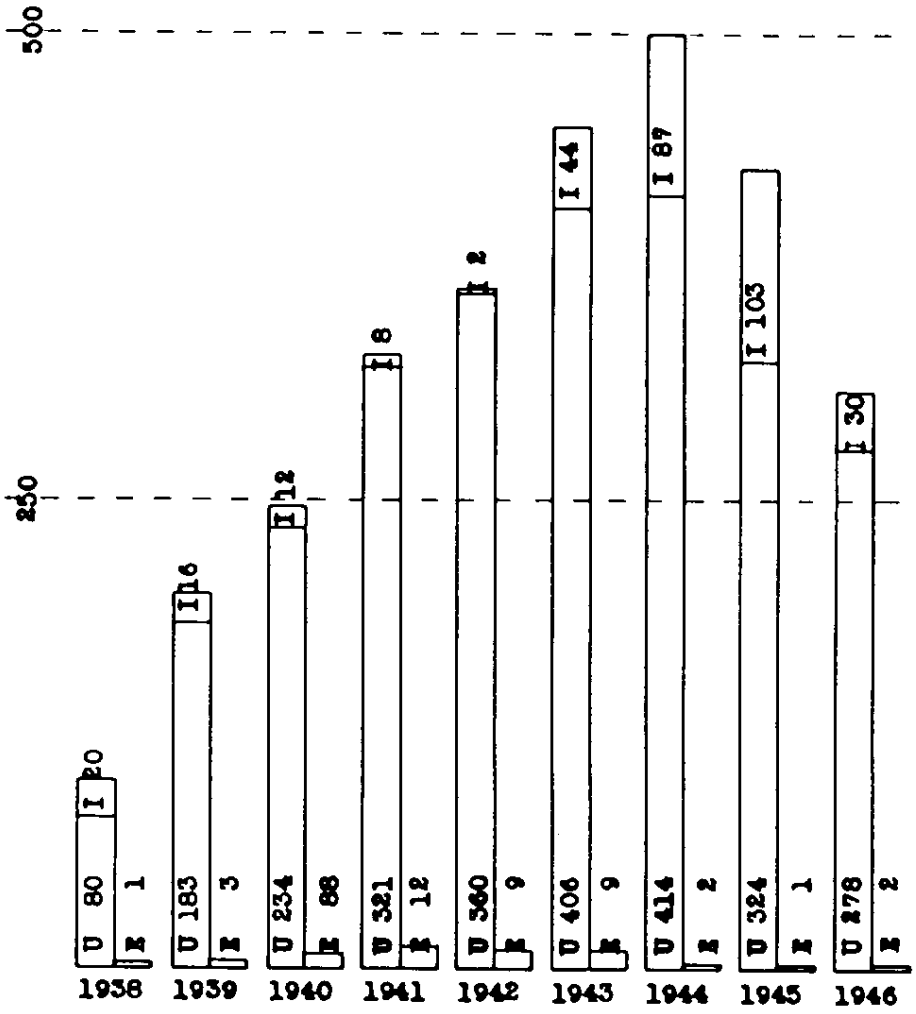


CHROMITE - thousands of short tons of ore

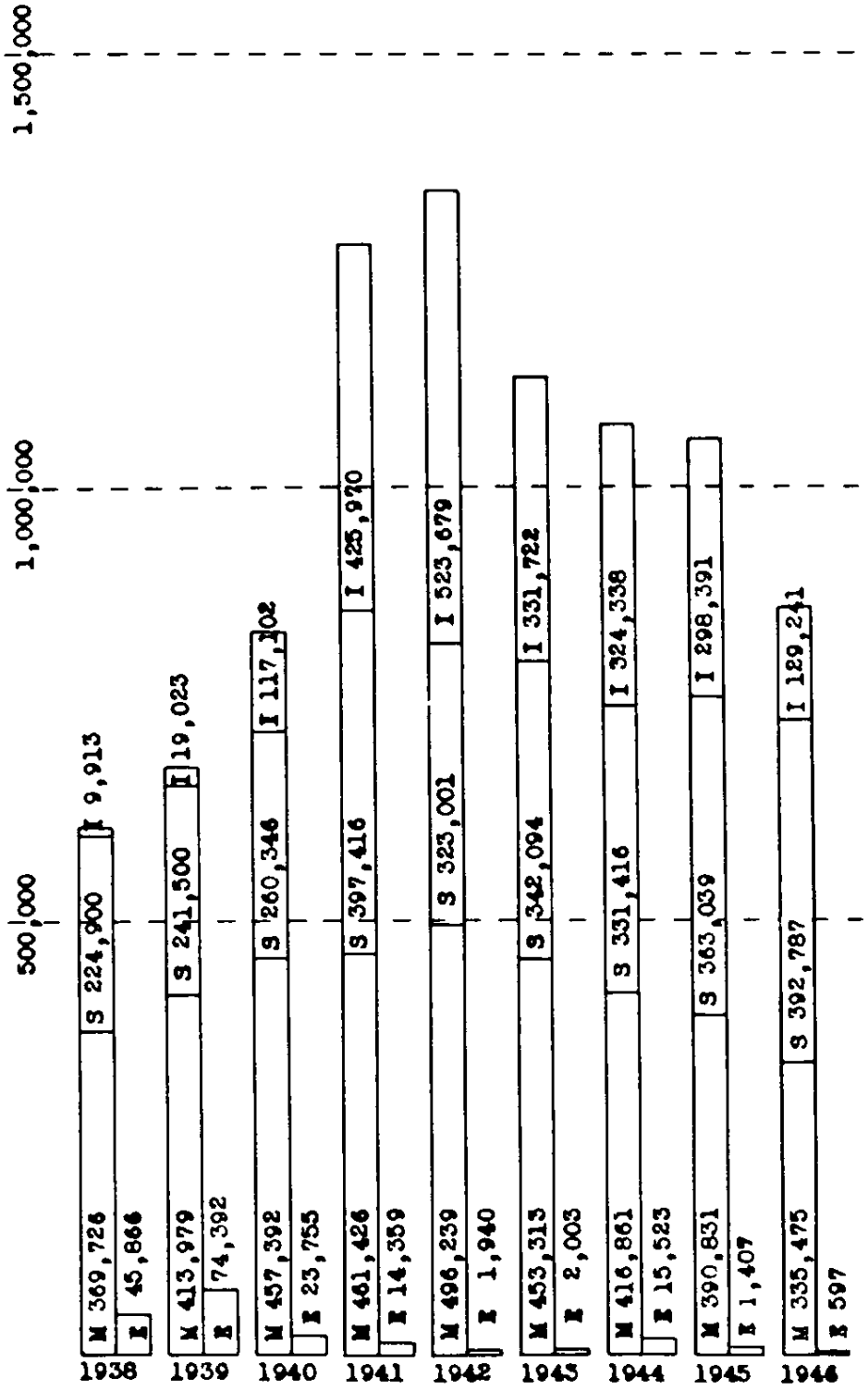




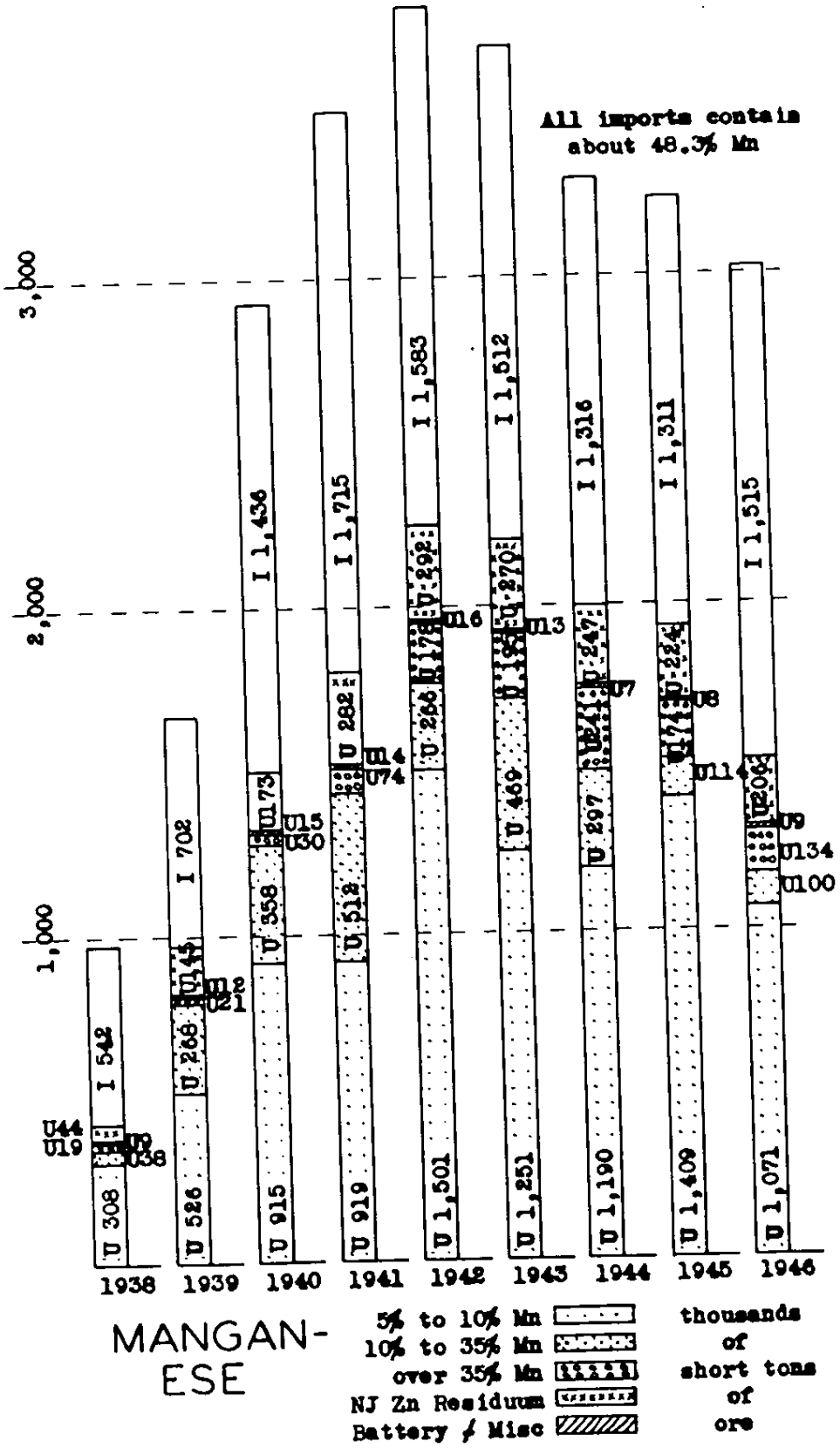


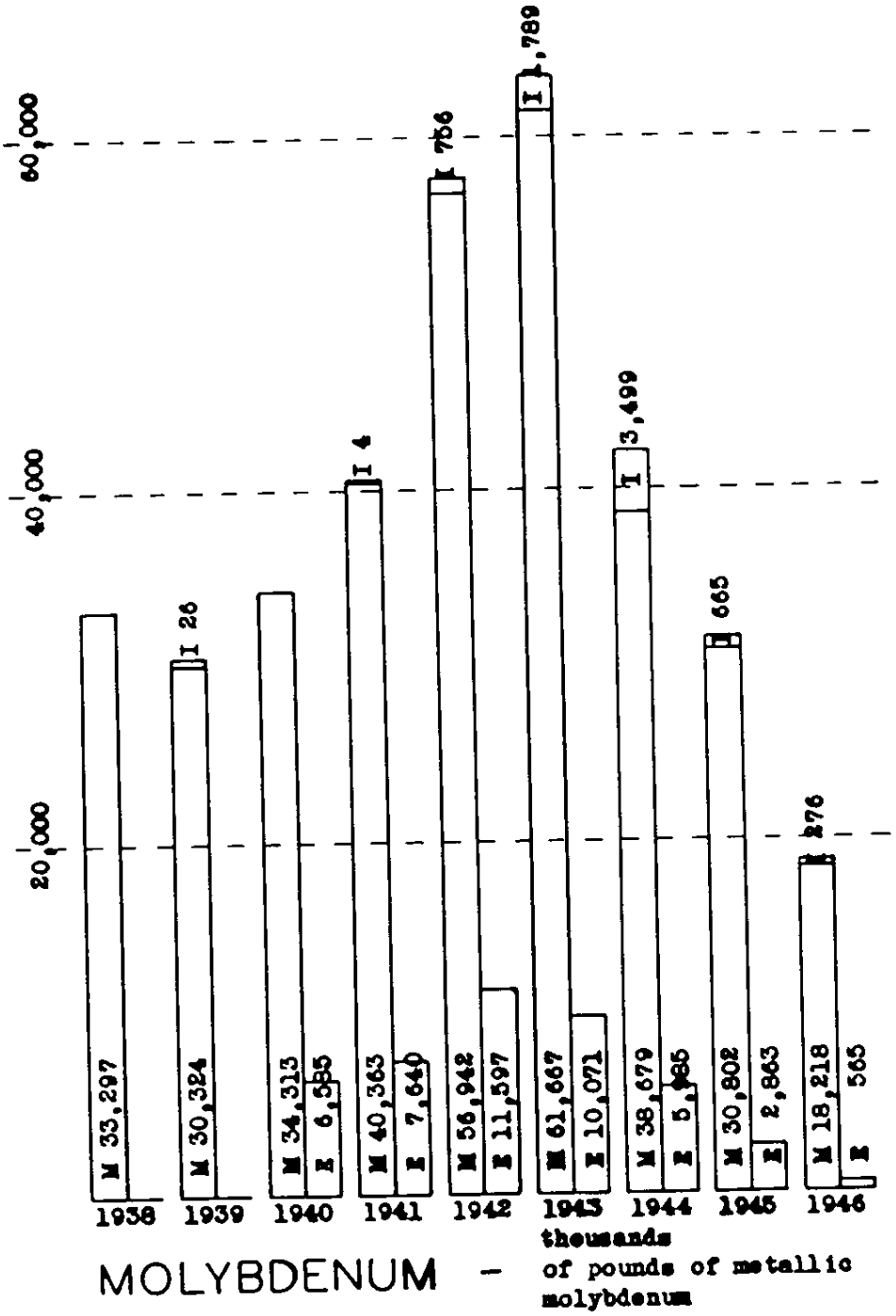


FLUORSPAR - thousands of short tons

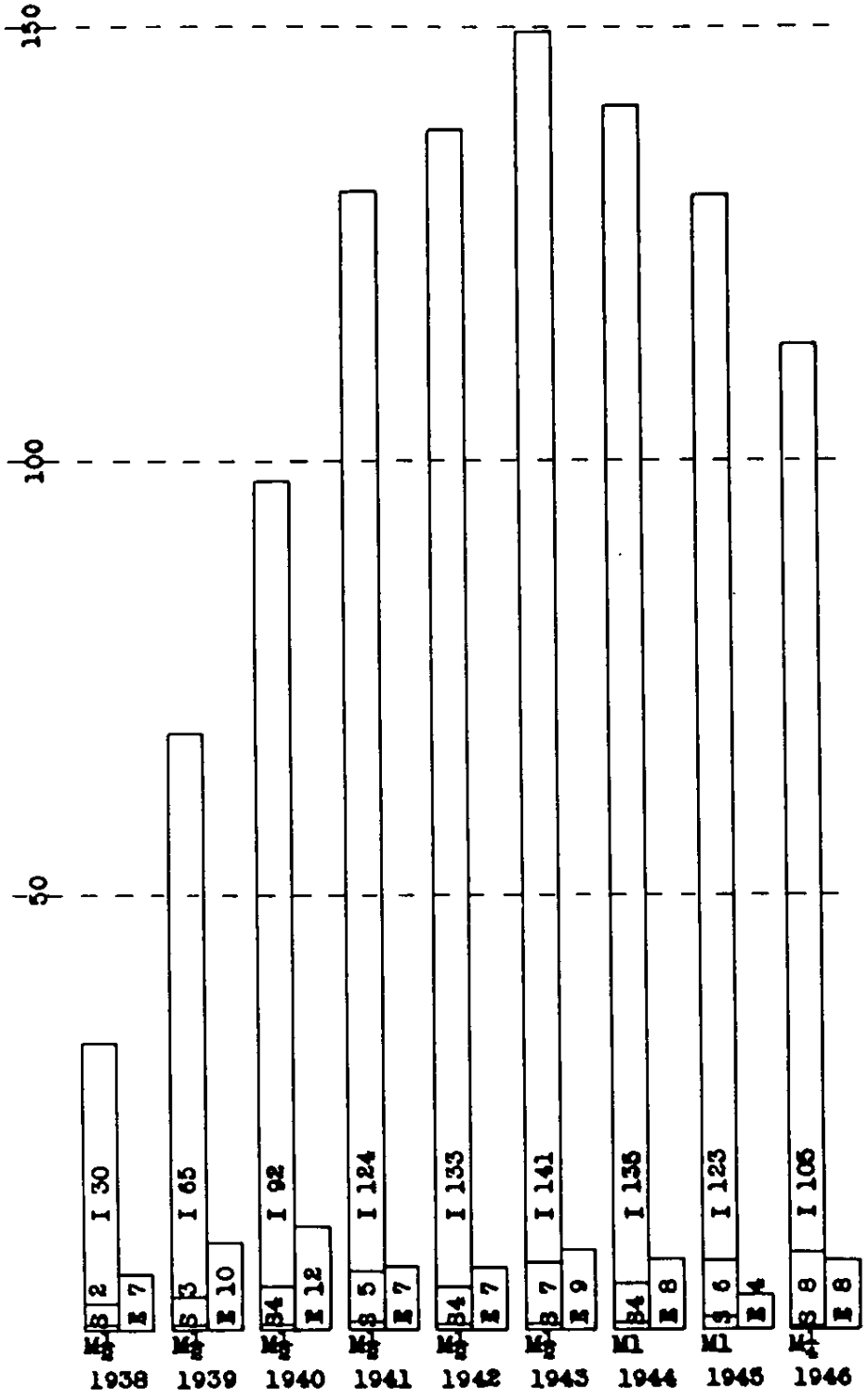


LEAD - short tons of metallic lead

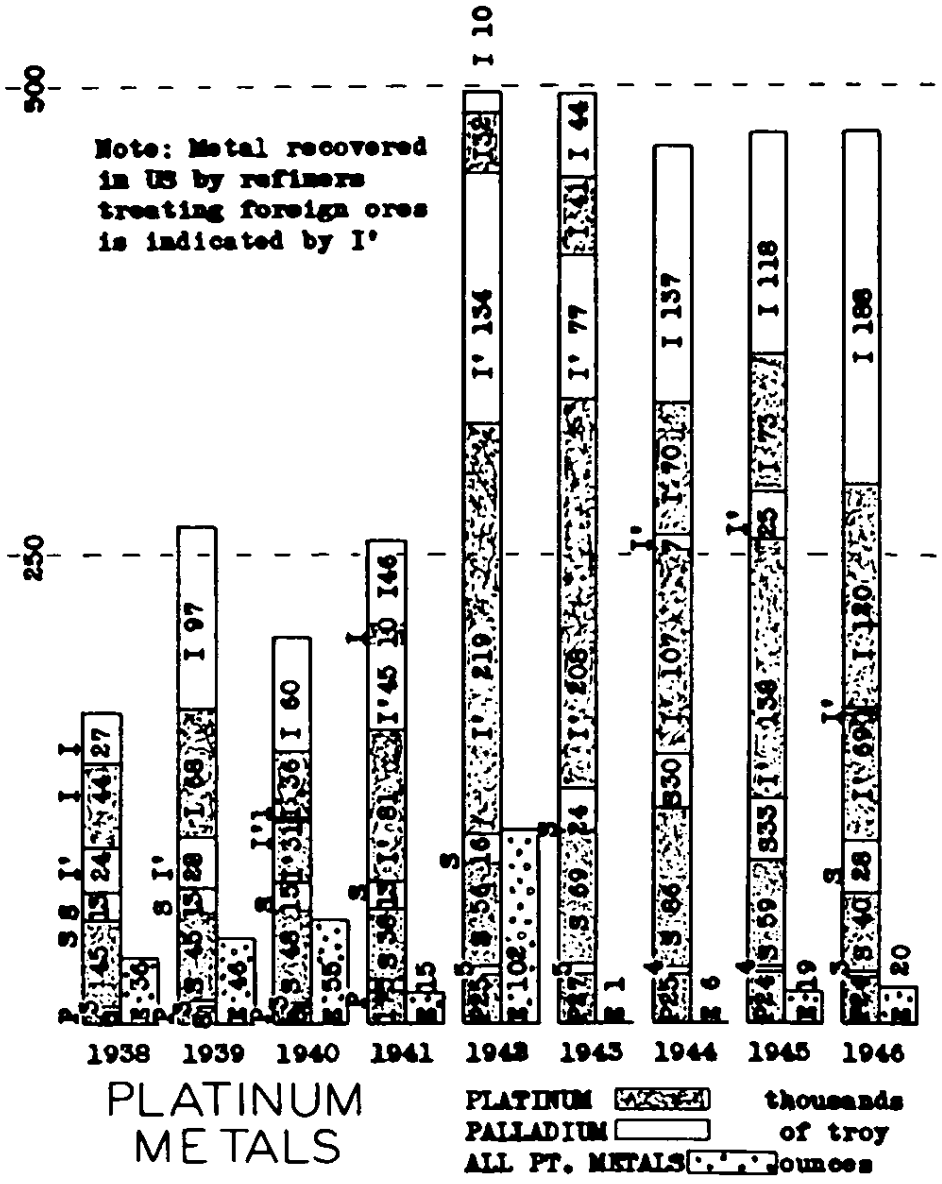


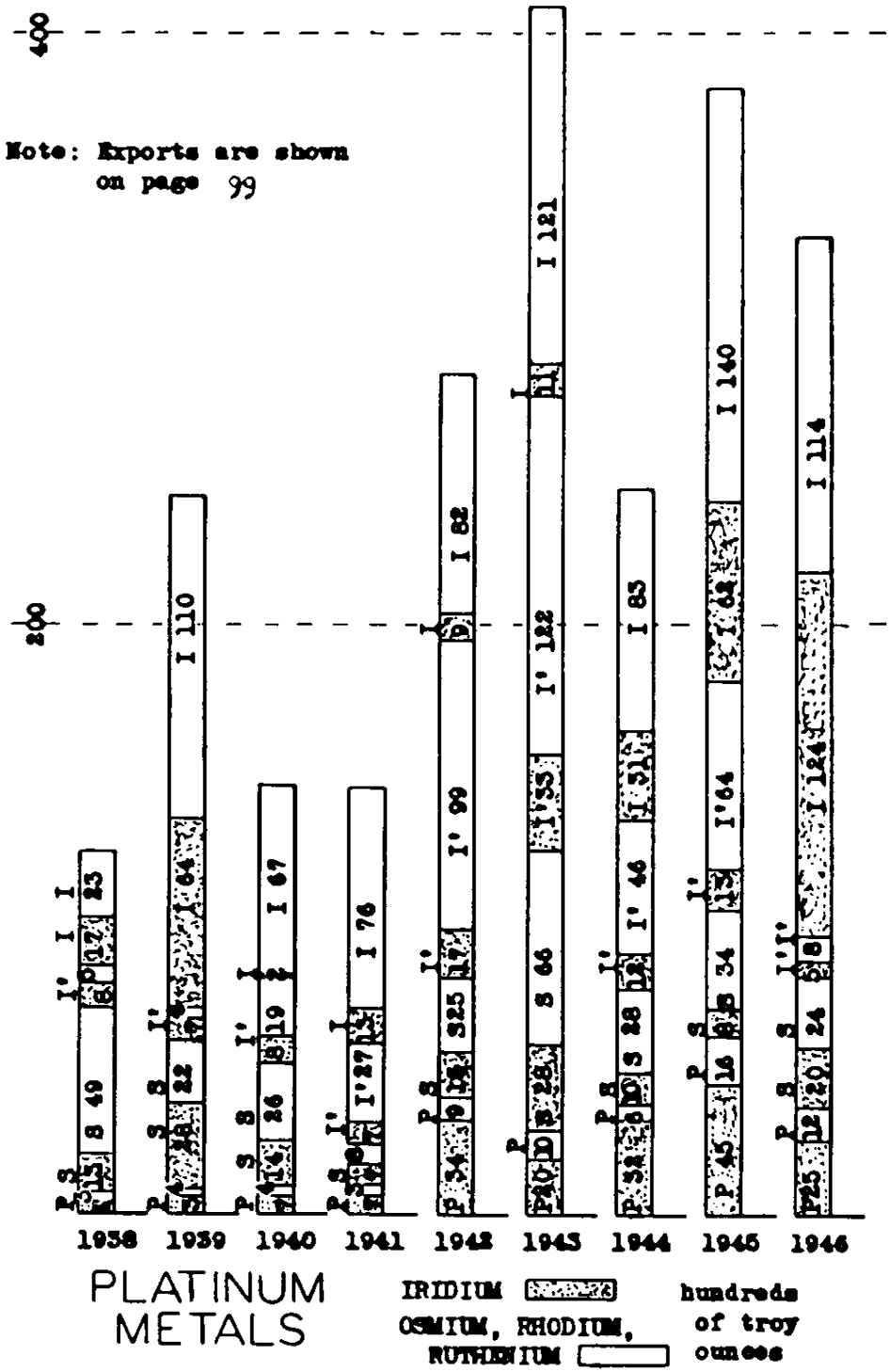


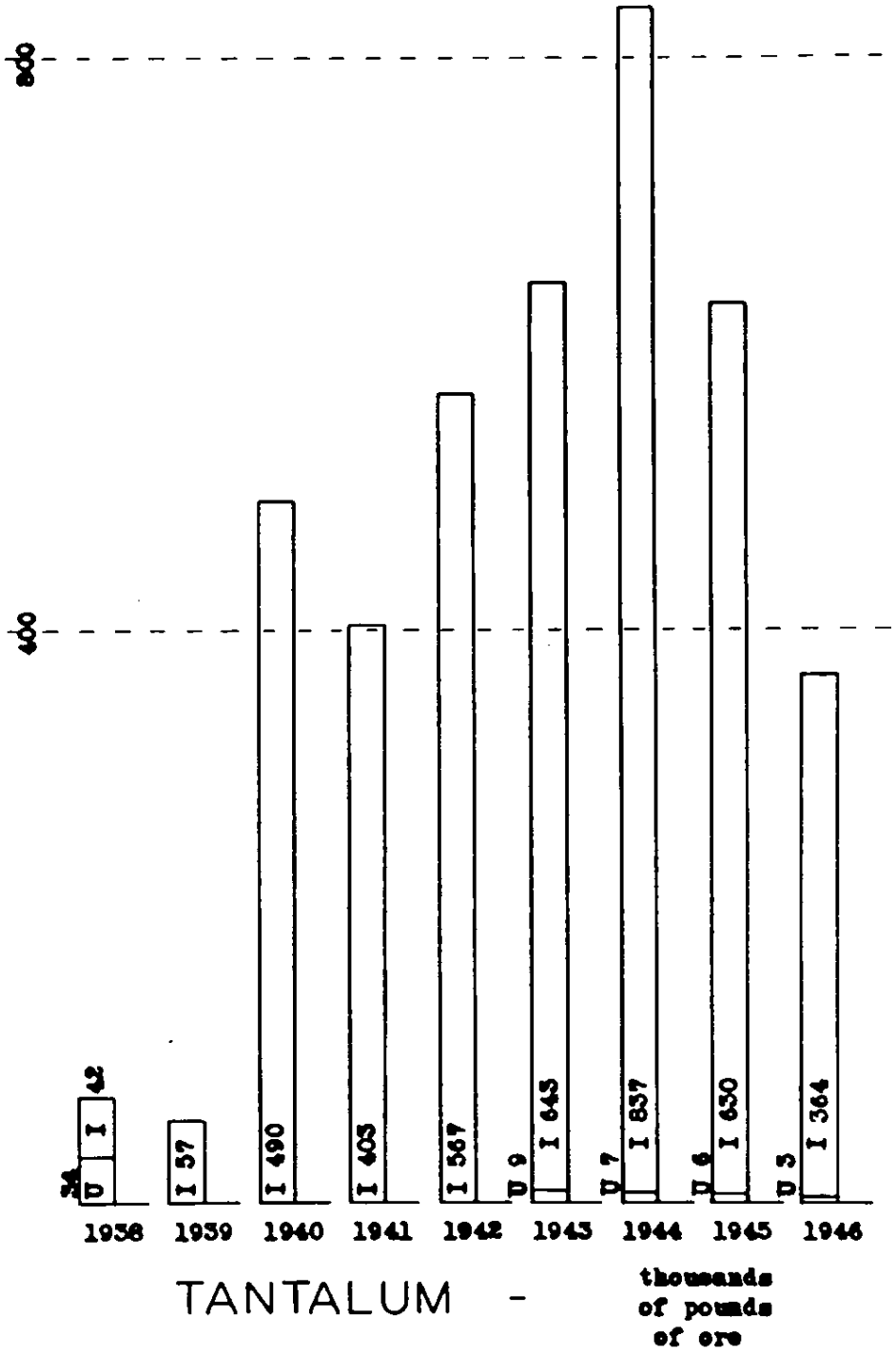
MOLYBDENUM – thousands of pounds of metallic molybdenum

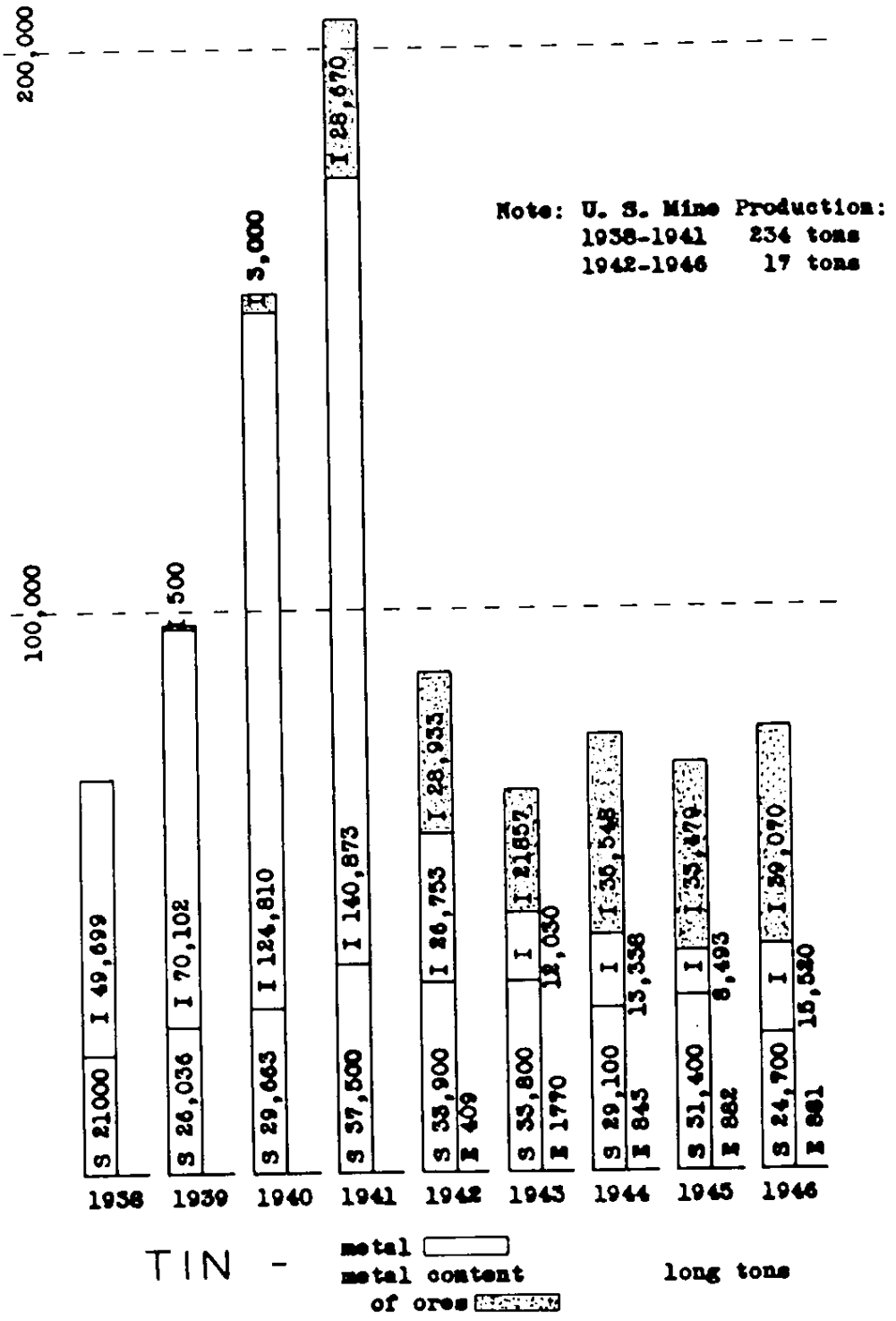


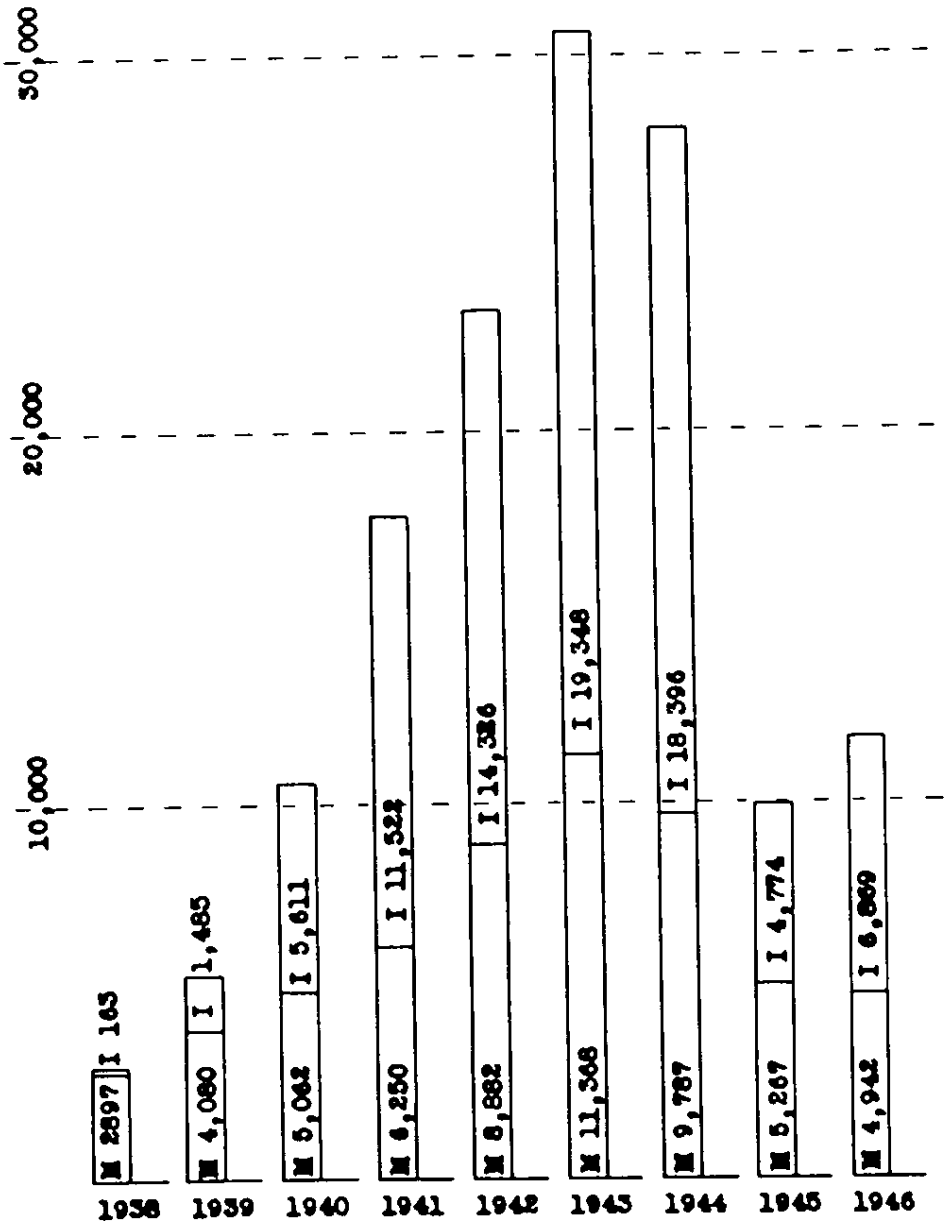
NICKEL-thousands of short tons



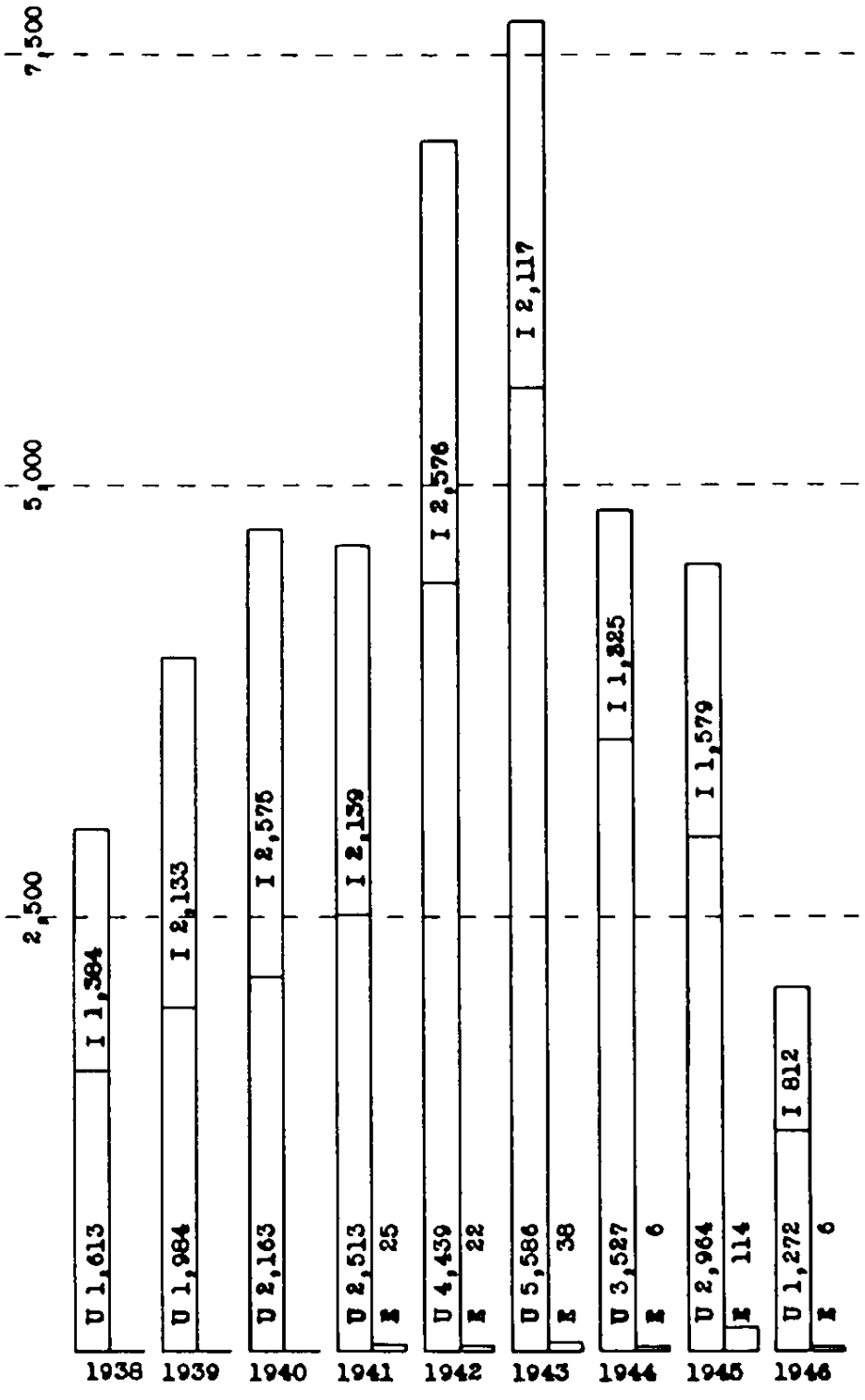








TUNGSTEN - thousands of pounds of tungsten in ores and concentrates



VANADIUM - thousands of pounds of metallic vanadium