ORNAMENTAL BUILDING STONE
MINE/MARKET SURVEY
MASTER LIST

FIELD NAME	VALUE	FIELD NAME	VALUE
RECORD ID	6043	QUERY DATE	1979
REGION	6	ROCK CLASS	
TYPE	V	MINING METHOD	III
TRADE NAME	RAMSEY SLATE	USE	B
ROCK CODE	SLATE	SURFACE TYPE	1
ROCK DESCRIPTION	SLATE THIN	GROUPING	
CONTACT PERSON	TERRY MALEY	MINING COST	0.00
CONTACT PHONE	FTS-554-1447	CONFIDENCE LEVEL (MC)	
SOURCE OF INFORMATION	D	FOB QUARRY	90.00
MERIDIAN		DEALER PRICE	0.00
TOWNSHIP		RETAIL PRICE	187.00
RANGE		DISTANCE FROM SOURCE	0.0
SECTION		AMOUNT PER MILE	0.00
STATE CODE	OR	FREIGHT PER TON	0.00
CITY LOCATION	BEND	CONFIDENCE LEVEL (DP)	1
VENDOR	SOMBRERO BLOCK INC.	ADJUSTED DEALER PRICE	187.00
STATE SOLD	OR	OWNERSHIP	
CITY SOLD	BEND	ADJUDICATED	
		COVERAGE	175.00
		DEALER PRICE/FT2	1.07
		ROYALTY	0.00

ORNAMENTAL BUILDING STONE
MINE/MARKET SURVEY
MASTER LIST

FIELD NAME	VALUE	FIELD NAME	VALUE
RECORD ID.....	6041	QUERY DATE.....	1979
REGION.....	6	ROCK CLASS	
TYPE.....	V	MINING METHOD.....	III
TRADE NAME.....	RAMSEY SLATE	USE.....	B
ROCK CODE.....	SLATE	SURFACE TYPE.....	1
ROCK DESCRIPTION.....	SLATE THICKER	GROUPING.....	
CONTACT PERSON.....	TERRY MALEY	MINING COST.....	0.00
CONTACT PHONE.....	FTS-554-1447	CONFIDENCE LEVEL (MC).:	
SOURCE OF INFORMATION.:	D	FOB QUARRY.....	0.00
MERIDIAN.....		DEALER PRICE.....	0.00
TOWNSHIP.....		RETAIL PRICE.....	128.00
RANGE.....		DISTANCE FROM SOURCE..:	0.0
SECTION.....		AMOUNT PER MILE.....	0.00
STATE CODE.....	OR	FREIGHT PER TON.....	0.00
CITY LOCATION.....	BEND	CONFIDENCE LEVEL (DP).:	
VENDOR.....	SOMBRERO BLOCK INC.	ADJUSTED DEALER PRICE.:	128.00
STATE SOLD.....	OR	OWNERSHIP.....	
CITY SOLD.....	BEND	ADJUDICATED.....	
		COVERAGE.....	100.00
		DEALER PRICE/FT2.....	1.28
		ROYALTY.....	0.00

ORNAMENTAL BUILDING STONE
MINE/MARKET SURVEY
MASTER LIST

FIELD NAME	VALUE	FIELD NAME	VALUE
RECORD ID	6042	QUERY DATE	1979
REGION	6	ROCK CLASS	
TYPE	R	MINING METHOD	I
TRADE NAME	OCHOCO FAUN	USE	A
ROCK CODE	LAVA	SURFACE TYPE	1
ROCK DESCRIPTION	RHYOLITE 1" THICK	GROUPING	
CONTACT PERSON	TERRY MALEY	MINING COST	25.00
CONTACT PHONE	FTS-554-1447	CONFIDENCE LEVEL (MC)	1
SOURCE OF INFORMATION	DQ	FOB QUARRY	110.00
MERIDIAN		DEALER PRICE	0.00
TOWNSHIP		RETAIL PRICE	160.00
RANGE		DISTANCE FROM SOURCE	0.0
SECTION		AMOUNT PER MILE	0.00
STATE CODE	OR	FREIGHT PER TON	0.00
CITY LOCATION	BEND	CONFIDENCE LEVEL (DP)	1
VENDOR	GERALD HEDEN	ADJUSTED DEALER PRICE	160.00
STATE SOLD	OR	OWNERSHIP	PDB
CITY SOLD	BEND	ADJUDICATED	Y/N
		COVERAGE	180.00
		DEALER PRICE/FT2	0.89
		ROYALTY	0.00

ORNAMENTAL BUILDING STONE
MINE/MARKET SURVEY
MASTER LIST

FIELD NAME	VALUE	FIELD NAME	VALUE
RECORD ID	6043	QUERY DATE	1979
REGION	6	ROCK CLASS	
TYPE	R	MINING METHOD	I
TRADE NAME	OCHOCO FAUN	USE	A
ROCK CODE	LAVA	SURFACE TYPE	1
ROCK DESCRIPTION	RHYOLITE 2" THICK	GROUPING	
CONTACT PERSON	TERRY MALEY	MINING COST	21.00
CONTACT PHONE	FTS-554-1447	CONFIDENCE LEVEL (MC)	1
SOURCE OF INFORMATION	D	FOB QUARRY	60.00
MERIDIAN		DEALER PRICE	0.00
TOWNSHIP		RETAIL PRICE	80.00
RANGE		DISTANCE FROM SOURCE	0.0
SECTION		AMOUNT PER MILE	0.00
STATE CODE	OR	FREIGHT PER TON	0.00
CITY LOCATION	BEND	CONFIDENCE LEVEL (DP)	1
VENDOR	GERALD HEDEN	ADJUSTED DEALER PRICE	80.00
STATE SOLD	OR	OWNERSHIP	PDB
CITY SOLD	BEND	ADJUDICATED	YN
		COVERAGE	110.00
		DEALER PRICE/FT2	0.73
		ROYALTY	0.00

ORNAMENTAL BUILDING STONE
MINE/MARKET SURVEY
MASTER LIST

FIELD NAME	VALUE
RECORD ID	6044
REGION	6
TYPE	R
TRADE NAME	OCHOCO FAUN
ROCK CODE	LAVA
ROCK DESCRIPTION	RHYOLITE 4" THICK
CONTACT PERSON	TERRY MALEY
CONTACT PHONE	FTS-554-1447
SOURCE OF INFORMATION	DG
MERIDIAN	
TOWNSHIP	
RANGE	
SECTION	
STATE CODE	OR
CITY LOCATION	BEND
VENDOR	GERALD HEDEN
STATE SOLD	OR
CITY SOLD	BEND

FIELD NAME	VALUE
QUERY DATE	1979
ROCK CLASS	
MINING METHOD	I
USE	A
SURFACE TYPE	1
GROUPING	
MINING COST	20.00
CONFIDENCE LEVEL (MC)	1
FOB QUARRY	50.00
DEALER PRICE	0.00
RETAIL PRICE	65.00
DISTANCE FROM SOURCE	0.0
AMOUNT PER MILE	0.00
FREIGHT PER TON	0.00
CONFIDENCE LEVEL (DP)	1
ADJUSTED DEALER PRICE	65.00
OWNERSHIP	PDB
ADJUDICATED	YN
COVERAGE	50.00
DEALER PRICE/FT2	1.30
ROYALTY	0.00

ORNAMENTAL BUILDING STONE
MINE/MARKET SURVEY
MASTER LIST

FIELD NAME	VALUE	FIELD NAME	VALUE
RECORD ID	6045	QUERY DATE	1979
REGION	6	ROCK CLASS	
TYPE	R	MINING METHOD	I
TRADE NAME	DESERT PURPLE SAGE	USE	A
ROCK CODE	LAVA	SURFACE TYPE	1
ROCK DESCRIPTION	RHYOLITE 1"	GROUPING	
CONTACT PERSON	TERRY MALEY	MINING COST	25.00
CONTACT PHONE	FTS-554-1447	CONFIDENCE LEVEL (MC)	1
SOURCE OF INFORMATION	DQ	FOB QUARRY	110.00
MERIDIAN		DEALER PRICE	0.00
TOWNSHIP		RETAIL PRICE	160.00
RANGE		DISTANCE FROM SOURCE	0.0
SECTION		AMOUNT PER MILE	0.00
STATE CODE	OR	FREIGHT PER TON	0.00
CITY LOCATION	BEND	CONFIDENCE LEVEL (DP)	1
VENDOR	GERALD HEDEN	ADJUSTED DEALER PRICE	160.00
STATE SOLD	OR	OWNERSHIP	PDB
CITY SOLD	BEND	ADJUDICATED	
		COVERAGE	180.00
		DEALER PRICE/FT2	0.39
		ROYALTY	0.00

ORNAMENTAL BUILDING STONE
MINE/MARKET SURVEY
MASTER LIST

FIELD NAME	VALUE
RECORD ID	6046
REGION	6
TYPE	R
TRADE NAME	DESERT PURPLE SAGE
ROCK CODE	LAVA
ROCK DESCRIPTION	RHYOLITE 2" THICK
CONTACT PERSON	TERRY MALEY
CONTACT PHONE	FTS-554-1447
SOURCE OF INFORMATION	DQ
MERIDIAN	
TOWNSHIP	
RANGE	
SECTION	
STATE CODE	OR
CITY LOCATION	BEND
VENDOR	GERALD HEDEN
STATE SOLD	OR
CITY SOLD	BEND

FIELD NAME	VALUE
QUERY DATE	1979
ROCK CLASS	
MINING METHOD	I
USE	A
SURFACE TYPE	1
GROUPING	
MINING COST	25.00
CONFIDENCE LEVEL (MC)	1
FOB QUARRY	50.00
DEALER PRICE	0.00
RETAIL PRICE	80.00
DISTANCE FROM SOURCE	0.0
AMOUNT PER MILE	0.00
FREIGHT PER TON	0.00
CONFIDENCE LEVEL (DP)	1
ADJUSTED DEALER PRICE	80.00
OWNERSHIP	PDB
ADJUDICATED	
COVERAGE	110.00
DEALER PRICE/FT2	0.73
ROYALTY	0.00

ORNAMENTAL BUILDING STONE
MINE/MARKET SURVEY
MASTER LIST

FIELD NAME	VALUE	FIELD NAME	VALUE
RECORD ID	6049	QUERY DATE	1979
REGION	6	ROCK CLASS	
TYPE	R	MINING METHOD	I
TRADE NAME	DESERT PURPLE SAGE	USE	A
ROCK CODE	LAVA	SURFACE TYPE	1
ROCK DESCRIPTION	RHYOLITE 4" THICK	GROUPING	
CONTACT PERSON	TERRY MALEY	MINING COST	25.00
CONTACT PHONE	FTS-554-1447	CONFIDENCE LEVEL (MC)	1
SOURCE OF INFORMATION	DQ	FOB QUARRY	50.00
MERIDIAN		DEALER PRICE	0.00
TOWNSHIP		RETAIL PRICE	65.00
RANGE		DISTANCE FROM SOURCE	0.0
SECTION		AMOUNT PER MILE	0.00
STATE CODE	OR	FREIGHT PER TON	0.00
CITY LOCATION	BEND	CONFIDENCE LEVEL (DP)	1
VENDOR	GERALD HEDEN	ADJUSTED DEALER PRICE	65.00
STATE SOLD	OR	OWNERSHIP	POB
CITY SOLD	BEND	ADJUDICATED	
		COVERAGE	50.00
		DEALER PRICE/FT2	1.30
		ROYALTY	0.00

ORNAMENTAL BUILDING STONE
MINE/MARKET SURVEY
MASTER LIST

FIELD NAME	VALUE	FIELD NAME	VALUE
RECORD ID	6050	QUERY DATE	1979
REGION	6	ROCK CLASS	
TYPE	V	MINING METHOD	II
TRADE NAME	RAMSEY SLATE	USE	B
ROCK CODE	SLATE	SURFACE TYPE	1
ROCK DESCRIPTION	SLATE 1" THICK	GROUPING	
CONTACT PERSON	TERRY MALEY	MINING COST	30.00
CONTACT PHONE	FTS-554-1447	CONFIDENCE LEVEL (MC)	
SOURCE OF INFORMATION	DQ	FOB QUARRY	110.00
MERIDIAN		DEALER PRICE	0.00
TOWNSHIP		RETAIL PRICE	160.00
RANGE		DISTANCE FROM SOURCE	0.0
SECTION		AMOUNT PER MILE	0.00
STATE CODE	OR	FREIGHT PER TON	0.00
CITY LOCATION	BEND	CONFIDENCE LEVEL (DP)	1
VENDOR	GERALD HEDEN	ADJUSTED DEALER PRICE	160.00
STATE SOLD	OR	OWNERSHIP	
CITY SOLD	BEND	ADJUDICATED	
		COVERAGE	175.00
		DEALER PRICE/FT2	0.54
		ROYALTY	0.00

ORNAMENTAL BUILDING STONE
MINE/MARKET SURVEY
MASTER LIST

FIELD NAME	VALUE	FIELD NAME	VALUE
RECORD ID	6051	QUERY DATE	1979
REGION	6	ROCK CLASS	
TYPE	V	MINING METHOD	II
TRADE NAME	RAMSEY SLATE	USE	B
ROCK CODE	SLATE	SURFACE TYPE	1
ROCK DESCRIPTION	SLATE 2" THICK	GROUPING	
CONTACT PERSON	TERRY MALEY	MINING COST	30.00
CONTACT PHONE	FTS-554-1447	CONFIDENCE LEVEL (MC)	
SOURCE OF INFORMATION	DQ	FOB QUARRY	0.00
MERIDIAN		DEALER PRICE	75.00
TOWNSHIP		RETAIL PRICE	95.00
RANGE		DISTANCE FROM SOURCE	0.0
SECTION		AMOUNT PER MILE	0.00
STATE CODE	OR	FREIGHT PER TON	0.00
CITY LOCATION	BEND	CONFIDENCE LEVEL (DP)	
VENDOR	GERALD HEDEN	ADJUSTED DEALER PRICE	95.00
STATE SOLD	OR	OWNERSHIP	
CITY SOLD	BEND	ADJUDICATED	
		COVERAGE	100.00
		DEALER PRICE/FT2	1.60
		ROYALTY	0.00

ORNAMENTAL BUILDING STONE
MINE/MARKET SURVEY
MASTER LIST

FIELD NAME	VALUE	FIELD NAME	VALUE
RECORD ID	6052	QUERY DATE	1979
REGION	6	ROCK CLASS	
TYPE	R	MINING METHOD	I
TRADE NAME	BLACK GOLD	USE	A
ROCK CODE	LAVA	SURFACE TYPE	1
ROCK DESCRIPTION	WELDED ASH	GROUPING	
CONTACT PERSON	TERRY MALEY	MINING COST	50.00
CONTACT PHONE	FTS-554-1447	CONFIDENCE LEVEL (MC)	1
SOURCE OF INFORMATION	DQ	FOB QUARRY	97.00
MERIDIAN		DEALER PRICE	0.00
TOWNSHIP		RETAIL PRICE	120.00
RANGE		DISTANCE FROM SOURCE	0.0
SECTION		AMOUNT PER MILE	0.00
STATE CODE	OR	FREIGHT PER TON	0.00
CITY LOCATION		CONFIDENCE LEVEL (DP)	
VENDOR	NORTHWEST STONE INC.	ADJUSTED DEALER PRICE	0.00
STATE SOLD	OR	OWNERSHIP	
CITY SOLD	PORTLAND	ADJUDICATED	
		COVERAGE	0.00
		DEALER PRICE/FT2	0.00
		ROYALTY	0.00

ORNAMENTAL BUILDING STONE
MINE/MARKET SURVEY
MASTER LIST

FIELD NAME	VALUE	FIELD NAME	VALUE
RECORD ID	6053	QUERY DATE	1979
REGION	6	ROCK CLASS	
TYPE	R	MINING METHOD	I
TRADE NAME	COLOMBIA RIVER BASALT	USE	A
ROCK CODE	LAVA	SURFACE TYPE	1
ROCK DESCRIPTION	GREY BASALT	GROUPING	
CONTACT PERSON	TERRY MALEY	MINING COST	25.00
CONTACT PHONE	FTS-554-1447	CONFIDENCE LEVEL (MC)	1
SOURCE OF INFORMATION	DQ	FOB QUARRY	69.00
MERIDIAN		DEALER PRICE	0.00
TOWNSHIP		RETAIL PRICE	85.00
RANGE		DISTANCE FROM SOURCE	0.0
SECTION		AMOUNT PER MILE	0.00
STATE CODE	WA	FREIGHT PER TON	0.00
CITY LOCATION	CAMAS	CONFIDENCE LEVEL (DP)	1
VENDOR	NORTHWEST STONE INC.	ADJUSTED DEALER PRICE	85.00
STATE SOLD	OR	OWNERSHIP	PVT
CITY SOLD	PORTLAND	ADJUDICATED	
		COVERAGE	0.00
		DEALER PRICE/FT2	0.00
		ROYALTY	0.00

ORNAMENTAL BUILDING STONE
MINE/MARKET SURVEY
MASTER LIST

FIELD NAME	VALUE	FIELD NAME	VALUE
RECORD ID	6054	QUERY DATE	1979
REGION	6	ROCK CLASS	
TYPE	R	MINING METHOD	II
TRADE NAME	DESERT ANTIQUE	USE	A
ROCK CODE	LAVA	SURFACE TYPE	1
ROCK DESCRIPTION	RHYOLITE	GROUPING	
CONTACT PERSON	TERRY MALEY	MINING COST	61.00
CONTACT PHONE	FTS-554-1447	CONFIDENCE LEVEL (MC)	1
SOURCE OF INFORMATION	DQ	FOB QUARRY	31.00
MERIDIAN		DEALER PRICE	0.00
TOWNSHIP		RETAIL PRICE	100.00
RANGE		DISTANCE FROM SOURCE	438.0
SECTION		AMOUNT PER MILE	0.05
STATE CODE	ID	FREIGHT PER TON	22.00
CITY LOCATION	OAKLEY	CONFIDENCE LEVEL (DP)	3
VENDOR	NORTHWEST STONE INC.	ADJUSTED DEALER PRICE	78.00
STATE SOLD	OR	OWNERSHIP	
CITY SOLD	PORTLAND	ADJUDICATED	YN
		COVERAGE	0.00
		DEALER PRICE/FT2	0.00
		ROYALTY	0.00

ORNAMENTAL BUILDING STONE
MINE/MARKET SURVEY
MASTER LIST

FIELD NAME	VALUE	FIELD NAME	VALUE
RECORD ID	6055	QUERY DATE	1979
REGION	6	ROCK CLASS	
TYPE	R	MINING METHOD	II
TRADE NAME	DESERT MOSS	USE	A
ROCK CODE	LAVA	SURFACE TYPE	1
ROCK DESCRIPTION	DENSE BASALT LAVA	GROUPING	
CONTACT PERSON	TERRY MALEY	MINING COST	60.00
CONTACT PHONE	FTS-554-1447	CONFIDENCE LEVEL (MC)	1
SOURCE OF INFORMATION	DQ	FOB QUARRY	97.00
MERIDIAN		DEALER PRICE	0.00
TOWNSHIP		RETAIL PRICE	120.00
RANGE		DISTANCE FROM SOURCE	0.0
SECTION		AMOUNT PER MILE	0.00
STATE CODE	OR	FREIGHT PER TON	0.00
CITY LOCATION	BEND	CONFIDENCE LEVEL (DP)	1
VENDOR	NORTHWEST STONE INC.	ADJUSTED DEALER PRICE	120.00
STATE SOLD	OR	OWNERSHIP	
CITY SOLD	PORTLAND	ADJUDICATED	
		COVERAGE	0.00
		DEALER PRICE/FT2	0.00
		ROYALTY	0.00

ORNAMENTAL BUILDING STONE
MINE/MARKET SURVEY
MASTER LIST

FIELD NAME	VALUE	FIELD NAME	VALUE
RECORD ID	6056	QUERY DATE	1979
REGION	6	ROCK CLASS	
TYPE	R	MINING METHOD	I
TRADE NAME	DRIFTWOOD	USE	A
ROCK CODE	FIELD ST	SURFACE TYPE	1
ROCK DESCRIPTION		GROUPING	
CONTACT PERSON	TERRY MALEY	MINING COST	23.00
CONTACT PHONE	FTS-554-1447	CONFIDENCE LEVEL (MC)	1
SOURCE OF INFORMATION	DQ	FOB QUARRY	97.00
MERIDIAN		DEALER PRICE	0.00
TOWNSHIP		RETAIL PRICE	120.00
RANGE		DISTANCE FROM SOURCE	847.0
SECTION		AMOUNT PER MILE	0.05
STATE CODE	ID	FREIGHT PER TON	42.00
CITY LOCATION	ISLAND PARK	CONFIDENCE LEVEL (DP)	4
VENDOR	NORTHWEST STONE INC.	ADJUSTED DEALER PRICE	78.00
STATE SOLD	OR	OWNERSHIP	PDF
CITY SOLD	PORTLAND	ADJUDICATED	
		COVERAGE	0.00
		DEALER PRICE/FT2	0.00
		ROYALTY	0.00

ORNAMENTAL BUILDING STONE
MINE/MARKET SURVEY
MASTER LIST

FIELD NAME	VALUE	FIELD NAME	VALUE
RECORD ID	6057	QUERY DATE	1979
REGION	6	ROCK CLASS	
TYPE	R	MINING METHOD	II
TRADE NAME	FEATHER RIVER TRAVERTINE	USE	A
ROCK CODE	TRAV	SURFACE TYPE	1
ROCK DESCRIPTION	BLACK & WHITE TRAVERTINE	GROUPING	
CONTACT PERSON	TERRY MALEY	MINING COST	65.00
CONTACT PHONE	FTS-554-1447	CONFIDENCE LEVEL (MC)	1
SOURCE OF INFORMATION	DQ	FOB QUARRY	89.00
MERIDIAN		DEALER PRICE	0.00
TOWNSHIP		RETAIL PRICE	110.00
RANGE		DISTANCE FROM SOURCE	642.0
SECTION		AMOUNT PER MILE	0.05
STATE CODE	CA	FREIGHT PER TON	32.00
CITY LOCATION	QUINCY	CONFIDENCE LEVEL (DP)	2
VENDOR	NORTHWEST STONE INC.	ADJUSTED DEALER PRICE	78.00
STATE SOLD	OR	OWNERSHIP	
CITY SOLD	PORTLAND	ADJUDICATED	
		COVERAGE	0.00
		DEALER PRICE/FT2	0.00
		ROYALTY	0.00

ORNAMENTAL BUILDING STONE
MINE/MARKET SURVEY
MASTER LIST

FIELD NAME	VALUE	FIELD NAME	VALUE
RECORD ID	6058	QUERY DATE	1979
REGION	6	ROCK CLASS	
TYPE	R	MINING METHOD	I
TRADE NAME	HARMONY BROWN	USE	A
ROCK CODE	FIELD ST	SURFACE TYPE	1
ROCK DESCRIPTION		GROUPING	
CONTACT PERSON	TERRY MALEY	MINING COST	49.00
CONTACT PHONE	FTS-554-1447	CONFIDENCE LEVEL (MC)	1
SOURCE OF INFORMATION	DQ	FOB QUARRY	105.00
MERIDIAN		DEALER PRICE	0.00
TOWNSHIP		RETAIL PRICE	130.00
RANGE		DISTANCE FROM SOURCE	0.0
SECTION		AMOUNT PER MILE	0.00
STATE CODE	OR	FREIGHT PER TON	0.00
CITY LOCATION		CONFIDENCE LEVEL (DP)	
VENDOR	NORTHWEST STONE INC.	ADJUSTED DEALER PRICE	0.00
STATE SOLD	OR	OWNERSHIP	
CITY SOLD	PORTLAND	ADJUDICATED	
		COVERAGE	0.00
		DEALER PRICE/FT2	0.00
		ROYALTY	0.00

ORNAMENTAL BUILDING STONE
MINE/MARKET SURVEY
MASTER LIST

FIELD NAME	VALUE	FIELD NAME	VALUE
RECORD ID	6059	QUERY DATE	1979
REGION	6	ROCK CLASS	
TYPE	R	MINING METHOD	I
TRADE NAME	IDAHO STONE	USE	A
ROCK CODE	LAVA	SURFACE TYPE	1
ROCK DESCRIPTION	BANDED RHYOLITE	GROUPING	
CONTACT PERSON	TERRY MALEY	MINING COST	30.00
CONTACT PHONE	FTS-554-1447	CONFIDENCE LEVEL (MC)	
SOURCE OF INFORMATION	DQ	FOB QUARRY	57.00
MERIDIAN		DEALER PRICE	0.00
TOWNSHIP		RETAIL PRICE	70.00
RANGE		DISTANCE FROM SOURCE	0.0
SECTION		AMOUNT PER MILE	0.00
STATE CODE	ID	FREIGHT PER TON	0.00
CITY LOCATION		CONFIDENCE LEVEL (DP)	
VENDOR	NORTHWEST STONE INC.	ADJUSTED DEALER PRICE	0.00
STATE SOLD	OR	OWNERSHIP	
CITY SOLD	PORTLAND	ADJUDICATED	
		COVERAGE	0.00
		DEALER PRICE/FT2	0.00
		ROYALTY	0.00

ORNAMENTAL BUILDING STONE
MINE/MARKET SURVEY
MASTER LIST

FIELD NAME	VALUE	FIELD NAME	VALUE
RECORD ID	6060	QUERY DATE	1979
REGION	o	ROCK CLASS	
TYPE	R	MINING METHOD	I
TRADE NAME	NEVADA STONE	USE	A
ROCK CODE	FIELD ST	SURFACE TYPE	1
ROCK DESCRIPTION		GROUPING	
CONTACT PERSON	TERRY MALEY	MINING COST	52.00
CONTACT PHONE	FTS-554-1447	CONFIDENCE LEVEL (MC)	1
SOURCE OF INFORMATION		FOB QUARRY	39.00
MERIDIAN		DEALER PRICE	0.00
TOWNSHIP		RETAIL PRICE	110.00
RANGE		DISTANCE FROM SOURCE	512.0
SECTION		AMOUNT PER MILE	0.05
STATE CODE	NV	FREIGHT PER TON	26.00
CITY LOCATION		CONFIDENCE LEVEL (DP)	4
VENDOR	NORTHWEST STONE INC.	ADJUSTED DEALER PRICE	84.00
STATE SOLD	OR	OWNERSHIP	
CITY SOLD	PORTLAND	ADJUDICATED	
		COVERAGE	0.00
		DEALER PRICE/FT2	0.00
		ROYALTY	0.00

ORNAMENTAL BUILDING STONE
MINE/MARKET SURVEY
MASTER LIST

FIELD NAME	VALUE	FIELD NAME	VALUE
RECORD ID	6061	QUERY DATE	1979
REGION	6	ROCK CLASS	
TYPE	R	MINING METHOD	I
TRADE NAME	NORTHPORT MARBLE	USE	A
ROCK CODE	TRAV	SURFACE TYPE	1
ROCK DESCRIPTION	MARBLE	GROUPING	
CONTACT PERSON	TERRY MALEY	MINING COST	56.00
CONTACT PHONE	FTS-554-1447	CONFIDENCE LEVEL (MC)	
SOURCE OF INFORMATION	DQ	FOB QUARRY	81.00
MERIDIAN		DEALER PRICE	0.00
TOWNSHIP		RETAIL PRICE	100.00
RANGE		DISTANCE FROM SOURCE	0.0
SECTION		AMOUNT PER MILE	0.00
STATE CODE	OR	FREIGHT PER TON	0.00
CITY LOCATION		CONFIDENCE LEVEL (DP)	
VENDOR	NORTHWEST STONE INC.	ADJUSTED DEALER PRICE	0.00
STATE SOLD	OR	OWNERSHIP	
CITY SOLD	PORTLAND	ADJUDICATED	
		COVERAGE	0.00
		DEALER PRICE/FT2	0.00
		ROYALTY	0.00

ORNAMENTAL BUILDING STONE
MINE/MARKET SURVEY
MASTER LIST

FIELD NAME	VALUE	FIELD NAME	VALUE
RECORD ID	6062	QUERY DATE	1979
REGION	6	ROCK CLASS	
TYPE	R	MINING METHOD	III
TRADE NAME	HONEYLEDGE	USE	B
ROCK CODE	SCHIST	SURFACE TYPE	1
ROCK DESCRIPTION	SCHIST	GROUPING	
CONTACT PERSON	TERRY MALEY	MINING COST	70.00
CONTACT PHONE	FTS-554-1447	CONFIDENCE LEVEL (MC)	
SOURCE OF INFORMATION	DQ	FOB QUARRY	105.00
MERIDIAN		DEALER PRICE	0.00
TOWNSHIP		RETAIL PRICE	130.00
RANGE		DISTANCE FROM SOURCE	563.0
SECTION		AMOUNT PER MILE	0.05
STATE CODE	ID	FREIGHT PER TON	28.00
CITY LOCATION	OAKLEY	CONFIDENCE LEVEL (DP)	3
VENDOR	NORTHWEST STONE INC.	ADJUSTED DEALER PRICE	102.00
STATE SOLD	OR	OWNERSHIP	
CITY SOLD	PORTLAND	ADJUDICATED	
		COVERAGE	0.00
		DEALER PRICE/FT2	0.00
		ROYALTY	0.00

ORNAMENTAL BUILDING STONE
MINE/MARKET SURVEY
MASTER LIST

FIELD NAME	VALUE	FIELD NAME	VALUE
RECORD ID	6063	QUERY DATE	1979
REGION	6	ROCK CLASS	
TYPE	A	MINING METHOD	II
TRADE NAME	NO NAME ASHLER	USE	B
ROCK CODE	QTZT	SURFACE TYPE	1
ROCK DESCRIPTION		GROUPING	
CONTACT PERSON	TERRY MALEY	MINING COST	66.00
CONTACT PHONE	FTS-554-1447	CONFIDENCE LEVEL (MC)	1
SOURCE OF INFORMATION	DQ	FOB QUARRY	122.00
MERIDIAN		DEALER PRICE	0.00
TOWNSHIP		RETAIL PRICE	150.00
RANGE		DISTANCE FROM SOURCE	0.0
SECTION		AMOUNT PER MILE	0.00
STATE CODE	OR	FREIGHT PER TON	0.00
CITY LOCATION		CONFIDENCE LEVEL (DP)	
VENDOR	NORTHWEST STONE INC.	ADJUSTED DEALER PRICE	0.00
STATE SOLD	OR	OWNERSHIP	
CITY SOLD	PORTLAND	ADJUDICATED	
		COVERAGE	0.00
		DEALER PRICE/FT2	0.00
		ROYALTY	0.00

ORNAMENTAL BUILDING STONE
MINE/MARKET SURVEY
MASTER LIST

FIELD NAME	VALUE	FIELD NAME	VALUE
RECORD ID	6064	QUERY DATE	1979
REGION	6	ROCK CLASS	
TYPE	V	MINING METHOD	III
TRADE NAME	MICA SLATE	USE	8
ROCK CODE	SLATE	SURFACE TYPE	1
ROCK DESCRIPTION	MICACEOUS QUARTZITE	GROUPING	
CONTACT PERSON	TERRY MALEY	MINING COST	137.00
CONTACT PHONE	FTS-554-1447	CONFIDENCE LEVEL (MC)	
SOURCE OF INFORMATION	DQ	FOB QUARRY	211.00
MERIDIAN		DEALER PRICE	0.00
TOWNSHIP		RETAIL PRICE	260.00
RANGE		DISTANCE FROM SOURCE	563.0
SECTION		AMOUNT PER MILE	0.05
STATE CODE	ID	FREIGHT PER TON	23.00
CITY LOCATION	OAKLEY	CONFIDENCE LEVEL (DP)	3
VENDOR	NORTHWEST STONE INC.	ADJUSTED DEALER PRICE	232.00
STATE SOLD	OR	OWNERSHIP	
CITY SOLD	PORTLAND	ADJUDICATED	
		COVERAGE	0.00
		DEALER PRICE/FT2	0.00
		ROYALTY	0.00

ORNAMENTAL BUILDING STONE
MINE/MARKET SURVEY
MASTER LIST

FIELD NAME	VALUE	FIELD NAME	VALUE
RECORD ID	6065	QUERY DATE	1979
REGION	6	ROCK CLASS	
TYPE	V	MINING METHOD	II
TRADE NAME	MT ADAMS	USE	B
ROCK CODE	SLATE	SURFACE TYPE	1
ROCK DESCRIPTION		GROUPING	
CONTACT PERSON	TERRY MALEY	MINING COST	106.00
CONTACT PHONE	503-554-1447	CONFIDENCE LEVEL (MC)	
SOURCE OF INFORMATION	DQ	FOB QUARRY	178.00
MERIDIAN		DEALER PRICE	0.00
TOWNSHIP		RETAIL PRICE	220.00
RANGE		DISTANCE FROM SOURCE	0.0
SECTION		AMOUNT PER MILE	0.00
STATE CODE	OR	FREIGHT PER TON	0.00
CITY LOCATION		CONFIDENCE LEVEL (DP)	
VENDOR	NORTHWEST STONE INC.	ADJUSTED DEALER PRICE	0.00
STATE SOLD	OR	OWNERSHIP	
CITY SOLD	PORTLAND	ADJUDICATED	
		COVERAGE	0.00
		DEALER PRICE/FT2	0.00
		ROYALTY	0.00

ORNAMENTAL BUILDING STONE
MINE/MARKET SURVEY
MASTER LIST

FIELD NAME	VALUE	FIELD NAME	VALUE
RECORD ID	6066	QUERY DATE	1979
REGION	6	ROCK CLASS	
TYPE	V	MINING METHOD	III
TRADE NAME	NO NAME FLAGGING	USE	B
ROCK CODE	SLATE	SURFACE TYPE	1
ROCK DESCRIPTION		GROUPING	
CONTACT PERSON	TERRY MALEY	MINING COST	91.00
CONTACT PHONE	FTS-554-1447	CONFIDENCE LEVEL (MC)	
SOURCE OF INFORMATION	DQ	FOB QUARRY	292.00
MERIDIAN		DEALER PRICE	0.00
TOWNSHIP		RETAIL PRICE	360.00
RANGE		DISTANCE FROM SOURCE	0.0
SECTION		AMOUNT PER MILE	0.00
STATE CODE	OR	FREIGHT PER TON	0.00
CITY LOCATION		CONFIDENCE LEVEL (DP)	
VENDOR	NORTHWEST STONE INC.	ADJUSTED DEALER PRICE	0.00
STATE SOLD	OR	OWNERSHIP	
CITY SOLD	PORTLAND	ADJUDICATED	
		COVERAGE	0.00
		DEALER PRICE/FT2	0.00
		ROYALTY	0.00

ORNAMENTAL BUILDING STONE
MINE/MARKET SURVEY
MASTER LIST

FIELD NAME	VALUE	FIELD NAME	VALUE
RECORD ID	6067	QUERY DATE	1979
REGION	6	ROCK CLASS	
TYPE	V	MINING METHOD	II
TRADE NAME	NO NAME PATIO	USE	B
ROCK CODE	SLATE	SURFACE TYPE	1
ROCK DESCRIPTION		GROUPING	
CONTACT PERSON	TERRY MALEY	MINING COST	66.00
CONTACT PHONE	FTS-554-1447	CONFIDENCE LEVEL (MC)	1
SOURCE OF INFORMATION	DQ	FOB QUARRY	146.00
MERIDIAN		DEALER PRICE	0.00
TOWNSHIP		RETAIL PRICE	180.00
RANGE		DISTANCE FROM SOURCE	0.0
SECTION		AMOUNT PER MILE	0.00
STATE CODE	OR	FREIGHT PER TON	0.00
CITY LOCATION		CONFIDENCE LEVEL (DP)	
VENDOR	NORTHWEST STONE INC.	ADJUSTED DEALER PRICE	0.00
STATE SOLD	OR	OWNERSHIP	
CITY SOLD	PORTLAND	ADJUDICATED	
		COVERAGE	0.00
		DEALER PRICE/FT2	0.00
		ROYALTY	0.00

ORNAMENTAL BUILDING STONE
MINE/MARKET SURVEY
MASTER LIST

FIELD NAME	VALUE	FIELD NAME	VALUE
RECORD ID	6068	QUERY DATE	1979
REGION	6	ROCK CLASS	
TYPE	V	MINING METHOD	III
TRADE NAME	VERMONT	USE	B
ROCK CODE	SLATE	SURFACE TYPE	2
ROCK DESCRIPTION	SLATE	GROUPING	
CONTACT PERSON	TERRY MALEY	MINING COST	285.00
CONTACT PHONE	FTS-554-1447	CONFIDENCE LEVEL (MC)	3
SOURCE OF INFORMATION	DQ	FOB QUARRY	405.00
MERIDIAN		DEALER PRICE	0.00
TOWNSHIP		RETAIL PRICE	500.00
RANGE		DISTANCE FROM SOURCE	2063.0
SECTION		AMOUNT PER MILE	0.05
STATE CODE	VT	FREIGHT PER TON	103.00
CITY LOCATION		CONFIDENCE LEVEL (DP)	4
VENDOR	NORTHWEST STONE INC.	ADJUSTED DEALER PRICE	397.00
STATE SOLD	OR	OWNERSHIP	
CITY SOLD	PORTLAND	ADJUDICATED	
		COVERAGE	0.00
		DEALER PRICE/FT2	0.00
		ROYALTY	0.00

jettystone

October 21, 1968

Mr. Dale Mallicoat, Director
Division of State Lands
20 Agriculture Building
Salem, Oregon

Dear Mr. Mallicoat:

At your request we have prepared a list of some of the factors which should be considered in granting a lease on a certain jettystone prospect. Since I view the subject as a geologist and not as a contractor, someone knowledgable of contracting and quarry operation should be consulted. It would also be advisable to obtain the opinions of the U.S. Army Corps of Engineers.

One of the first considerations should be the geology of the site. Information should be obtained on: (1) the rock type, (2) specific gravity, (3) spacing of fractures and joints, and (4) hardness or resistance to abrasion.

The structure and size of the deposit determines to a great extent the cost of the quarry operation. If the rock is a sill or flow, how much overburden must be removed to expose the quarry rock? Is there much weathering of the exposed surfaces and in joints and fractures? Have folding, faulting, or later intrusions fractured the rock so that the required sizes will be difficult to produce without a large percentage of waste?

A large deposit may produce rock for many subsequent contracts if quarried and developed properly. If the rock quality is variable, selective quarrying will greatly increase the expense of quarry operations and limit the amount of rock available.

If the jettystone prospect is to be used, it must have an economic attraction when compared with existing sources. The dangers of considering use of an unknown site when bidding on a jetty contract are many; therefore, it would be foolish for a contractor to bid any less than it could cost to complete the contract with rock purchased from a proven source. However, after receiving the contract, the contractor could consider producing rock from a closer and cheaper source.

Royalties range from 10 cents to $1.00 per ton. The initial royalty costs should take into consideration the contractor's costs of development of the quarry as a rock source. After enough rock has been produced to amortize the initial high cost of development the royalty should be raised, either by review at regular intervals or increased according to the original lease.

The State should specify and control quarry operations so that the quarry will continue to be a source of rock. The lease should specify the maximum height of the quarry face and require proper benching. The lease should also specify selective drilling and shooting and under no conditions allow a massive centrally located charge known as "coyote hole." Selective drilling and shooting by men experienced in jettystone operations will continue to produce a maximum of large sized jettystone. Coyote shooting will definitely ruin a quarry for jettystone.

A new jettystone source would be advantageous for Oregon in several ways. The money from the rock would go to this State, and the lower costs due to competition would result in lower cost jetties.

Finally, some arrangement should be made to have the quarry available to the successful bidders of jetty contracts. Possibly the original lessee will not get the contract but will be able to sell to the contractor getting the bid.

As I said before, these statements are from a geologist, noe one who has contractor or legal experience. I believe that actual costs of operation should be considered, including development, and therefore I recommend that you hire an experienced engineer to advise you on writing a contract.

We hope these thoughts will be of some help in arriving at a jettystone lease agreement.

Sincerely,

H. G. Schlicker
Geologist

HGS:lk

Stone

April 22, 1969

Mr. Howard I. Henson, Director
Stone Industry Division
Laborers' International Union of North America
905 - 16th Street, N.W.
Washington, D.C. 20006

Dear Mr. Henson:

Here are the three principal stoneyards in the State of Oregon:

Doug Remmick Northwest Stone
9290 S.W. Hall Boulevard
Portland, Oregon 97223

Serendip Industrial Minerals
2020 N. Marine Drive
North Portland, Oregon

Stone Center, Inc.
2603 S.E. Grand Avenue
Portland, Oregon.

Sincerely yours,

Ralph S. Mason
Mining Engineer

RSM:lk

MORESCHI BUILDING

JOSEPH V. MORESCHI, General President PETER FOSCO, General Secretary-Treasurer ROBERT J. CONNERTON, General Counsel

W. Vernie Reed, 1st Vice-President
Herbert W. Fiesher, 2nd Vice-President
Robert E. Powell, 3rd Vice-President
Maurice Fancher, 4th Vice-President
Ledger Diamond, 5th Vice-President
Wilbur Freitag, 6th Vice-President
Terence J. O'Sullivan, 7th Vice-President
Michael Lorello, 8th Vice-President

LABORERS' INTERNATIONAL UNION of North America

AFFILIATED WITH AFL-CIO AND CLC

905 16th STREET, N.W. • WASHINGTON, D.C. 20006 • TEL. 737-8320

March 31, 1969 Ralph ?

Chief Geologist
State Capitol
Salem, Oregon

Dear Sir:

The Journeymen Stone Cutters Association of North America recently merged with the Laborers' International Union of North America.

We are instituting a dual-purpose campaign in this Country to promote and publicize the use of all types of stone in public and private buildings, and we are faced with some 400 million dollars worth of stone being shipped into this Country from foreign ports. In order that we might coordinate this program better and reach all interested parties, we are attempting to up-date our listings of all stone companies and quarrying operations in the United States.

We would greatly appreciate receiving the names and addresses of all such companies doing business within your State at the earliest convenience. We will promptly reimburse you for any cost involved in forwarding this material to us. We shall also appreciate any effort on the part of your Office in contacting your Senators and Congressmen with the aim of securing their support in the above-mentioned objectives.

Thanking you in advance, I am

Very truly yours,

Howard I Henson

HOWARD I. HENSON, Director
Stone Industry Division

Enclosure

HELP SAVE THE STONE INDUSTRY!

Please lend your support toward increasing tariffs, or passing into law a bill or amendment prohibiting fabricated or carved stone imports, and limiting raw stone imports to specific approved instances. This country needs the stone industry, and its craftsmen.

We would appreciate any effort on your part to increase the use of natural stone in state, county and government building programs. Natural Stone is beautiful, and durable. Remove the possibility of future slums by using stone; it's cheaper.

The following Resolutions were submitted to recent Labor Conventions, and help spell out the need for the above action:

RESOLUTION

Re: Import Duty on Carved Stone

Submitted by:
Journeymen Stone Cutters Association of North America

Referred to: Committee on Adjustments

Whereas, the United States has ample quantities of natural stone in nearly every state, including marble, granite, limestone and sandstone in almost every quality and color; and

Whereas, the stone industry is in a state of depression, and has been in such state chronically ever since World War II; and

Whereas, practically no apprenticeship program is available, so the supply of skilled workers will soon be depleted, if these conditions continue, thereby destroying one of the country's most valuable assets in constructing art memorials, and in utilizing the world's finest building material, natural stone; and

Whereas, we at present still have in the United States an adequate supply of artisans to do sculpturing and art work; and

Whereas, if the need for additional skilled artisans should arise, before they can be trained in this country, it is possible and practical to import such people, who would thereby become an asset to this country,

Now, Therefore, Be It Resolved by this convention assembled:

"That labor support a bill, to be introduced in the Congress of the United States, increasing the import duty on building, monumental and ornamental stone which has been carved, fabricated or processed in any manner whatsoever, other than original quarrying and cutting to proper size for shipping; except that this increased duty shall not apply to any legitimate sculptured or art work which is at least six years old."

RESOLUTION

Re: Prohibition of Imported Carved Stone

Submitted by:
Journeymen Stone Cutters Association of North America

Referred to: Committee on Adjustments

Whereas, the United States has ample quantities of natural stone in nearly every state, including marble, granite, limestone and sandstone in almost every quality and color; and

Whereas, the stone industry is in a state of depression, and has been in such state chronically ever since World War II; and

Whereas, practically no apprenticeship program is available, so the supply of skilled workers will soon be depleted, if these conditions continue, thereby destroying one of the country's most valuable assets in constructing art memorials, and in utilizing the world's finest building material, natural stone; and

Whereas, we at present still have in the United States an adequate supply of artisans to do sculpturing and art work; and

Whereas, if the need for additional skilled artisans should arise, before they can be trained in this country, it is possible and practical to import such people, who would thereby become an asset to this country.

Now, Therefore, Be It Resolved by this convention assembled:

"That labor support a bill, to be introduced in the Congress of the United States, prohibiting the importation of building, monumental and ornamental stone which has been carved, fabricated or processed in any manner whatsoever, other than the original quarrying and cutting to proper size for shipping; except that this prohibition shall not apply to any legitimate sculptured or art work which is at least six years old."

Howard I. Henson

USE NATURAL STONE

Jerry G- FYI

R. L. LOOFBOUROW
REGISTERED PROFESSIONAL ENGINEER
3601 Park Center Blvd.
Minneapolis, Minn. 55416

June 13, 1983

State Dept. of Geology &
Mineral Industries
1069 State Office Building
1400 SW Fifth Avenue
Portland, OR 97201

Attention: Mr. Donald A. Hull

Underground Mining for Stone

Gentlemen:

Facts of modern life tend, I believe, to be increasingly favorable to underground mining for stone. The substantial number of underground stone mines indicate that where conditions are favorable, underground mining can be profitable.

In the enclosed paper I endeavor to list those favorable conditions.

I would value any comment you wish to express and to discuss prospects with you or others interested.

Sincerely,

R.L. Loofbourow

RL/jl

Enclosure

VICTOR ATIYEH
GOVERNOR

Department of Geology and Mineral Industries
ADMINISTRATIVE OFFICE
1005 STATE OFFICE BLDG., PORTLAND, OREGON 97201 PHONE (503) 229-5580

October 14, 1983

TO: Sid Johnson

FROM: Don Hull

Thanks for sending the magazine article describing the Netherlands construction project which involves concrete piers to construct a surge barrier. Will this type of construction reduce the demand for jetty stone?

I have forwarded copies of the article to Paul Lawson and Jerry Gray. Enclosed is the original.

DAH:jr
Encl.
cc Paul Lawson
cc Jerry Gray

STONE

By Ralph S. Mason*

The production of stone accounts for almost half of the State's total mineral value. Included in this category are: limestone, sandstone, building stone, crushed and broken stone, jetty stone, and riprap. Lightweight aggregates such as pumice, volcanic cinders, and expansible shale are treated elsewhere.

Limestone

Limestone is one of the more important industrial rocks. Raw limestone is used directly in many ways. Agricultural limestone is applied to fields after grinding, aggregate for roads and concrete is crushed and sized, as is flux stone for metallurgical purposes in blast furnaces. High-calcium or high-magnesium limestones are crushed and washed for the manufacture of glass. Special limestone deposits yield blocks suitable for building stone or sculpture. Large tonnages of limestone are calcined into quicklime which in turn forms the base for a large number of chemical products. The term lime has become a very general and loosely used term that includes practically all of the finely divided types of raw limestone and the burned forms of limestone. Strictly speaking, lime refers to burned or calcined limestone (quicklime), but it also includes the hydrated form called hydrated lime, slaked lime, or calcium hydroxide.

Lime is a fundamental ingredient in the manufacture of calcium carbide and many other chemical compounds. Lime is extensively used in the building

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* Mining Engineer, State of Oregon Department of Geology and Mineral Industries.

trades, in soil stabilization, in agriculture, paints, plastics, glass, paper, rubber, glue, and medicines. Water treatment usually requires lime, as does oil well drilling mud, sugar refining, the preparation of insecticides and sand-lime brick. Large quantities of crushed limestone are consumed in the manufacture of portland cement.

Limestone is quarried in nearly every state in the Union. Generally the stone is used or processed locally, since the unit value of the raw stone is low and will not stand high transportation charges. Limestone is basic to the manufacture of cement and construction lime, and it plays a vital role in competitive community development costs. Cement in recent years has become the principal building material used in this country. An excellent review of the importance of limestone, lime, and cement is given in various chapters of Industrial Minerals and Rocks, published by the American Institute of Mining, Metallurgical and Petroleum Engineers, 1960.

Limestone is composed essentially of the mineral calcite which is pure calcium carbonate. Calcium carbonate is formed in a variety of ways. The following description by Bowen (1957) outlines the principal methods:

> "Many aquatic organisms, both plant and animal, secrete calcium carbonate for protective and supporting parts. As many of these organisms are colonial on at least gregarious in habit, their limy remains may accumulate and be preserved in large concentrations. Micro-organisms may also contribute indirectly to the chemical precipitation of carbonate minerals by upsetting the chemical equilibrium of the aqueous system, by catalytic activity and so on. Changes of temperature and changes in mineral concentration and composition of ocean and lake waters may also result in precipitation of carbonate minerals without the aid of organisms. The relative importance of purely chemical precipitation as compared with the action or influence of organisms in

producing limestone has not been well established, but organisms appear to play the predominating role in limestone formation, and mechanical concentration of pre-existing carbonate detritus as well as inorganic chemical precipitation play lesser roles. . . ."

"A few deposits of limestone, which are of sufficient size and purity to be of economic importance, have formed by a combination of evaporation and chemical interaction between carbonate-laden spring water and air. Such material, which is known as travertine limestone, grows by accretion around multiple spring vents and occasionally builds deposits aggregating tens of millions of tons. Algae, bacteria and other organisms may aid the process.

"Some sea-floor carbonate deposits also grow by accretion of tiny, interbonded mineral crystals, but the bulk of most marine- and lacustrine-laid limestones are believed to originate as soft, unconsolidated oozes which are compacted and finally lithified long after burial under succeeding strata. Consolidation and lithification of soft oozes generally involves widespread re-solution, cementation, dehydration and crystallization, the ultimate rock having few voids and consisting principally of interlocking crystals. Microscopic examination of some limestones shows that some material forms by dehydration of colloidal carbonate gels without crystallization in early stages of lithification. However, colloidal material probably does not form the major parts of most limestone deposits.

"Limestones also accumulate by direct growth of reef-building organisms such as corals or the lime secreting algae

Lithothamnion. Reef limestones differ from the accumulations of sea shells in that most of the shell deposits have been transported to some extent by water, whereas the bulk of reef limestone generally is secreted in place by colonial organisms.

"Calcareous deposits of considerable size also form in desert climates as the result of evaporation of carbonate-laden groundwater. These calcareous evaporites or caliches, as they are commonly called, may form at or close to the surface or they may form deeper in the pervious mantle above locally-developed impervious layers. Caliche was the principal raw material used at the early-day Jamul Ranch cement plant in San Diego County and is used to some extent today at several of the desert cement plants."

Oregon limestone deposits are, from a commercially important standpoint, divided into two main areas. In southwestern Oregon large reserves of high-grade limestone, some of which has been partly metamorphosed, are found in the hilly country south of Grants Pass in Josephine County. The deposits occur in a series of lenses or pods in a metasedimentary series of Upper Paleozoic or Jurassic age. The distribution of the various limestone bodies is shown on the Geologic Map of the Grants Pass Quadrangle, by Wells (1940). Commercial production from one of the larger deposits on Marble Mountain about 12 miles southwest of Grants Pass has been carried on for many years. The bulk of the stone was shipped to a cement plant at Gold Hill, with minor amounts being sold for agricultural use and paper manufacture. The plant, operated by Ideal Cement Company, closed down in 1967. Near Williams a relatively small pod of crystalline limestone ranging in color from variegated

black and white to nearly pure white was the source of a small amount of monumental stone. In the mid-1930's an attempt was made to produce burnt lime from a deposit on a ridge south of Powell Creek west of the town of Provolt. About 15 miles southwest of the Williams monument stone quarry and on an extension of the same geological belt of narrow but greatly elongated metasediments lies the Oregon Caves National Monument. A fairly extensive system of limestone caverns has been developed as a tourist attraction. Although not presently accessible, a comparable cave complex was discovered many years ago on Marble Mountain during quarrying operations. The following analyses are typical of the southwestern Oregon limestones:

Analyses of Limestones from Marble Mountain*

Constituents	1	2	3	4	5	6
SiO_2	0.87	0.06	2.31	0.34	1.73	3.20
Al_2O_3	0.35	0.01	1.72	0.06	1.69	0.93
Fe_2O_3	0.31	0.31	0.33	0.32	0.30	0.30
CaO	54.60	55.85	54.06	55.44	54.16	54.05
MgO	0.80	0.33	0.41	0.25	0.40	0.36
Ignition loss	43.41	42.09	41.33	42.07	41.57	40.74
Total	100.34	98.65	100.16	98.48	99.85	99.58

1 Body A
2 Body B -- U.S.E.D. Sample 190A.
3 Body C -- U.S.E.D. Sample 184A, composite from middle and south ends.
4 Body D -- U.S.E.D. Sample 188A.
5 Body E -- U.S.E.D. Sample 182A, composite from middle, north, and south ends.
6 Body F -- U.S.E.D. Sample 186A, south end.

* From - Hodge, Edwin T., Market for Columbia River hydroelectric power using Northwest minerals, Sec. III, Vol. I, Pt., I, Limestones of the Northwest states: U.S. Army Corps of Engineers, Jan. 1938, p. 288.

In northeastern Oregon large limestone deposits lie scattered over parts of Baker, Union, and Wallowa Counties, with minor occurrences in Grant, Malheur, Harney, and Crook Counties. A map showing the generalized locations of the various deposits is shown on page _____ (from May 1958 Ore Bin). A compilation by Wagner (1958) gives condensed information for each of the localities shown on the map which has been adapted from the original report. Additional information on the more important deposits appears in Libbey (1957), Moore (1937), and Hodge (1938). The large deposits represented by those on the Lostine River, Hurricane Creek, and Black Marble quarry in Wallowa County, and the Baker County occurrences such as those near Lime and the headwaters of Fox, Connor, and Hibbard Creeks are believed to be of Permo-Triassic age.

A cement plant at Lime, Baker County, has been in operation since 1910. Limestone has also been quarried near Nelson, about 10 miles northwest of Lime, for various industrial and chemical applications. Years ago the Black Marble quarry on Murray Creek about $5\frac{1}{2}$ miles southwest of Enterprise in Wallowa County produced cut stone for monuments. When polished the stone is a lustrous velvety black with occasional white fossil shell inclusions. In more recent years the quarry has supplied high-grade stone for the manufacture of calcium carbide and for agricultural use. A lime plant located at Wing, 5 miles northwest of Baker in Baker County, burns lime from quarries high up in the Elkhorn Mountains on Marble and Baboon Creeks. There are large reserves of high-grade limestone in northeastern Oregon which are adjacent to or not far removed from both rail and highway transportation. Present markets, with the exception of minor quantities used by agriculture and the refining of beet sugar, are located at considerable distances from the deposits. The cement plant at Lime and the lime plant at Wing both ship most of their products

several hundred miles, but their enhanced value permits a much wider marketing radius than that for raw limestone. In recent years barge shipments of limestone from Texada Island, British Columbia into the Portland area have cut deeply into the movement of cement rock from Baker County. Typical analyses of northeastern Oregon limestones are shown in the following table:

Analyses of Some Northeastern Oregon Limestones*

Constituents	1	2	3	4	5	6
SiO_2	0.92	1.17	0.12	1.99	None	0.38
Al_2O_3	0.34	0.17	Tr.	----	None	----
R_2O_3	----	----	----	0.47	----	0.11
Fe_2O_3	Tr.	0.12	Tr.	----	None	----
CaO	54.50	53.15	55.62	54.07	55.65	55.00
MgO	0.52	1.23	0.28	1.03	0.52	0.17

1 Lostine River
2 Black Marble quarry
3 Hurricane Creek
4 Deposits at Lime
5 Connor Creek
6 Elkhorn Mountain

* 1, 2, 3, 4, 5 - From - Moore, B. N., 1937, Nonmetallic mineral resources of eastern Oregon: U.S. Geol. Survey Bull. 875.
6 - From - Wagner, N. S., 1958, Limestone occurrences in eastern Oregon: Oregon Dept. Geology and Mineral Industries The Ore Bin, vol. 20, no. 5, p. 45.

In Polk County there are several lenses of limestone which have been quarried for agricultural and cement use. The stone is not as high grade as either the southwestern or northeastern deposits. The following analysis

is typical: SiO_2 - 24.08, $Al_2O_3+Fe_2O_3$ - 15.66, CaO - 31.58, MgO - 2.74, CO_2 - 20.24. Due to the low quality of the limestone its use for agricultural purposes is largely restricted to local markets. The stone quarried for cement is shipped to Oswego where it is mixed with high-calcium stone from British Columbia.

In addition to the deposits mentioned above there are literally hundreds of pods and lenses scattered over the State which are either too small, too low grade, too far from transportation and market, or too expensive to mine. Many of these are included in the compilations by Peterson and Mason (1958) and Wagner (1958).

Building Stone

Building stone is one of the oldest construction materials used by man. The ancients made extensive use of both rough and shaped stone in their temples, public buildings, and somewhat later engineering works such as aqueducts, bridges, and dams. Man gave up living in a tree when his dawning intelligence directed him to a cave which had better environmental control. Still later it became apparent that loose rock could be fashioned into an adjustable cave which could be adapted to individual or group requirements. From such humble but basic beginnings the building stone industry has sprung. Today the industry makes use of an exceedingly wide variety of building stones, ranging from blocks of porous coralline limestone to the densest of granites. The choice of materials is dictated by numerous factors, primary among them is availability, although the history of Stonehenge erected on the Salisbury plains in southern England tends to refute this. Beauty and utility are obvious requirements. The Taj Mahal is constructed of pure white marble and

is considered to be the most beautiful building in the world. In sharp contrast, another equally famous stone structure, the Great Pyramid at Cheops, Egypt, constructed of nummulitic limestone blocks selected primarily for their utility, has resisted weathering and erosion for over 4800 years. When completed the pyramid was sheathed in smooth limestone, but this has since been removed and reused in lesser structures. Much modern construction makes use of ornamental stone facings which are applied to enhance the appearance of the structure rather than to impart structural strength. In such applications the attractiveness and workability of the stone is of paramount importance. Overshadowing nearly all of the requirements listed above is the cost of the delivered stone. Substitutes for any particular stone are often readily available in another building stone possessing comparable characteristics, and competition from artificial stone is ever present.

Modern uses for building stone include governmental and other public buildings, retaining walls, footings, curbing, veneering for commercial buildings and private residences, rockeries, landscaping, monuments, statuary, and flagging.

Building stone is sold in several forms. Chunks of rough stone, commonly called rubble, thin sheets of polished veneer, sawed blocks of many sizes, and sawed strips with rough "stone" faces constitute the bulk of the commercially produced building stone. The development of the tilt-up wall has greatly increased the use of rubble. The considerable reduction in cost achieved by this method contrasted to the conventional placement of individual stones permits the erection of rock walls at prices approaching standard concrete construction. Stone veneer has been a standard building material for a long time and its use will probably continue for a long time to come. Veneer sheets

usually have a minimum thickness of about one inch, but may be considerably thicker for very large-sized pieces. Marble, granite, sandstone, limestone, and travertine are most commonly used for veneer. In recent years the use of veneer strips has become very popular. The strips may vary considerably in thickness and length but are uniformly about a brick width wide. The vertical faces are rough surfaces produced by guillotining the sawed slabs into the random length strips. Placement of the strips is similar to brick laying. Large sawed blocks of stone find limited use in modern building construction. Memorials, mausoleums, and a few government buildings and other structures are built with solid cut stone, but the high cost of the stone plus installation greatly restricts this type of construction.

Building stones are derived from all types of geologic formations and from pre-Cambrian to Recent in age. Stone is the most abundant material on the surface of the earth. The specifications for some types of building stone are extremely rigid while those for others are very broad and flexible. The applications for building stone are so numerous and varied that practically any stone could be used for some purpose or other. The amount of stone that is actually available is, however, very small. The highest quality building stone, free from all impurities and flaws, and possessing the proper color, texture, density, and workability occurs in limited quantities and commands a premium price. Such stone can, however, be marketed at considerable distances from the quarry. Lower quality stone must sell for less, and even though there are greater tonnages available the market area is curtailed since freight represents a disproportionately large cost item. Common field stone and some types of rubble are normally plentiful, but their very low value restricts their use to immediate markets and the tonnage produced is

correspondingly small. There is an additional factor involved in building stone which plays an important role in its marketing. Distance lends enchantment to many things and building stone is one of them. The ultimate consumer of ornamental or monumental stone will more often than not be willing to pay more for material that has come from some far away place, even though equally good and attractive stone is locally available.

Oregon's building stones have been used since early pioneer days when the first permanent structures were erected. Originally the stone was collected locally and used rough, or with only minor shaping. Formal production of building stone dates from the late 1880's when basalt from St. Helens in Columbia County was quarried and shaped. By 1889 the U.S. Geological Survey reported in The Mineral Resources of the United States 1889-1900 that Oregon was producing granite, marble, and sandstone. The report stated that granite was produced from Columbia, Multnomah, Clackamas, and Jackson Counties. Almost certainly the granite produced from the first three counties must have come from glacial erratics ice-rafted down the Columbia River from either northeastern Washington or north of the Canadian border. Numerous erratics of granite gneiss and schist have been found in the lower Willamette and Tualatin Valleys and in some areas are still being used for foundation stone locally. In later years other granite quarries which were opened up included: the Ashland granite quarry in Jackson County, the Gold Ray quarry near Tolo in Jackson County, and the Haines quarry two miles east of Haines in Baker County. Of the three, only the Haines quarry had any extended period of production. The quarry was opened before 1900 and shut down in 1960 when the plant was destroyed by fire.

Sandstone

The principal sandstone producer in Oregon was the Pioneer Quarry in Lincoln County which was most active during the middle and late 1890's. Other sandstone production has come from the Geary Quarry southwest of Medford in Jackson County; the Cooper Quarry 3 miles south of Sutherlin in Douglas County; the Monroe Quarry at Monroe in Benton County; the Boos Quarry 2½ miles northwest of Gaston in Washington County; the Cow Creek Quarry about 4 miles west of Riddle in Douglas County; and the Brownsville Quarry 4 miles south of Brownsville in Linn County. Only the Pioneer and Boos Quarries produced any significant tonnage of building stone. The Brownsville Quarry has been the source of a small amount of stone used for statuary by sculpture classes at the University of Oregon. The Cow Creek Quarry has supplied a limited quantity of fine-grained flagstone.

Limestone

Limestone and marble have been quarried for ornamental stone at several localities in Oregon. Since most of these quarries have been principally used for the production of commercial limestone used by the burnt lime, cement, and calcium carbide industries, they are discussed under the section on "Limestone" elsewhere in this report.

Volcanic tuffs and flow rocks

Building stone production in Oregon is currently restricted almost entirely to the various volcanic rocks. Tuffs, tuffaceous sandstones, basalt, andesite, and rhyolite are the most common. Tuffs, composed of volcanic ash that has been cemented by minerals dissolved in migrating ground water, are found widely scattered in the State, but principally east of the Cascades. A wide

variety of colors, textures, and patterns are available. Welded tuffs are formed from ash flows which issued from vents as large quantities of incandescent volcanic ash, dust, and rocks which became welded together upon cooling, often at considerable distances from their source. Generally the welded tuffs are harder and denser than the water-cemented variety, but a great variation both in color, texture, composition, and density exists. Some welded tuffs emit a bell-like tone when struck. Tuffaceous sandstones grade insensibly from true water-cemented tuffs into sandstones, and it is often difficult to classify some of these transitional varieties.

The Rainbow Rock Quarry, located about 5 miles south of Pine Grove in southwestern Wasco County, has been producing brightly colored and banded tuff since 1949. The quarry is located on the nose of a low ridge which stands about 100 feet higher than the surrounding countryside. Rock of similar appearance has been uncovered but not developed on the flat nearby to the east of the quarry. Quarry blocks have been cut with wire saws or travelling circular saws making horizontal and vertical cuts. The saw carriage is mounted on heavy rails. An interesting feature of Rainbow Rock is the deepening of the colors upon firing in a ceramic kiln. When quarried the stone is easily shaped and various small art objects have been fashioned from it. After firing the pieces can be given a salt glaze which produces a hard, impervious and transparent surface. Past production from the quarry has gone mainly into veneer strips and split-face blocks.

The Willowdale quarry on U.S. Highway 97, about 20 miles north of Madras in northern Jefferson County has been producing stone from a welded tuff outcrop for many years. Colors available in the well-developed quarry range from rose through reddish browns to darker shades. A travelling track-mounted

carriage equipped with vertically and horizontally mounted circular saws cuts out "cants" of various dimensions. The "cants" are then resawed and guillotined in the shop.

An outcrop of green-colored tuff located about 4 miles north of Prineville in Crook County was worked in a small way for a short time. The stone proved to be uneven in composition and hardness. Whether this condition persisted much below the shallow depths exposed in the quarry is not known.

A rough, dark-red scoria is quarried at Tetherow Butte located a few miles north of Redmond and just west of U.S. Highway 97. The Butte is a Recent cinder cone several miles in length. Portions of the Butte are composed of loose aggregate which has been extensively used for road ballast. Along a part of the southwest flank of the Butte the scoria has been consolidated sufficiently to permit the extraction of large rough blocks. The blocks, which lack nearly every characteristic of a good building stone, are much used for making rockery walls, planters, and low retaining walls. The blocks can be shaped readily with a borrowed ax and are popular with home owners who like to build their own walls.

The Kah-Nee-Ta stone quarry on the Warm Springs Indian Reservation, Wasco County, produces rough pieces of silicified rhyolite. The rhyolite has been partly infiltrated with silica derived from local hot spring activity. The stone is vari-colored with browns, tans, and whites predominating, and is quite rough and vesicular.

The Carver Quarry, six-tenths of a mile east of Carver in Clackamas County, has produced building stone for many years. The quarry is located at the base of towering cliffs of uniformly gray Boring Lava which is readily worked. Currently most of the production is going into retaining walls. The old Portland

Hotel, one of the landmarks in the city of Portland for many years, was constructed of stone from this quarry.

Near Idanha in southeastern Marion County a small quarry has produced veneer strips and split face blocks intermittently over the past two decades. The stone is a buff colored, banded tuff which works up easily.

Moon Mesa Quarry, located about 15 miles south of Baker in southern Baker County, produces building stone composed of thin-banded rhyolite. Colors range from creamy white to almost purplish. Veneer strips and split-face blocks are sold for facings on both domestic and commercial buildings.

Numerous buildings in the city of Baker have been constructed of volcanic tuff obtained from quarries at Pleasant Valley, a railroad siding 13 miles east of town. The tuff covers a considerable area and is at least 100 feet thick where exposed. Joint spacing is such that large blocks can be quarried readily. The tuff is of uniform texture and light gray color. The stone is easily worked when freshly quarried but hardens considerably upon exposure. A detailed report on the Pleasant Valley deposits by Parks (1914) contains the following table showing results of tests on stone specimens:

TESTS OF OREGON VOLCANIC TUFFS.

Name and location of quarry.	Percentage of Absorption	Crushing strength in pounds per square inch			Specific Gravity
		Specimen tested dry	Specimen tested saturated with water	Tested after freezing and thawing 10 times	
Grant Quarry..... Pleasant Valley, Ore.	22.68	2916	2861	2816	1.81
Oregon Lava..... Stone Co., Pleasant Valley, Ore.	28.96	.....	1212	.....	1.64
" "	29.29	1724	1160	1261	1.33

A few miles east of Sublimity, Marion County, there is a tuff quarry which has produced a considerable quantity of light gray stone. The tuff is quite soft and has numerous fragments of pumice and occasional pieces of charcoal, indicating the high temperature of the ash flow. The quarry has been developed for a length of 200 feet along the hillside with a series of benches 36 inches high. The stone is cut with horizontally and vertically mounted circular saws equipped with carbide inserts. Blocks measuring 8 by 16 inches in cross section and of varying lengths are removed to a guillotine where 8 by 8 inch split-face stone is made. The blocks have a high insulating value and have been used in numerous local cold storage plants and meat packing plants. The Sublimity stone has a water of absorption of between 23 to 30 percent, an apparent porosity which ranges between 31 and 41 percent, and a bulk specific gravity of about 1.35.

A stone quarry located on the northeast flank of Rocky Butte, a prominent landmark in northeast Portland, has been a producer of building stone for many years. Rocky Butte is a Plio-Pleistocene age volcano which has been somewhat eroded by the ancestral Columbia which swirled against it before moving into its present channel a short distance to the north. The lavas are generally gray in color but portions show a pinkish tinge. As early as 1885, stone from the quarry was shipped to the mouth of the Columbia River to build the south jetty. Other structures using Rocky Butte stone include the nearby Rocky Butte County Jail and the Grotto at the Sanctuary of Our Sorrowful Mother. Over the years the boundaries of the quarry have approached adjacent property lines and encroaching urbanization has prevented further expansion. The quarry has had limited production in recent years.

In addition to the quarries discussed above there are literally dozens of outcrops that have been used for ornamental and building stone purposes on an

informal and short-lived basis. The great cost of developing a quarry and a sufficient market to keep it running steadily has severely limited the establishment of large, well equipped building stone operations in the State. On the other hand, the current popularity of rubble-faced walls has spurred the use of rock from suitable exposures where it has been loosened by natural processes and can be readily reduced to size. Some of this type of rock is obtained by individuals who wish to erect their own stonework, but masonry contractors also use stone from similar exposures for small jobs.

The following table lists the principal stone quarries in the State together with results of tests for water of absorption, apparent porosity, and bulk specific gravity. All tests were performed by the State of Oregon Department of Geology and Mineral Industries, using ASTM procedures.

SELECTED BUILDING STONES IN OREGON

Quarry or Deposit	Location	Description of Stone	Water of Absorption	Apparent Porosity	Bulk Specific Gravity
Banasco Quarry	Sec. 8, T. 37 S., R. 24 E. Lake County SW of Plush 3 mi. ±	Dark red scoria lumps up to 18" in diameter.		Not tested.	
Breitenbush stone	Sec. 20?, T. 9 S., R. 7 E. Marion County Near hot springs	Pink tuff with white inclusions.	9.95	20.7	2.08
Brownsville sandstone	Sec. 24, T. 14 S., R. 3 W. Linn County 3.8 mi. S. of Brownsville	Buff tuffaceous sandstone with dark bands.	5.7	12.8	2.24
Butte Creek tuff	Sec. 29, T. 6 S., R. 2 E. Clackamas County 4.3 mi. SE of Scotts Mills Jct. on Butte Cr. Road	Buff tuffaceous sandstone containing occasional fossils.	12.1	22.4	1.85
Carver Quarry	Sec. 18, T. 2 S., R. 3 E. Clackamas County .6 mi. E. of Carver	Gray Boring Lava.	3.9	9.7	2.48
Cinder Hill Quarry	Sec. 33, T. 14 S., R. 13 E. Deschutes County On U.S. 97 just N. of Redmond.	Dark red, highly inflated scoria.		Not tested. (Similar to Red Rock Mine)	
East Lake Quarry	West end of East Lake Newberry Crater Deschutes County	Lump pumice, buff to light gray, some admixed obsidian.		Not tested.	
Glass Buttes opalite	Sec. 34, T. 23 S., R. 23 E. Lake County 82 mi. E. of Bend on U.S. Highway 20.	Milk-white opalite chunks up to 12" across with some red cinnabar patches.		Not tested.	

Hines highway cut	Sec. 31?, T. 24 S., R. 30 E. Harney County About 2 mi. W. of Hines on U.S. Highway 20.	Pinkish-red tuff with numerous dark red to brown inclusions.	15.8	27.6	1.75
Idanha Quarry	Sec. 10, T. 10 S., R. 6 E. Marion County Near Idanha.	Banded buff tuff.	13.9	26.3	1.95
Indian Candy Stone Quarry	Sec. ?, T. 7 S., R. 12 E. Wasco County Near Cuchta Corral	Light colored volcanic tuff with pronounced banding and some dark inclusions.	Not tested. (Similar to Rainbow Rock)		
Kah-Nee-Ta Stone Quarry	Sec. 20, T. 8 S., R. 13 E. Wasco County Next to Kah-Nee-Ta Hot Springs resort.	Creamy-yellow siliceous sinter with darker bands and numerous vugs.	6.95	13.8	1.98
McDermitt dendrite	Near McDermitt Malheur County	Thin-bedded sandstone with large manganese dioxide dendrites resembling ferns on bedding planes.	Not tested.		
Moon Mesa Quarry	T. 11 S., R. 40 E. Baker County ½ mi. E. of State Highway 7 near Dooley Mt. summit.	Creamy-yellow, thin-banded rhyolite with darker bands.	2.34	5.42	2.31
North Fork tuff	Sec. 30, T. 6 S., R. 32 E. Umatilla County 3.3 mi. upstream from U.S. Highway 395.	Pink to off-white volcanic tuff with darker inclusions. Some salt and pepper coloring.	8.88	16.8	1.85
Ochoco stone	Sec. 14, T. 15 S., R. 12 E. Deschutes County E. flank of Cline Butte.	Dark brown to gray, flow banded rhyolite.	Not tested.		

Oregon Blue Stone	Sec. 32, T. 30 S., R. 7 W. Douglas County On S. bank Cow Creek near gauging station.	Dark bluish to greenish fine-grained sandstone. Slabs 2" to 8" thick. Dense, hard, heavy.	2.6	5.44	1.98
Oregon Emerald Quarry	Sec. 17, T. 14 S., R. 16 E. Crook County 3.7 mi. N. of Prineville.	Green volcanic tuff.	8.87	15.2	1.71
Oregon Tuff Stone Quarry	Sec. 29, T. 8 S., R. 1 E. Marion County About 4 mi. NE of Sublimity.	Light gray volcanic tuff with large creamy pumice chunks and occasional inclusions of charcoal.	27.0	36.0	1.35
Rainbow Rock Quarry	Sec. 11, T. 6 S., R. 11 E. Wasco County About 5 mi. S. of Pine Grove.	Brightly colored volcanic tuff with contrasting bands. Reds, yellows, browns.	16.7	28.3	1.72
Red Rock Mine	Sec. 20, T. 14 S., R. 13 E. Deschutes County NW side of Tetherow Butte.	Dark red scoria.	37.4	45.0	1.20
Rome stone	Sec. 6, T. 32 S., R. 41 E. Malheur County ½ mi. N. of Bannock War marker on Highway 95.	Light gray, tuffaceous sandstone with dark, fine bands. Somewhat friable, low density.	25.8	39.1	1.52
Sahara Tan Quarry	Sec. 21, T. 14 S., R. 13 E. Deschutes County 1 mi. S. of Terrebonne.	Brown to off-white silicified tuff. Brittle and fairly dense.		Not tested.	
Snowbird Quarry	Sec. 24, T. 27 S., R. 1 E. Douglas County On Snowbird Road.	Red banded rhyolite with whitish bands.	14.5	27.7	1.94
Sorenson Quarry	Sec. 3?, T. 5 S., R. 12 E. Wasco County On Wamic Road.	Dark red scoria.		Not tested.	

Stayton Flatrock Quarry	Sec. 11, T. 9 S., R. 1 W. Marion County E. edge of Stayton on Highway 222.	Platy andesite, gray on fresh fracture but with tan weathered surface.		Not tested.	
Willowdale Quarry	Sec. ?, T. 9 S., R. 15 E. Jefferson County 2.6 mi. S. of Willowdale on U.S. Highway 97.	Rhyolite tuff in various shades of pink, brown, and with purplish tints. Some color banding.	21.9	31.6	1.66

Crushed stone

Crushed stone is the most valuable mineral resource produced in the State of Oregon. This position is closely contested by sand and gravel, discussed in a separate chapter. Stone is a vital commodity for community growth and development, and no substitutes are available for most of the many uses to which it is put. Sand and gravel and crushed stone supply the irreplaceable aggregate for a host of construction projects. Roads, highways, dikes, earthen and concrete dams, and concrete in all of its multitudinous forms require stone in sizes ranging from sand to boulders. Crushed stone is a low cost commodity and is commonly produced and used locally. Although the State has an abundance of excellent stone suitable for crushed aggregate, there are certain areas where demand is rapidly exhausting the supply. In these areas, usually in the western part of the State, spreading urbanization has already checkmated stone deposits and operating quarries and removed them as a source of supply of a vitally needed resource. Specifications for concrete aggregate are becoming steadily more exacting as technologies improve. Aggregates that were suitable for concrete prior to World War II may very well be sub-standard today.

Due to the double effects of urbanization and increasingly stringent specifications, the reserves of suitable and available stone are diminishing. Adequate planning for the exploitation of stone deposits has not been adopted in the State. Studies by Schlicker (1961) and Schlicker and Deacon (1967) discuss problems related to the pressing need for mineral construction materials in areas with rapidly developing urban populations. Any program for quarrying stone must include provisions for: (1) efficient and economical production of the commodity, (2) a minimum of dislocation of local activities and land

values, (3) secondary use of the abandoned site for sanitary fill or other use, and (4) final revamping of the site to the highest possible level compatible with the economics, public need, esthetics, and long range objectives of the area.

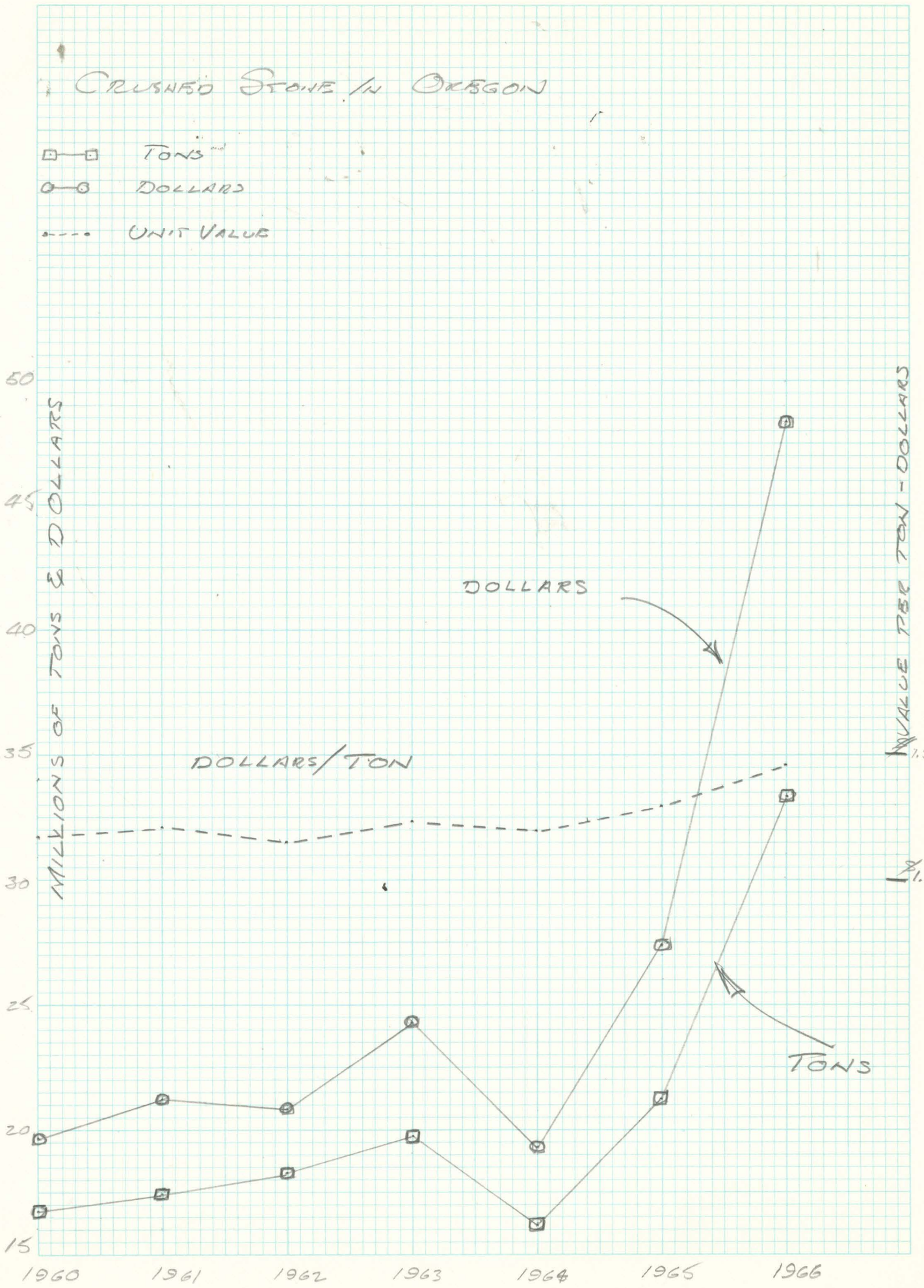
Basalt is the principal rock type quarried for crushed stone in Oregon. The Tertiary age lavas occur widely over the State and are quarried in most of the 36 counties. Characteristically the lavas are either exposed or have only a thin overburden. The economic production of crushed stone depends on many factors. The physical characteristics of the rock are of prime importance and include: abrasion resistance, specific gravity, weight loss with sodium sulphate, degradation, and asphalt stripping. These properties are usually determined when the stone is to be used in road, riprap, and jetty construction. Additional tests for concrete aggregate usually include the determination of the reactivity of the rock with the cement to be used. The joint patterns in a quarry often determine the most economical use to which the stone can be put. Widely spaced joints permit the freeing of large blocks which may be suitable for jetty and riprap construction. On the other hand, road aggregate operators favor quarries having fine-jointing which produces a maximum of pieces requiring a minimum of crushing. Quarries located on hills usually are free of ground water and flooding problems and the road grade to markets is usually downhill. Quarries located on flat ground may have thick soil overburden, and weathering may increase quarrying costs due to high rejection of inferior rock. Low cost crushed stone cannot be hauled very far economically, although more efficient hauling equipment, better roads, and the growing scarcity of deposits tend to extend the haul radius. Spreading urbanization and ever tightening regulations regarding air and water pollution present real problems to quarry operation.

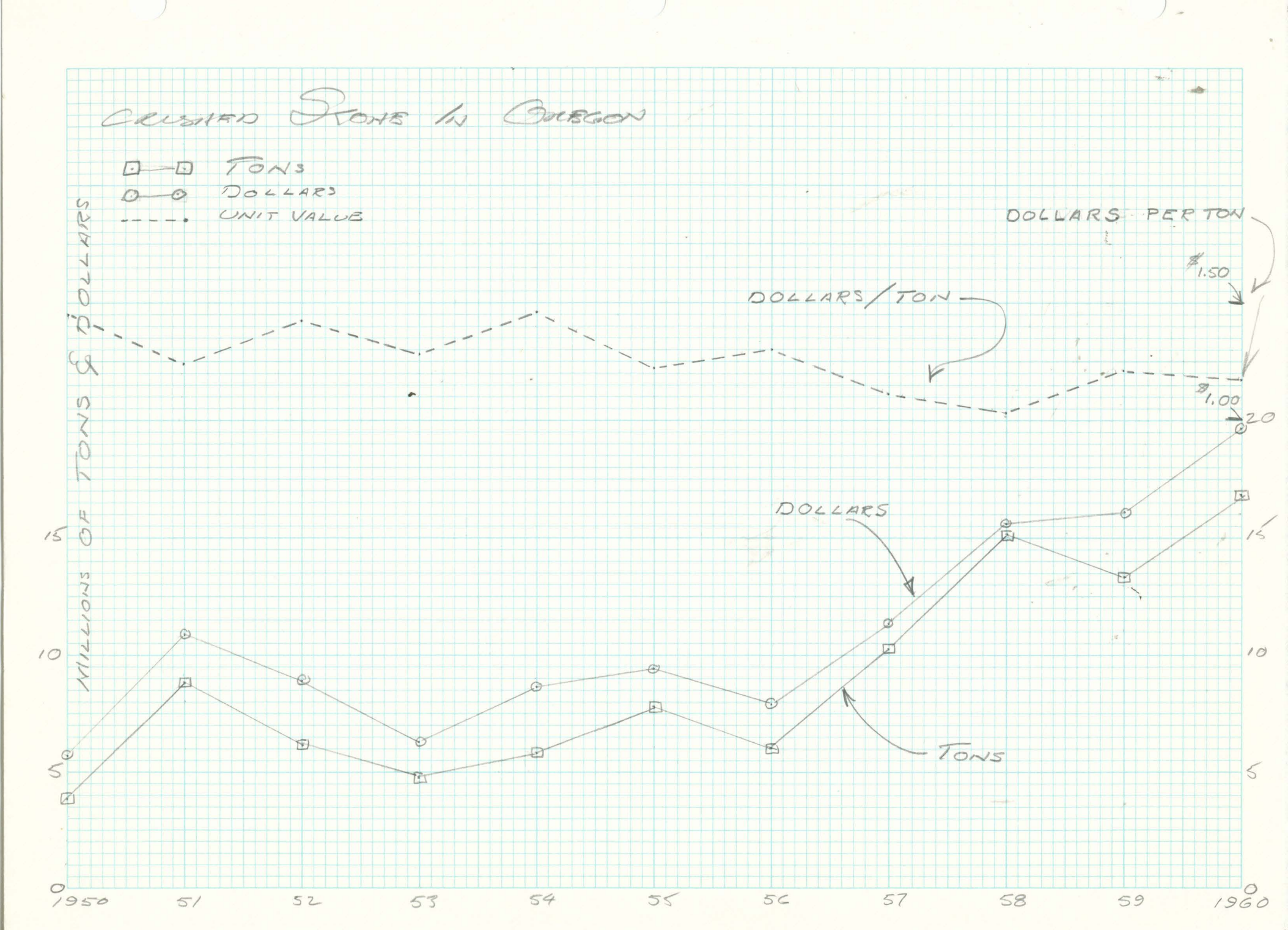
The production of crushed stone is one of the better indices of community growth. The following table, adapted from U.S. Bureau of Mines Mineral Resources volumes, shows the production of stone, unit value, and total value for the years 1945 through 1966:

Crushed Stone in Oregon 1945-1966

Year	Short Tons	Value	Unit Value (per ton)
1966	33,288,000	48,335,000	$1.46
1965	21,212,000	27,301,000	1.29
1964	16,120,000	19,296,000	1.20
1963	19,692,000	24,197,000	1.23
1962	18,258,000	20,977,000	1.15
1961	17,455,000	21,202,000	1.21
1960	16,864,000	19,620,000	1.16
1959	13,341,000	16,126,000	1.21
1958	15,077,000	15,621,000	1.03
1957	10,311,000	11,405,000	1.11
1956	6,098,000	7,890,000	1.30
1955	7,741,937	9,417,834	1.22
1954	5,872,353	8,617,795	1.46
1953	4,939,080	6,301,639	1.28
1952	6,250,849	8,893,368	1.42
1951	8,722,000	10,831,000	1.24
1950	3,837,000	5,559,000	1.45
1949	4,397,000	6,479,000	1.47
1948	3,682,000	5,734,000	1.56
1947	3,002,000	4,425,847	1.47
1946	1,472,000	2,008,374	1.36
1945	1,498,160	1,898,073	1.27

Crushed stone is produced in nearly every community in the State. No attempt will be made here to enumerate either the various deposits currently producing crushed stone or to depict the areas where the quarries are located. Many quarries are opened up to supply a specific, short-term need, such as the construction of a highway or dam. Other quarries are operated for long periods of time and serve the general needs of a community or industry. Many


CRUSHED STONE IN OREGON
TONS
DOLLARS
UNIT VALUE
MILLIONS OF TONS & DOLLARS
VALUE PER TON - DOLLARS
50
45
40
35
30
25
20
15
1.50
1.00
DOLLARS
DOLLARS/TON
TONS
1960
1961
1962
1963
1964
1965
1966


CRUSHED STONE IN OREGON
TONS
DOLLARS
UNIT VALUE
MILLIONS OF TONS & DOLLARS
DOLLARS PER TON
$1.50
DOLLARS/TON
$1.00
DOLLARS
TONS
0
5
10
15
20
1950
51
52
53
54
55
56
57
58
59
1960

quarries are operated on an intermittent or irregular basis in response to seasonal needs or during periods of emergency when dike and fill materials are needed. Some "abandoned" quarries are in reality only on a stand-by basis awaiting the needs of the community. The growing practice of producing stone on a batch basis by contractors equipped with portable quarry plants has been a factor in holding unit costs down. The use of such equipment relieves the quarry owner of the high capital cost needed to properly equip a quarry for low cost operation, and the contractor is able to operate his high volume equipment more hours per month by working a succession of quarries in the area.

Oregon has enormous reserves of excellent stone suitable for crushing, and riprap. The distribution of the reserves with respect to present markets is for the most part good. In the northwestern part of the State diminishing sources and expanding demand will sooner or later create local problems. These can be minimized by immediate, adequate, comprehensive planning, but no such programs have been adopted. In the long run, crushed stone will necessarily have to be quarried from less desirable deposits and the stone will have to be beneficiated to a greater extent than at present. The cost of longer hauls to market can be partly offset by more efficient and larger haulage equipment and better roads, but the unit cost of the delivered product will show substantial increases over present levels.

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Attach #3

U. S. DEPARTMENT OF THE INTERIOR
Geological Survey
So. 157 Howard Street
Spokane, Washington 99204

June 5, 1967

MEMORANDUM

To: Authors of "Mineral and Water Resources of Oregon"

From: A. E. Weissenborn

Subject: Suggestions for preparation of report on "Mineral and Water Resources of Oregon"

This memorandum is intended as a general guide in preparing the above-mentioned report. The report will follow closely the format of similar recently published reports on neighboring States, particularly the one on Washington. There will be two main sections: one on geology and mineral resources and one on water. There will be three separate subsections on water as follows:

1. Water Resources--to be prepared by the Water Resources Division of the U. S. Geological Survey in cooperation with the Oregon State Engineer's Office and the Oregon State Water Resources Board.

2. Water Resources Development--to be prepared by the Boise office of the Bureau of Reclamation.

3. Hydroelectric Power--to be prepared by the Bonneville Power Administration.

S. F. Kapustka of the USGS Water Resources Division office in Portland will have the over-all responsibility for those sections of the report dealing with water resources and will issue whatever instructions he thinks necessary.

Similar reports on other States have been very well received by geologists, hydrologists, and others professionally interested in geology, mineral and water resources. It is our hope that geologists, mining engineers, and hydrologists will likewise find this report a useful summary. However, we should keep in mind that this report will be written primarily for a nontechnical audience. The language, therefore, should be kept as simple and nontechnical as is consistent with clarity, precision, and brevity. Common technical terms may be used where required, but the use of unusual, obscure, or controversial terminology should be avoided. If terms are introduced that are likely to be unfamiliar to a reader of average intelligence, or if common words are used with a specialized meaning, they should be explained in the text or defined briefly--perhaps in a footnote.

One of the valuable features of the report is the list of references to the literature. Many of the references will be cited time and time again in the several chapters of the report. To avoid repeating them over and over, all references from chapters in the section on geology and mineral resources will be combined into a single reference list following this part of the report. Sections dealing with water will also be combined at the end of the part of the report dealing with water resources. Because of this, it is essential that all references cited be mentioned specifically somewhere in the text. If not, they will be lost in the general bibliography and will be of little use to the reader.

The use of charts or graphs that will clarify the text is encouraged in all sections of the report. Except for the geologic map of the State, all illustrations should be planned for reduction to page size (approximately 4.4 by 7.5 inches) or smaller. A 1:2,500,000 scale base will be used for the commodity maps. In many instances, reducing this to page size for publication will preclude showing individual deposits--only districts or groups of deposits can be shown. However, if more detail is desirable, larger scale maps showing smaller areas can be used, provided they can be reduced to page size. Figures 30 (Distribution of lead-zinc deposits in northeastern Washington according to mining districts, batholithic rocks, and silver content) and 58 (Known and possible areas of coal-bearing rocks in western Washington) are examples from the Washington report.

Cronoflex copies of the base map will be distributed. Final drafting can be done by the author if facilities are available, or the material can be plotted on Ozalid copies of the base and the final drafting done in Spokane. For the sake of uniformity, I would prefer that the final drafting of most of the commodity maps be done in Spokane. Inasmuch as this is a geologic report, the commodity maps should emphasize as far as possible the relation of the deposits to the lithology and structure.

The following outline is suggested as a guide for the commodity chapters. This outline is similar to those used for the Montana, Idaho, and Washington reports, and authors should refer to these reports.

1. Discussion of the commodity--its uses and its economic importance.

2. Geologic occurrence of the commodity--types of deposits and their geologic environment.

3. United States rank as a producer of the commodity.

4. Oregon's rank as a producer--past and present--and where appropriate, a brief history of discovery and development within the State.

5. Brief description of occurrences within the State by deposits or districts. For commodities that are widespread throughout the State, there may be some advantage in grouping them in accordance with all or some of the physiographic divisions that will be used in the section on geology. These are:

(a) Coast Range, Willamette Valley, and Coastal Plain

(b) Klamath Mountains

(c) Cascade Range

(d) Deschutes-Umatilla Plateau and Joseph Upland

(e) Blue Mountains and Snake River Canyon

(f) High Lava Plains

(g) Owyhee Upland

(h) Basin and Range

For others, broader groupings such as northeastern Oregon, southwestern Oregon, etc. may suffice. For still others a geographic breakdown would serve no useful purpose.

6. Resource potential--known reserves (if data are available) and future potential.

7. Realistic appraisal of the potential areas within the State that present a favorable environment for occurrence of the commodity. This might include discussion of economic factors such as accessibility, presence or absence of markets, etc.

It is not intended that this outline be followed precisely. The different commodities vary widely in their manner of occurrence and will require different treatment. For some, we have much data, for others very little. The completeness of the treatment will depend on the present or potential importance of the commodity to the economy of the State. The use of tables where possible is suggested. Much information on mining districts and commodity occurrences can be compressed into a table. There are numerous examples in the three reports cited.

Each chapter on the geology of the various physiographic divisions should contain one or more stratigraphic sections listing the more prominent lithologic units.

Some confusion exists between what is a "reserve" and what is a "resource." In our report, we will be concerned chiefly with resources,

but we may discuss both reserves and resources, and the two should be clearly distinguished. Survey usage is summarized below and should be followed.

> "In this report, the term resources applies to materials in the ground that are known to be minable now, plus materials that are likely to become minable at some time in the future. Reserves, on the other hand, are materials that may or may not be completely explored but which may be quantitatively estimated and are considered to be economically exploitable at the time of the estimate. Ore is mineral material that may be mined at a profit, and the term ore reserves is applied to mineral deposits currently being mined, or to deposits known to be of such size and grade that they may be profitably mined.
>
> "Mineral resources are fixed in quantity and quality and are not renewable. Reserves, on the other hand, fluctuate in amount. They are a continually changing quantity, the estimates of which are dependent on economic conditions, technologic changes, and available information. A low reserve figure for a commodity today, for example, doesn't necessarily mean the resource is near exhaustion. It may mean that a depressed market has lowered the value of the commodity to the point where the material no longer can be considered as a reserve."

An original and two copies of all sections and chapters of this report should be sent to this office as soon as they are completed. They will be reviewed here and then sent to the State Division of Mines and Mineral Industries and to the U. S. Geological Survey in Washington, D. C., for further review. They will then be returned to the author for approval and/or suggested revision. The "Introduction" and the "Mineral industry in Oregon" chapters cannot be completed until the rest of the report has been prepared, as these chapters are contingent on material that is in the other chapters. The report has been promised to Senator Hatfield by February 1, 1968. It is essential, therefore, that all the other chapters be in final form by December 15, 1967, in order to prepare the summary chapters, put the report together, and do the final typing and drafting.

A. E. Weissenborn

Parke is also quite pleased to work with Schlicker on the chapter on geology of the Coast Range, Willamette Valley, and the Coastal Plain and suggests somewhat the same procedure be followed.

I hope all this is OK with you. It looks like things are beginning to move.

Sincerely,

A. E. Weissenborn
Research Geologist
Branch of Resources Research

cc: Paul Averitt
Parke Snavely

Brooks, Mason) 2 copies

So. 157 Howard Street
Spokane, Washington 99204

June 16, 1967

Mr. Alfred L. Bush
U. S. Geological Survey
Federal Center
Denver, Colorado 80225

Dear Al:

Brooks

Thor Kiilsgaard has suggested that you would be the appropriate one to author the chapter on vermiculite for the report on the Mineral and Water Resources of Oregon. We are preparing this report at the request of Senator Hatfield and in cooperation with the Oregon Department of Geology and Mineral Industries. I am enclosing an oozalid print of the base map for use as a work sheet. I am also enclosing a memorandum to authors of the report as a guide in writing the chapters.

Mason

I would also like you to participate in the chapter on clays, which is being prepared by Ralph Mason of the Oregon Department. When the first draft is received from Ralph, I shall ask you to review it and to add such additional information as you may have.

Inasmuch as the field season is starting, I do not expect much in the way of immediate results. I hope that manuscripts will begin to come in in first draft by early fall so that all will be in final form by our deadline of December 15.

Sincerely,

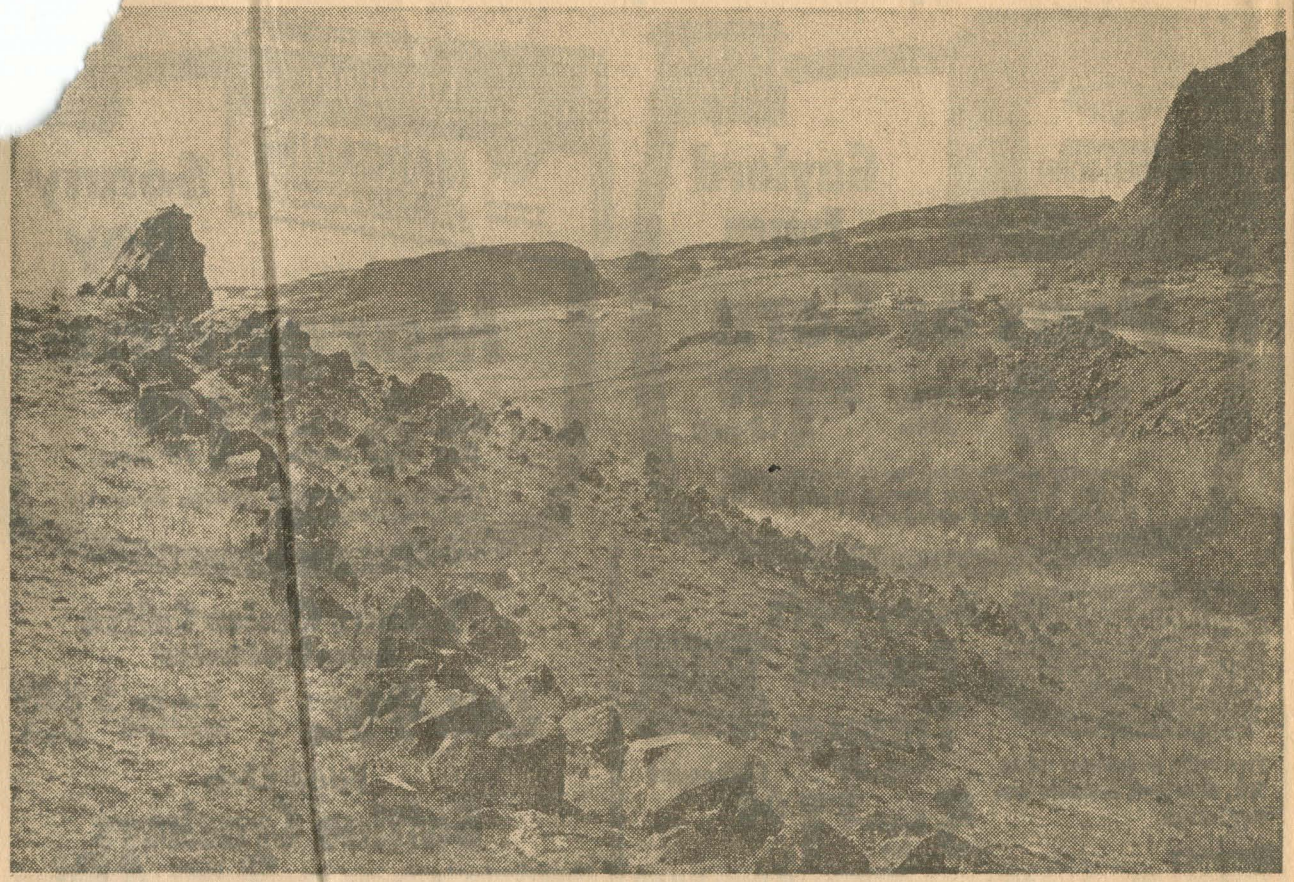
A. E. Weissenborn
Research Geologist
Branch of Resources Research

Enclosures

cc: Hollis Dole

EAL AND SOLID, BUT...

body Wants To Lay Claim To Building Old R



DID NATURE place these stone in straight line, or are they all that remains of crumbling stone wall? "We didn't do it," said first settlers. "We didn't either," said the Indians.

OREGON JOURNAL FEATURES ...the Northwest's greatest!

By DELL E. MURPHY
Free-Lance Writer

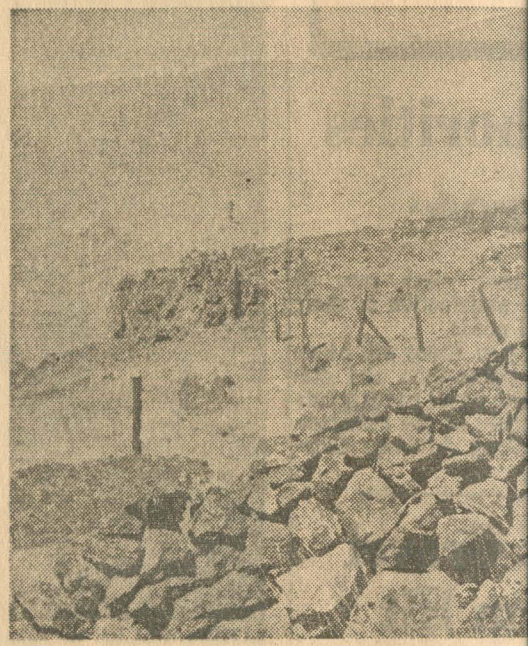
Crumbling rock walls which look like farm fences are scattered across the dry hills between Bingen and Goldendale on the north bank of the Columbia River and along the old Rowena Loops near Mosier. Their origin is lost in antiquity and their purpose a constant subject for speculation.

Anthropologists call them "rock pilings" or "aboriginally constructed stone monuments," and they have theories about them. Local Indians will tell you the stories heard in their childhood from the old men of their tribe; and old-timers descended from the first white settlers have their own ideas. One theory is as good as another, and the best is only an educated guess, because the truth lies far beyond the memory of the oldest Indian.

The Indians first denied that their ancestors had any part in building the walls, ascribing them to some mysterious forerunner of their race. This generation of Indians is not so sure.

THE LATE Teunis Wyers, one of the first settlers in White Salmon, used to tell a story recounted to him by an aged Indian who would appear on his cattle range coincidentally with the arrival of the chuck wagon and the noon meal. His explanation was that the walls were built by the "Big People" who preceded the Indians.

It seems that first there were only coyotes roaming the hills. Then the Big People came and drove away the coyotes. Later, Indians drove out the Big People.



ROCK WALLS of mysterious origin are crisscrossed here and there by more efficient barbed wire placed there by ranchers. This wall between Lyle and Maryhill

walls have been noted by air survey as far east as the John Day Canyon and south into the Wasco mountains. And one anthropologist, Harlan I. Smith, reported in 1910 what appeared to be similar formations in the Yakima Valley and in Mason County, Oregon.

THE JUNE, 1954, issue of the American Anthropologist says of the rock pilings that, "No locally oriented ethnographic data is capable of demonstrating a relationship to any historically known group." Which is a fancy way of saying that their origin is unknown.

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ROCK WALLS of mysterious origin are crisscrossed here and there by more efficient barbed wire placed there by ranchers. This wall between Lyle and Maryhill on north bank of Columbia River starts aimlessly up hill and then stops. (Chester Murphy Photos)

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The same article quotes Vern F. Ray, who speculated in 1942 that the pilings were pits or the monuments might have ritual significance, but he thinks the stone walls had a more practical use. He has a collection of pictures taken over the years and believes that the walls could have served to trap or pen animals, sometimes in narrow canyons. If true, this belief could tie in with a theory put forth by some anthropologists that Indians may have domesticated some of the wild animals.

LLOYD NOW IS in correspondence with Dr. John Benedict of the Mountain Research Station, University of Colorado, who is delving into the subject.

Mr. and Mrs. Robert Overbaugh of White Salmon ha-

while the ancient walls often ramble along rocky ridges. They may only extend a few feet, or they may be in playful-looking patterns, zig-zagging or crossing over each other.

WE INTERVIEWED some local Indians, Mr. and Mrs. Andrew Jackson, but they displayed little interest in the stone pilings, being more preoccupied with the impending loss of their last fishing grounds.

Mrs. Jackson, a descendant of Skookum Wallahee, chief of the Klickitats, did say that her ancestors, peace-loving people, were harrassed by warlike Paiutes from Nevada, and would use the rock walls or

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OREGON JOURNAL FEATURES ...the Northwest's greatest!

Feeding Good Time To Stimulate Infant

By LOUIS B. AMES, Ph.D.
With Gesell Institute

DEAR DOCTOR AMES — "I read quite a lot in the magazines to the effect that mothers must stimulate their babies if they want them to grow up normally intelligent. I don't know quite what they mean. With my first two children I just did what came naturally, and they seem bright enough. Can you tell me what if anything I should be doing with my baby that a normally loving what a normally loving and reasonably intelligent mother does with her baby is quite enough. However, for any mother who may feel that a newborn baby needs only food, sleep and a dry diaper, I can assure you that the newborn baby arrives with five working senses and they all benefit by stimulation.

Fortunately, as Pediatrician Lee Salk points out in his useful new book, "What Every Child Would Like His is being fed.

MOST NEWBORN babies show a phenomenal tendency to look at the face and into the eyes of the person feeding them. A baby's penetrating and exciting stare usually stimulates a smile and baby talk from the parent feeding him. Holding your baby in a relaxed manner during feeding provides him with pleasant tactile sensations.

Most people feeding newborn babies tend to stroke laxation, he feels secure and gratified. He will begin to look toward people for his satisfaction.

AS TO the method of feeding which will be best for your infant, Dr. Salk points out that, if you absolutely do not want to breast-feed, it may be best not to become involved. But, "If you are indecisive or perhaps indifferent about breast-feeding, my feeling is to encourage it. It is a natural process which should be encouraged on that

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It seems that first there were only coyotes roaming the hills. Then the Big People came and drove away the coyotes. Later, Indians drove out the Big People. Now the white man has replaced the Indian; but "By and by, men will come from far away" — here he would gesture toward the Pacific — "and the white man will be all gone." In the end, according to the Indian, the coyotes will be back. Kind of a scary story.

Most of the rock walls, along with rock cairns, pits, monuments, and other "manhandled" rocks, lie within the easternmost portion of the Klickitat tribal territory adjacent to the land of the Upper Chinookan Wishram people. But some walls have been noted by air survey as far east as the John Day Canyon and south into the Wasco mountains. And one anthropologist, Harlan I. Smith, reported in 1910 what appeared to be similar formations in the Yakima Valley and in Mason County, Oregon.

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The same article quotes Vern F. Ray, who speculated in 1942 that the pilings were incident to the quest for spirit power. This coincides with the belief of Frank Wilke of Bingen, a long-time student of Indian lore, who thinks that when Indian boys were sent into the hills to spend a period of time alone and unprotected to prove their readiness for manhood and to commune with the great spirit, they would pile up rocks from the talus slopes as part of a ritual, and perhaps as evidence of their sojourn.

L. D. Lloyd, of the Flying L ranch in Glenwood, disagrees. He admits that the pits or the monum
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LLOYD NOW IS in correspondence with Dr. John Benedict of the Mountain Research Station, University of Colorado, who is delving into the subject.

Mr. and Mrs. Robert Overbaugh of White Salmon haven't any theory about it but claim that there is a spot between Bingen and Lyle where the walls, when viewed from the hill above, appear to be in the shape of a star.

Any study of the subject by the common layman is complicated by the fact that later walls, thrown up by early sheepherders, can be hard to distinguish from the ancient ones. A few of these later walls can be seen in level, grassy meadows; but it is usually apparent that they formed enclosures; while the ancient walls often ramble along rocky ridges. They may only extend a few feet, or they may be in playful-looking patterns, zig-zagging or crossing over each other.

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Mrs. Jackson, a descendant of Skookum Wallahee, chief of the Klickitats, did say that her ancestors, peace-loving people, were harrassed by warlike Paiutes from Nevada, and would use the rock walls or any other handy barricade from which to fight them off.

Her grandmother, the beautiful Sally Wahkiacus, who died in 1930 at the age of 100, remembered the great battle that left the river banks strewn with bodies, so that their bones were constantly uncovered by the winds until their final burial beneath the waters of the Columbia as it rose behind the dams.

Whatever their original purpose, the crumbling walls still stand against the velvety slopes of the golden hills and prod the imagination.

Portland REPORTER

Family Fare

PULL OUT THIS SECTION

Section C | Portland, Oregon, Monday, August 14, 1961 | Pages 1-12

RAY WING PHOTOS

■ Sister Noreen Elizabeth, who conceived and executed dramatic mosaic panels for exterior wall of new Marylhurst college building (left) pauses during inspection of installation now under way.

■ Clean-up job on college building mosaic decoration project finds veterans Michele Edwards and Sister Miriam Philip (lower left) sorting left-over stones for future use by art students.

■ Below is detail from one of mosaic panels showing use of untumbled rocks, quarry tiles and few agates in panel designs of abstracted trees and other symbols related to creation.

XXXX

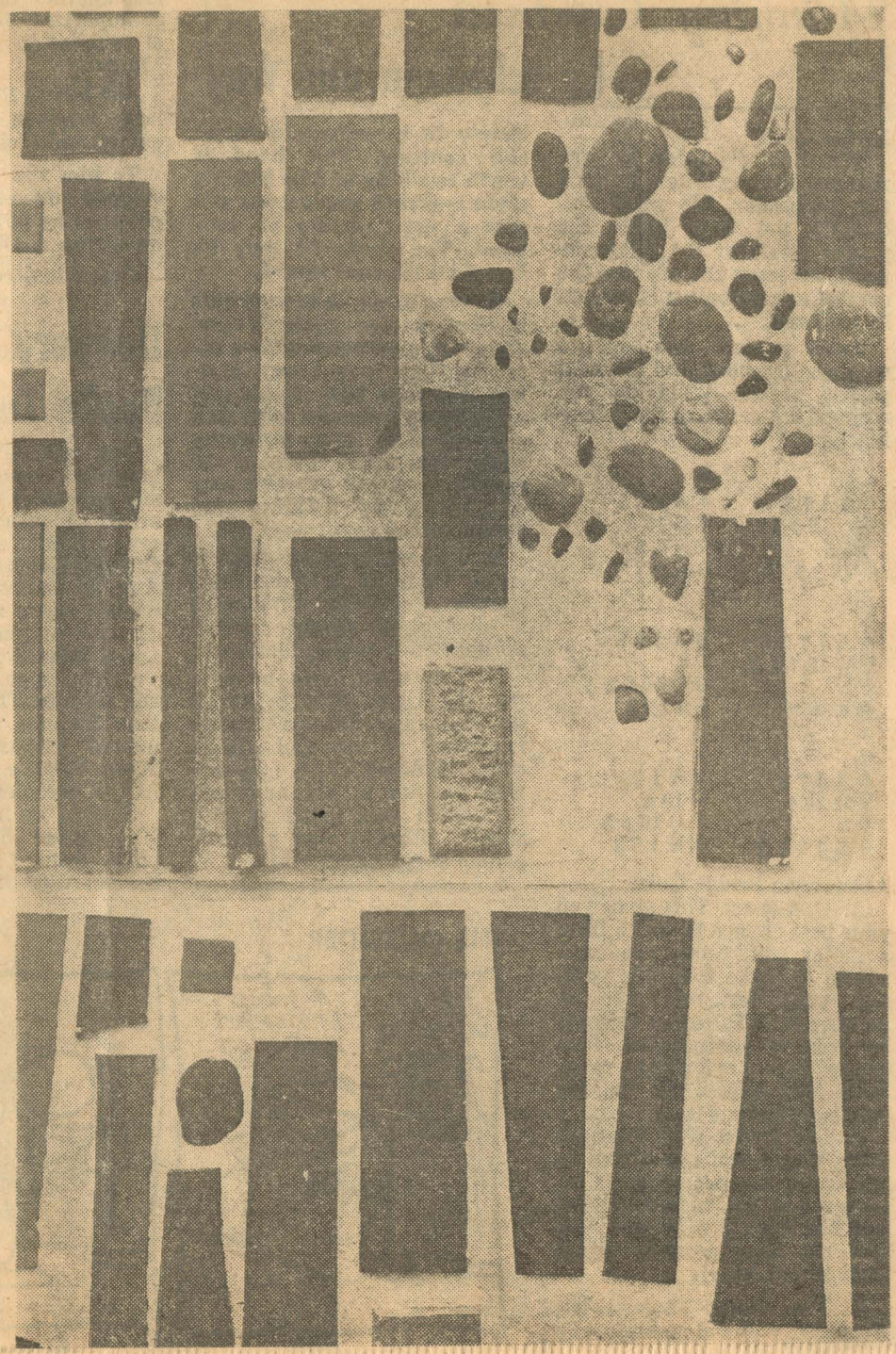
Big Mosaics Make Impact

By LOUISE AARON

Two handsome new buildings are nearing completion on the back campus of Marylhurst college and one of them is an excellent example of the union of art and architecture in initial planning.

That is a spacious facility to care for all the food preparation and dining at the college. The structure, not yet named, faces east and is located between Flavel hall and the Arts building. A large concrete terrace with cutouts for floral plantings stretches across the front. Six 3 by 15-foot mosaic panels sep-

Turn to Page 3 C, Col. 3



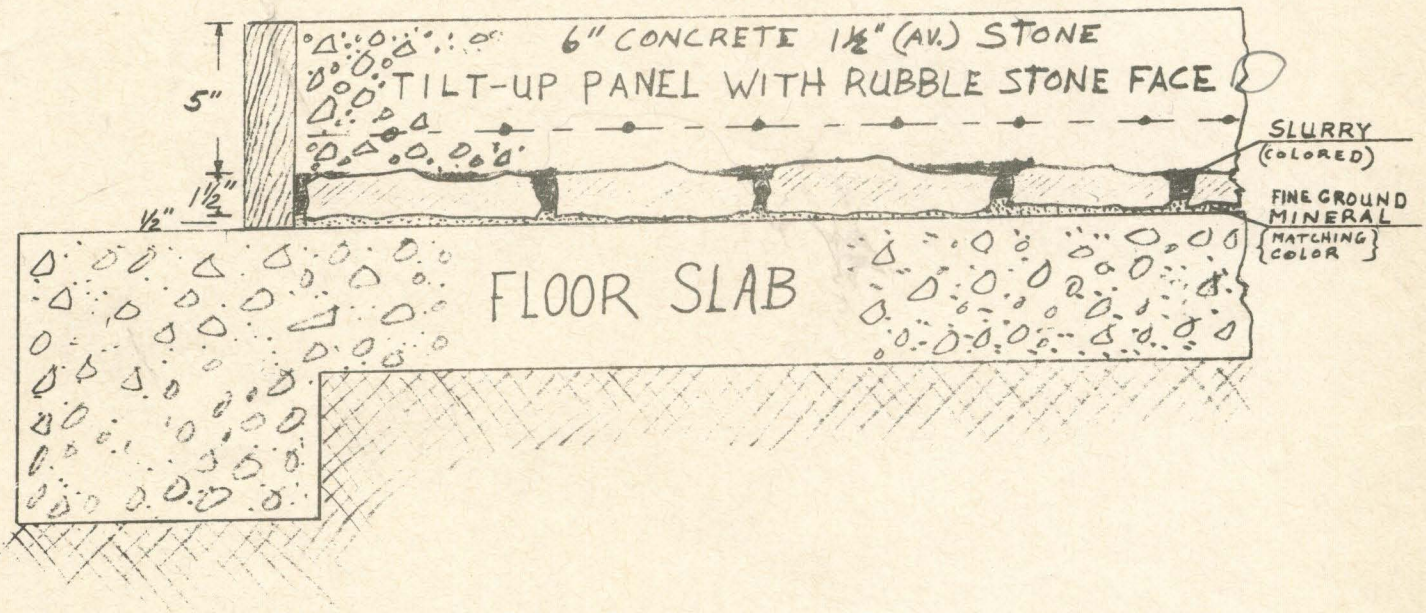
WILEY

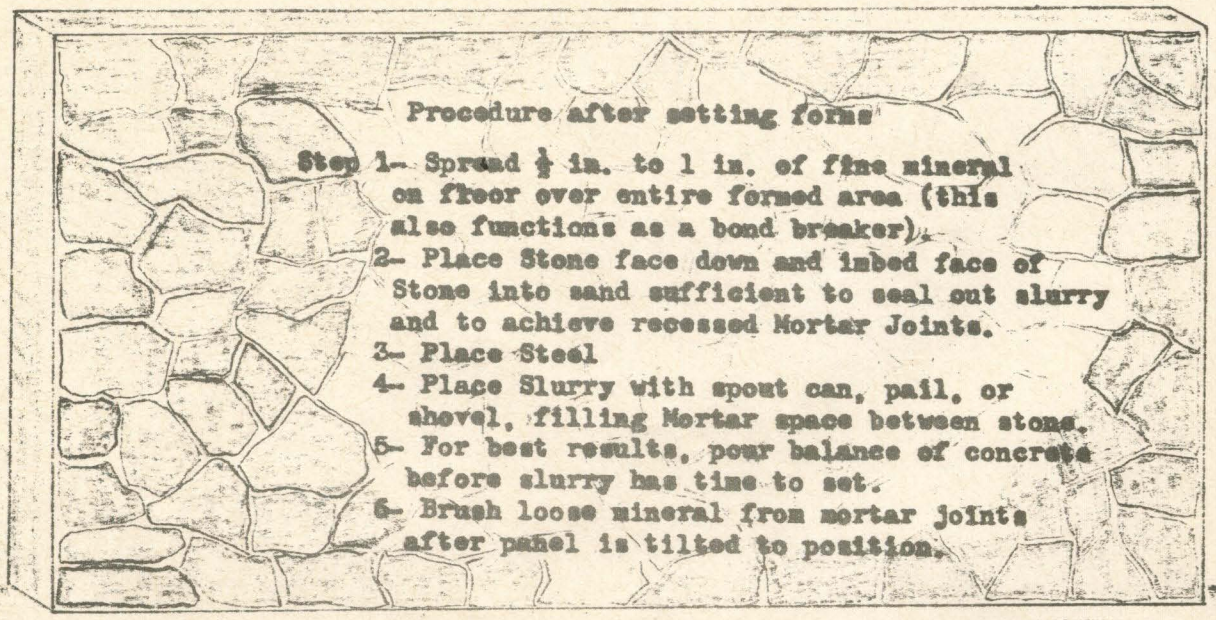
HOT SPGS - T8S R15E
SEC 20

YLINNEN WASH SPGS RV

MARBLE MOUNTAIN MINERAL COMPANY
2419 N.E. SANDY BLVD.
PORTLAND, OREGON

DETAIL - RUBBLE STONE VENEER TILT-UP CONSTRUCTION





7-27-60

MC' B & T

DIAMOND CRUSH .2 ROW EAGLE 2"

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ELEC HEATED SCREEN -8 MESH OSCAR
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TO TRUCK AROUND TO BINS

TWO 3/8 TO SHOVELS IN PIT -
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MOSTLY COMM BLDG BIZ ALL OVER STATE

GRANDE RONDE IS PLASTIC & CREAM/FIRE

HAL KELLEY → SHOULD SEE NICHOL AT
MC MINNVILLE B & T.

BLM - PETRIE

LEWIS O. WEAVER
CENTRAL ORE. BENTONITE
12-30-57 ASSESSMENT BLZ NOTICE FILED -

TO SHELL SSA TURN R. TO POSS - CAMP CR. IN. HOUSE AS
JU W/LOMBARDY POPLAR (ABOUT 18 MI E OF POSS) TURN S.
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19 CLAIMS E. OF PIVILLE
ROCKS SHIPPED OUT OF PIVILLE BY TRUCK & RAIL

PORTLAND STATE UNIVERSITY - PARK BLOCKS AREA TOUR OF WALLS

1. The Forecourt Fountain is a visual concert in concrete aided by the presence of tons of falling water. Look for wood grain effects on some of the concrete "walls."

2. The Public Auditorium employs the use of pre-cast wall panels of white aggregate and white mortar.

3. The rubble wall surrounding the site of the old St. Mary's Academy is composed of basalt blocks from Belgium which came over as ballast in the 1860's. Parishioners hauled the stone up from the foot of Clay Street in wheelbarrows to build the wall.

4. The new St. Mary's Academy employs a very old type of building material. Fired brick have been used for 5000 years and remain essentially unchanged in format and manner of use. Wide varieties of color and surface treatment are available, and good examples may be seen in the area. Look also at the variety of mortar joints between the brick.

5. St. James Lutheran Church employs two contrasting colors of sandstone. Over the years the stones have weathered considerably and in places the original bedding planes of the sand can be seen. On the west side of the church there is a rough brick wall which must have been laid up by church members.

6. The Portland Art Museum has a low perimeter wall capped with Italian travertine. Travertine is a spring deposit and the swirly pattern and frequent voids attest to the manner in which it was deposited.

7. At the Masonic Temple another perimeter wall surrounds the building. The capping is a man-made pre-cast stone which tends to weather over the years. As a result the quartz aggregate begins to protrude, producing a sandpapery feel.

8. Exposed aggregate covers the exterior walls at the Oregon Historical Society. These are pre-cast panels which have had the aggregate brought into relief after casting but before the matrix has achieved full strength.

9. The First Congregational Church uses black basalt for an ashlar exterior wall. The basalt is relieved in places with a gray sandstone which is not faring as well as the more durable basalt. Marble columns support the arches facing Park Street.

10. Verde antique, a type of serpentine, appears inside the foyer at the Arlington Club.

11. The Multnomah County Court House has large sandstone blocks from the State of Washington. Look for quarry drill holes which have been neatly plugged with dowels of stone.

12. Simulated stone columns on the first floor of City Hall represent a minor triumph in attempting to "fake" stone with lesser materials.

13. Red Cold Springs Minnesota granite forms the lower red portion of the 40-story First National Bank Building. The upper white "skin" is marble from Cararra, Italy.

14. Equitable Savings & Loan uses white-on-white pre-cast concrete wall units.

15. The Oregonian Building uses Cold Springs granite and a buff colored sandstone which shows bedding planes in some of the panels.

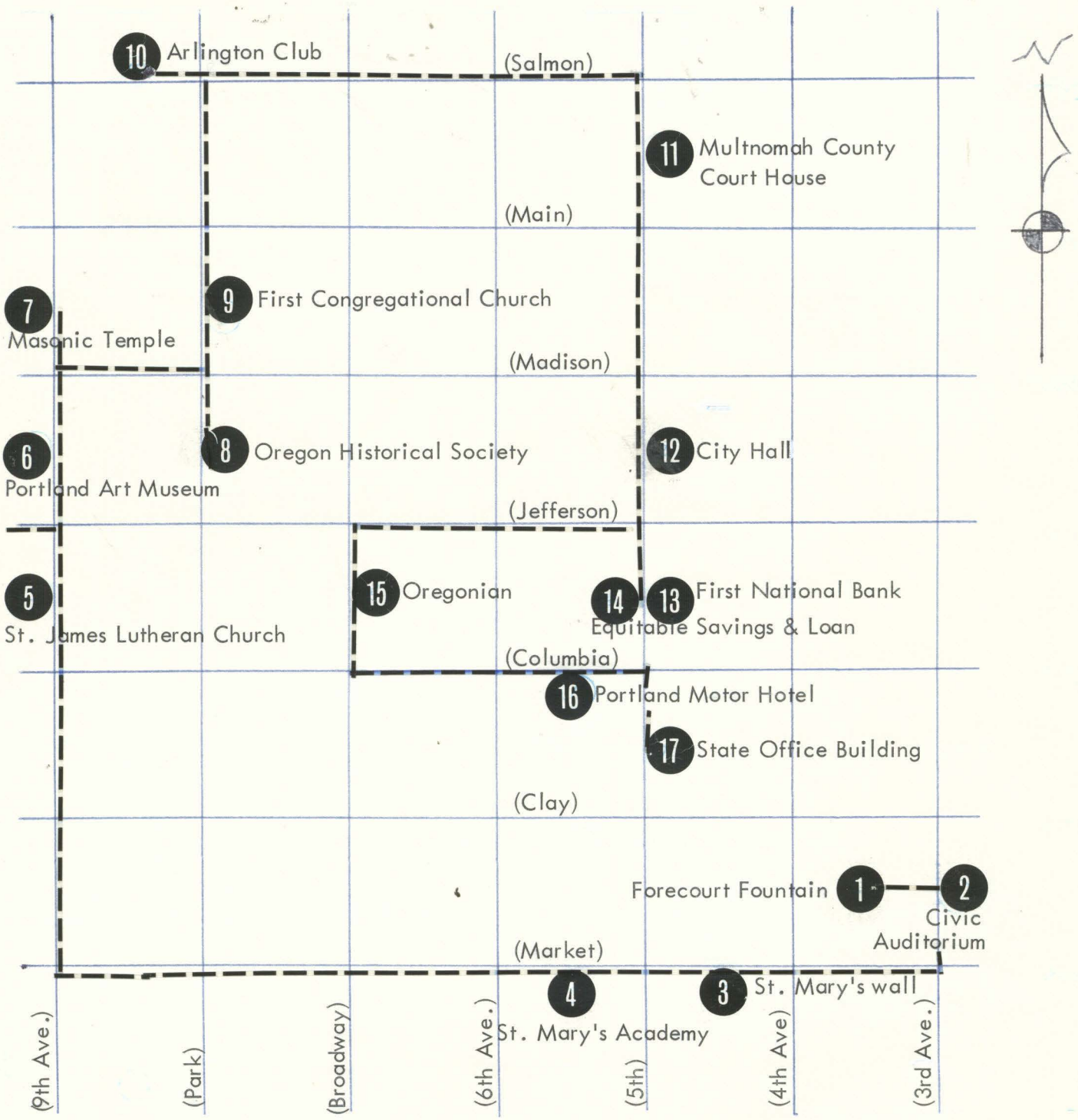
16. White magnesite forms the exterior rubble wall of the Portland Motor Hotel.

17. The State Office Building is sheathed with Cold Springs granite. Large twinned feldspar crystals highlight the two entrance columns of black granite.

Lloyd Center Tour--3

99A	Blouse Tree	exposed agg
96	Riggs Pharmacy	exposed agg
8	Rosenblatt's	blue pearl (?)
5	Clark's Apparel	cobbles and gneiss
2	Stevens and Son	travertine, BUFF MARBLE
1	Bests.	limestone and 6x12" ceramic tile
10	Chandler	river cobbles
11	Meier & Frank	brick, blue pearl, exposed agg
12	Hallmark	
13	Donut	sandstone
14	Culbertson	~~rick with slump mortar~~ BRICK
15	Naito	rubble
91	Florsheim	pre-cast, EGG (WHITE MARBLE COBBLES) granite
88	Paris Hats	white marble
87	Casual Village	silicified rhyolite, (Hawaiian travertine ?)
86	PARKLANE HOSIERY ~~Duke & Duchess~~	plaster, embossed tile
83	Nadeau	precast
82	Sanford	pink gneiss
57	Yuen Lui	exposed agg
56	Dr. Scholl	black marble
48	CHRISTIAN SUPPLY CTR	MODELLED TILE
47	Morrow's Nut House	brick

PORTLAND STATE UNIVERSITY - PARK BLOCKS AREA TOUR OF WALLS



LLOYD CENTER TOUR

(start U.S. Natl Bank on Multnomah Level)

Map No	Firm	Stone
24	U.S. Natl Bank	pre-cast sand-lime brick
23	Best's	limestone or marble
20	Granning and Treece	exposed aggregate, quartz
19	Wide Travel	andesite rubble
16	Title and Trust	Arizona sandstone
12	Richard Edwin	travertine
11	Dean Witter	black marble
8	Florence Thurman	ceramic tile, 4" and 1", red brick paving
6	Manning's	exposed aggregate, quartzite pebbles, used brick
5	Meier & Frank	red brick, weathered joints,"Emerald Pearl" larvikit
(go up stairs, stop at Lat & Long sign and fountain)		
16	Van Duyn	1" tile (transparent?)
19	Lerner	exposed agg
20	Leeds	terazzo and ~~red granite~~
21	Zukors	terazzo " " "
22	Kinney Shoes	terrazzo
23	Fabric House	ceramic tile
24	Alpine Hut	slate + 6" FIGURED TILE
25	Foreman & Clark	quarry tile
26	J.C. Penny	exposed agg and brick
27	Woolworth's	pre-cast exposed agg
28	Zales	marble
30	Lloyd Center Pharmacy	brick and exposed agg
31	Gordon's	brick, OVER FIRED
32	Galenkamps	1" tile
33	Paulettes	brick

Lloyd Center Tour-2

34	House of Nine	gabbro
37	Weisfields	1" ceramic tile
39	Reeds	1" ceramic tile
41	Mario's	sandstone veneer
42	Pancake House	used brick
35	Hertz Shoe Shop	exposed agg
32	Gallenkamps	exposed agg
49	Thom McAn	
54	J. K. GILL	12" CERAMIC TILE
63	State Liquor Store	exposed agg
62	Bottle Shop	used brick
61	Portland Fed. Sav & Loan	
60	McCall Oil	slate veneer
64	J.J. Newberry	pink granite (Yule ?) precast tile 1"
68	Pie Shop	1" ceramic tile
69	Tradewell	Stack-bonded brick
70	Safeway	brick and 2" ceramic tile
72	Nielsen's	verde antique, 1" ceramic tile
77	Pay 'N Save	1" tile
73	McClelland Cleaners	limestone veneer
75	First National Bank	ceramic tile
79	Goldberg's	random veneer slate
80	Atiyeh	ceramic tile
82	Sanford	pink gneiss
84	Toyland	1" tile
85	Hippopatomous	overfired brick
97	Aden	travertine rubble
98	~~Karafune~~ HOUSE OF UNIFORMS	1" tile
100	Armishaw's	rugbrick
101	Fahey Brockman	4$ cut blocks of gneiss
102	Nordstrom's	marbles
99	House of Uniforms	1" tile

STATE DEPARTMENT OF GEOLOGY
AND MINERAL INDUSTRIES
BAKER FIELD OFFICE
2033 FIRST STREET
BAKER, OREGON

June 12, 1962

Mr. Ralph Mason
1069 State Office Building
Portland 1, Oregon

Dear Ralph:

Mr. E. S. Becker of La Grande took some claims on building rock in the Chicken Hill area of the upper Grande Ronde River (extreme NW of Sumpter quad and adjacent to the north) a couple or three years ago. The area is occupied largely with early Tertiary acidic volcanics of assorted kinds.

Recently he has begun peddling stone and reports that the new Post Office in Wallowa, the new Pioneer Motel in Pendleton, a couple stores and several homes have been constructed with his material in La Grande. Also a model home at Midway, Washington (between Tacoma and Seattle). Also numerous fireplaces and planters in La Grande.

I have not seen the stone but will drop by and take a look some day. In the meantime this is to alert you concerning the operation, the address of which is:

Grande Ronde Stone Company
Rural Route 1,
Island City Highway
La Grande, Oregon.

Sincerely,

N. S. Wagner

NSW:tm

8-18-60

WILLOWDALE — CHAS F. BURK

GANG SAW 2" - 4½ - 7" 3¾" WIDE x 48" LONG.

15 T/BLOCKS 10' x 8' x 4' 6 HRS TO GANG SAW 30 BLADES

60" GUILLOTINE H7D

7 MEN - WILLOW - 2 IN 1 SAWING
4 " RANSOME

ALL STONE PALLETIZED & SHRINKED

Bldg. Stone Survey

Places To Visit:

1. Smithwick ✓
2. Empire (Spangler) ✓
3. Wiley ✓
4. Joe Marston ✓
5. Rainbow Rock
6. Indian Candy Stone + "Hawaiian Travertine"
7. Willowdale
8. Sublimity ✓
9. Riddle ✓
10. S.J. Squaw - 3765 W 11 Eugene - DI-3 8147 EUG
11. Butte Cr. - Sec 33 T 9S R 2E ✓
12. Leroy Grote - Redmond
13. Durfee - Redmond
14. Gaul - Portland
15. Brownsville ✓
16. Dooley Mt.
17. Bruce Manly - Medford - Sec 11-12 - T 35 S R 1 W
18. Rome Stone

(More)

BLDG STONE SURVEY

PLACES TO VISIT - 2

19 - ~~[illegible] NS WAGNER~~

20. STAYTON (OLIVER JUEL - JUEL & SON FLAGSTONE CO) ✓

21. COBLE - LITTLE RIVER. SEC 24 T.27S. R.1E.

22. ROCKWELL SEC 32 T6S R32E UMATILLA CO.

23 - FLOYD CARLSON, Sr. (REV)
107 MAYFAIR - EUGENE - DI-3 7741 or DI-3 7533

24 BARTELL - SERENDIPITY STONE LAKE CO.

25 CASCADE PUMICE - BEND

26 CENT ORE PUMICE - BEND

27 HARNEY COUNTY PUMICE - BURNS

28 C.HEMULT — (CARLSON)

29 - CHRISTY - EX OBSIDIAN

30 - MOULTRIE - BORING ON FOSTER ROAD.

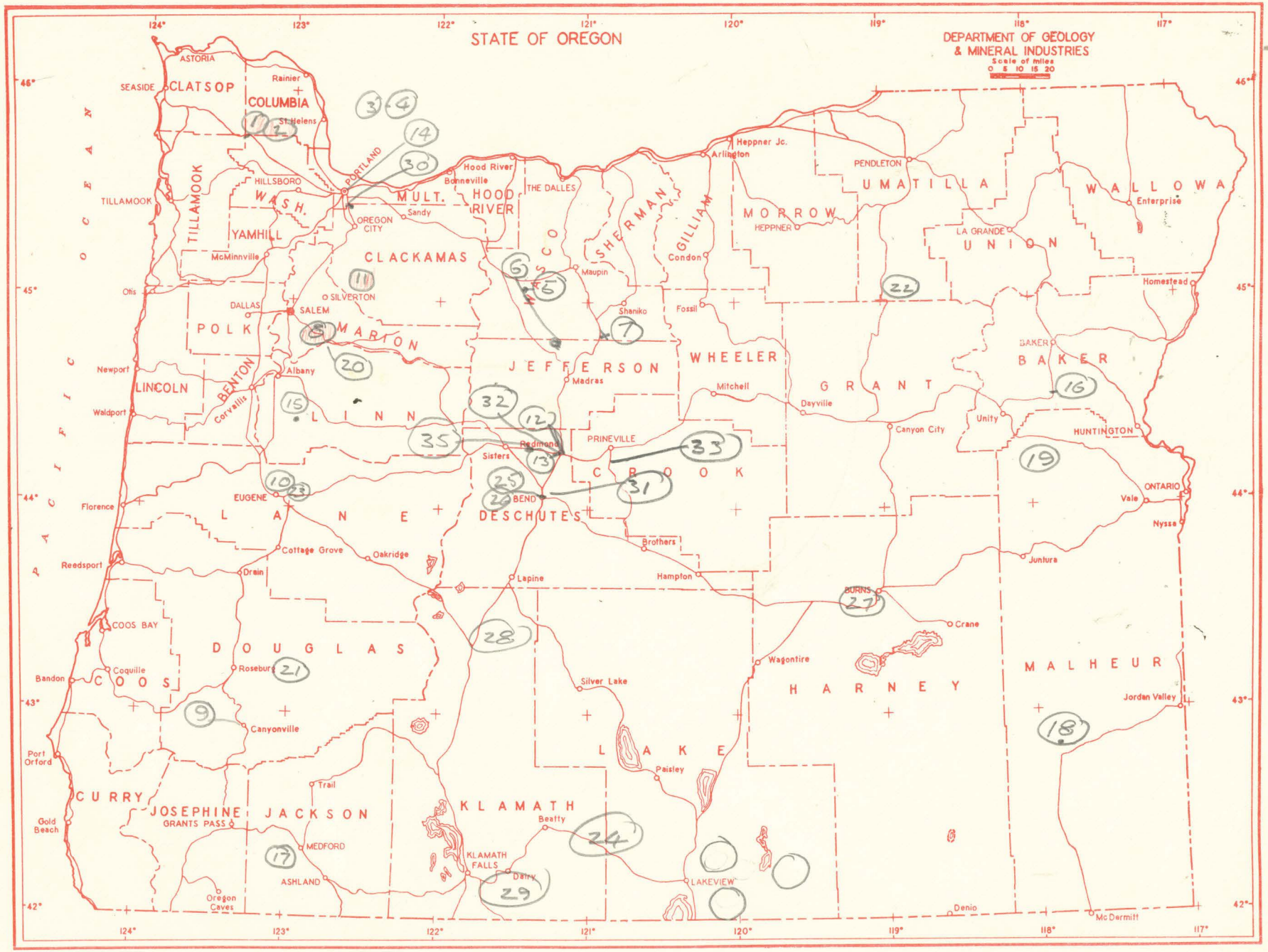
31 LELCO INC - JIM BARLOW 750 "D" AVE, BEND EV-2 3121

32 DON HURRLE - TETHEROW BUTTE REDMOND

33 QUARRY 3-4 MI S. OF PRINEVILLE W SIDE OF RIVER
(RALPH WATSON INFO)

34 JONES MARBLE QUARRY ✓

35 OCHOCO STONE - CLINE BUTTE - DURFEE



Blue Stone Quarries

September 7, 1960

Mrs. Lloyd A. Williamson
701 Broadway
Bend, Oregon

Dear Mrs. Williamson:

This Department is making a survey of lightweight aggregates and building stones in the State, the results of which will be published in a bulletin sometime next year. To round out our studies of these commodities, we would appreciate any information you might give us relative to your abrasive-grade pumice operation near East Lake. We are particularly interested in what uses the material is being put to, the specifications required by the trade, and the location of the markets. Information on prices and volume of production would be helpful, but you may not wish to have this published.

It is our understanding that your pumice has been used mostly for abrasive purposes in the past. Have you investigated the possibility of selling it as an ornamental building stone? Similar material, called "Feather Rock" and other descriptive names, is moving into southern California for use in homes and gardens. Some of the built-up roofs in California are even using small lumps of pumice similar to yours. Another possibility that occurs to us is to use large lumps for hanging flower pots and other shaped pieces. The lightness in weight, ease of shaping, and attractive texture of your pumice should make it desirable for many purposes in landscaping and building construction.

Sincerely yours,

Ralph S. Mason
Mining Engineer

RSM:lk

Water of absorption = $\frac{\text{weight of water absorbed}}{\text{dry weight}}$

Apparent porosity = $\frac{\text{weight of water absorbed}}{\text{volume}}$

Bulk Specific Gravity = $\frac{\text{dry weight}}{\text{volume}}$

Weight per cubic yard = bulk spec. grav. x 1684.8

Weight per cubic foot = bulk spec. grav. x 62.4

Cubic feet/ton = $\frac{2000}{\text{wt. per cu. ft.}}$

Record Courier - May 6, - 1965

A STONE FOR BUILDING

Oregon geology department's April issue of Ore Bin publication carries an interesting feature article on the mineral products which are going into exterior building finishes in modern Oregon architecture. The products range from the common brick to ceramics, cast aggregate, cement, slabbed stone and natural stone to the new and popular stone veneers.

Our point in mentioning this is that the department's article mentions three in the later category quarried in Oregon, a Wasco, a Deschutes and a Marion county veneer and ashlar. But it overlooks the newest of the products, the Moon Mesa stone quarried by Anthony Brandenthaler and his firm on Dooley Mt.

This stone where it appears, such as in several motels recently built, is one of the most outstanding, surpassing in our view the much-used Arizona stones for attractive coloring and contrast. So, really, the department should add this fourth building and architectural Oregon stone to the list.

The Baker County product is just now expanding its marketing scope and one can well predict that it will become one of the most popular of the natural stone finishes in the region.

Both from the standpoint of its extreme beauty and practicality, as well as its proximity and uniqueness to Baker, it would be wonderful if the new federal building now on the drawing board could specify the Moon Mesa stone. It would in fact tie the building down architecturally to the community, be meaningful to the economy of the area and strike an esthetic note that would be most significant to the locality the building will serve.

cc ~~xxx~~ nsw

Mr. Byron Brinton, Editor
Baker Record Courier,
Baker, Oregon

Dear Mr. Brinton,

My attention has been called to your recent column "A Stone For Building"., which commented on my "Walls of Portland" article in our monthly publication the Ore Bin. Thank you for calling attention to the article in your newspaper. The very great interest by the public in this subject is reflected in the number of letters I have received in the past week, many of them from out of state. One building contractor from Pasadena ~~xxx~~ has just written to request six copies of the article.

In writing the article it was necessary to impose certain limits or else it would have been encyclopedic in scope and terribly dull in content. For this reason the study of walls was limited to the Portland area, and only those walls of more than unusual interest or significance were discussed. There are dozens of examples where local stones (we have a record of nearly fifty quarries which have produced stone in the state) have been used as part of the exterior walls of buildings. Unfortunately only a few of your local stone quarry could be included in the article. No slight/was intended and I am sure that you will understand the problem.

Just as a matter of local interest may I suggest that you turn out an article on the use of native stone in your own city. As a ~~working~~ title I would like to offer "The Buildings of Baker". You can very probably turn up some ~~very~~ most interesting material right in your own back yard--I mean quarry.

sy rsm

Standard Plaza

retaining walls and small fountain bases of granite

exposed agg slabs for deck slabs

travertine panels above breezeway

Pioneer Broadcasting Bldg 1501 SW Jefferson

poured-in-place concrete posts

Fred Bassetti & Assoc, Seattle architects

concrete canopies over 2nd floor windows

Walls of Portland - notes

IBM Building 2000 SW First Ave

Lewis Crutcher & Assoc. architect representative
Hoffman Construction Co. gen contractor

floors supported by central core and by precast units forming perimeter wall installed after floors built.

each unit 12 ft wide x 52 ft high (4 floors)

38 units used total of 228 eyebrows

each unit weighs 34 tons

built in Tacoma by Concrete Technology Copp.

entire wall erected in 9 working days

units serve as support and sunscreen for floor-to-ceiling glass set just inside

concrete is 3" thick, poured in steel molds to give smoothest possible surface.

units welded to rebars protruding from waffle slab floors

"all concrete" no other material visible

Equitable Bldg. 1300 SW 6th

Pietro Belluschi, architect

precast wall panels mfd by Mosai, constructed at Swan Island

elevator wall of Baltic granite from Austria

travertine floor slabs from Italy

Cararra marble for counter tops from Italy

Walls of Portland--3

St. Helens Hall 6300 SW Nicol Road

Lewis Crutcher & ASSoc architects

exterior walls of hand glazed tile by Bennett Welsh, on Willamina body

Building Here Gets Unique 'Face

Exterior panels being placed on the new Equitable Savings & Loan Building will form a facing unique in Portland.

The exposed aggregate panels, some weighing as much as 12 tons, represent one of the "most highly sophisticated" precasting jobs ever undertaken by Olympian Stone Co., the Seattle firm which recently opened a branch on Swan Island.

The precast units form a completely finished wall, inside and out. Window frames and air conditioning ducts are cast into panels at each window opening.

Panels vary in size from 2 feet square to 12 by 27 feet. These largest window wall units, with eight openings, are the largest single units of their kind ever manufactured by Olympian Stone.

Trade name for the material is Mo-Sai. It is made with granite, vitreous or quartz aggregate cast in molds, under vibration, with white cement. Whilhelm Trucking Co. is transporting the units from the Swan Island plant to the 4-story reinforcement concrete and structural steel Equitable Building at SW 6th Ave. and Jefferson St. Erection of the precast panels is being done by Smith Masonry Contractors. The building was designed by Pietro Belluschi, with Wolff & Zimmer of Portland.

The east side of the building is being faced first. Work then will move to the south, west and north sides, in that order.

PART of 12-ton exterior facing panel awaiting installation looms in foreground of this photo of new Equitable Savings & Loan Building. Smaller 5-ton panel of similar design already in place, (arrow) shows in background. Precast exposed aggregate panels for facing of entire building are made by newly opened Swan Island branch of Olympian Stone Co., Seattle. Panels have window frames, air conditioning slots cast into them. (Journal photo by L. Ordeman)

P-29086

EVERETT
AKINS STONE DOUGLAS SEC 1 T 27S R 2E 2-6-64
2735 W GARY AVE. ROSEBURG,

VOL 40 × 36 × 2.1mm = 30.24 cc

WET WT 78.2
DRY WT 75.8
2.4

WATER OF ABS = $\frac{2.4}{75.8}$ = 3.18 %

APP POROSITY = $\frac{2.4}{30.24}$ = 7.95

BULK SP GR = $\frac{75.8}{30.24}$ = 2.5

WT/CU/FT = 2.5 × 1684.8 = 4210

SAMPLE NOT STANDARD SIZE

ROUGH-BANDED SILICIFIED RHYOLITE
ALL VESICLES FILLED W/ SILICA
CHOCOLATE BANDS & SPLOTCHES IN GRAY MATRIX.

PORTLAND BRICK & STONE CO.

MAIN OFFICE: 5437 S. W. CANYON COURT CA 6-6363
EAST SIDE YARD: 10125 S. E. FOSTER ROAD PR 5-1541
PORTLAND, OREGON

USUAL BUYING PRICE IS ABOUT 1/3 LESS THAN SELLING

CONTRACTORS PRICE LIST
Page S - 4
January 3, 1961

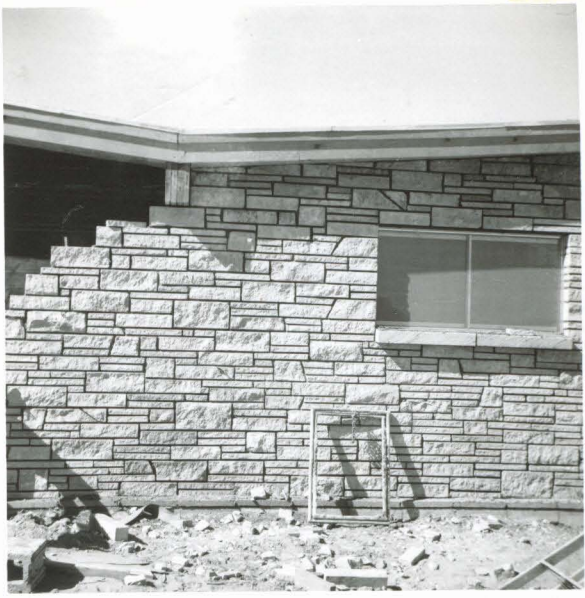
VENEER STONE, Graded Heights		Sylvan Yard
Kaibab Arizona KGS Sandstone	AC - 55	$75.00 Ton
Pinegrove Rainbow Stone 2-4 1/2-7"	AC - 80	80.00
Oregon Emerald Green 2-4 1/2-7"	AC - 75	80.00
Oregon Desert Rose 2-4 1/2-7"	AC - 70	80.00
Texas Shell or Cream 2 1/4-5-73/4"	AC - 50	60.00

VENEER STONE, (Random Sizes)		
Kaibab Arizona Random	AC - 50	$67.50
Utah Green (Light)	AC - 45 - 50	81.00
Kaibab Arizona Weatherust Random Heights	AC - 60	55.00

RUBBLE STONE		
Palos Verde Rubble Stone	AC - 40 - 45	$65.00 Ton
Drift Wood Rubble Stone	AC - 40 - 45	67.50
Kaibab Black Volcanic Stone	AC - 40 - 45	65.00
Echo Mountain Rubble Stone	AC - 45	58.00
Mica Mountain Rubble Stone	AC - 45	58.00
Copper Mountain Rubble Stone	AC - 45	58.00
Pine Grove Sawn Back Rubble	AC - 80	80.00
Oregon Emerald Green Sawn Back Rubble	AC - 75	80.00
Oregon Desert Rose Sawn Back Rubble	AC - 70	80.00
Fishers Gray Rubble Stone	AC - 45	36.00
Lake Merwin Rubble Stone	AC - 40	40.00
Penchot Forest Rubble Stone	AC - 40 - 45	44.00
Featherock Rubble (Rock to Boulder Size)		140.00
Golden Polynesian Coral Rubble (Rock to Boulder Size)		100.00
Pumice Rubble Rose		110.00
Pumice Rubble Gray		105.00

AC = approximate coverage in square feet per ton.

OCT • 58



SEPT 1958

APR 1963