UTAH GEOLOGICAL AND MINERALOGICAL SURVEY

QUARTERLY REVIEW

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UTAH OIL DISCOVERY

What promises to be one of the most significant Rocky Mountain oil discoveries on record has recently been made by PHILLIPS PETROLEUM COMPANY in Summit County, Utah. (See map page 6.)

The wildcat discovery well is the first to be drilled on the Bridger Lake Unit, and is located in NW ¼ SW ¼ sec. 25, T. 3 N., R. 14 E. (Salt Lake B.M.) about 2½ miles south of the Utah-Wyoming State Line, on National Forest land. The unitized area lies in both Summit County, Utah and Uinta County, Wyoming. Phillips Petroleum controls about 24,000 acres in and around the unit.

The top of the DAKOTA FORMATION was logged at 15,357 feet. There are 4 sands in the Dakota which are prospective producers, and which total about 90 feet net pay sand. Five cores were taken at depths ranging from 15,315 to 15,604 feet. A dipmeter survey was run, with satisfactory results, but no logs of the well have yet been released.

Five and one half inch casing was set to a depth of 15,703 feet. The well bottomed in the Morrison Formation. The lowermost (fourth) sand was perforated in an interval between 15,555 and 15,586 feet (31 feet of sand) and the next (third) between 15,054 and 15,517 feet (13 feet of sand). The well was completed January 28, 1966 with initial production from the lower two sands logged at 2,753 barrels per day flowing through a ¾-inch choke.

Two new wells have been located on the unit, #2 Fork-A, NWSE Sec. 26, T. 3 N., R. 14 E. and #3 Fork-A, NWNW Sec. 25, T. 3 N., R. 14 E. Both will be 16,000-foot Dakota tests.

TOPOGRAPHIC MAPPING of GREAT SALT LAKE

The Utah Geological Survey and the United States Geological Survey have co-ordinated their efforts in initiating a program which may result eventually in the topographic coverage of Great Salt Lake and the immediately adjacent shore areas. The Utah Geological Survey has allocated $25,000 for the production of twelve 7½-minute topographic maps; this amount will be matched by the Topographic Division of the U.S. Geological Survey. Since the first phase of mapping consists of taking aerial photographs, and since there has been urgent need for photography of the Lake at its current historic low stage, the Water Resources Division of the U.S. Geological Survey and the Utah Geological Survey have each contributed $5,000 to obtain complete photographic coverage of the Lake and its adjacent shores before a serious rise in lake level. Contracts for aerial photography were arranged in November, 1965. As a part of this program, the shoreline is being photographed with black and white, infrared-sensitive film in order to locate areas covered with water.

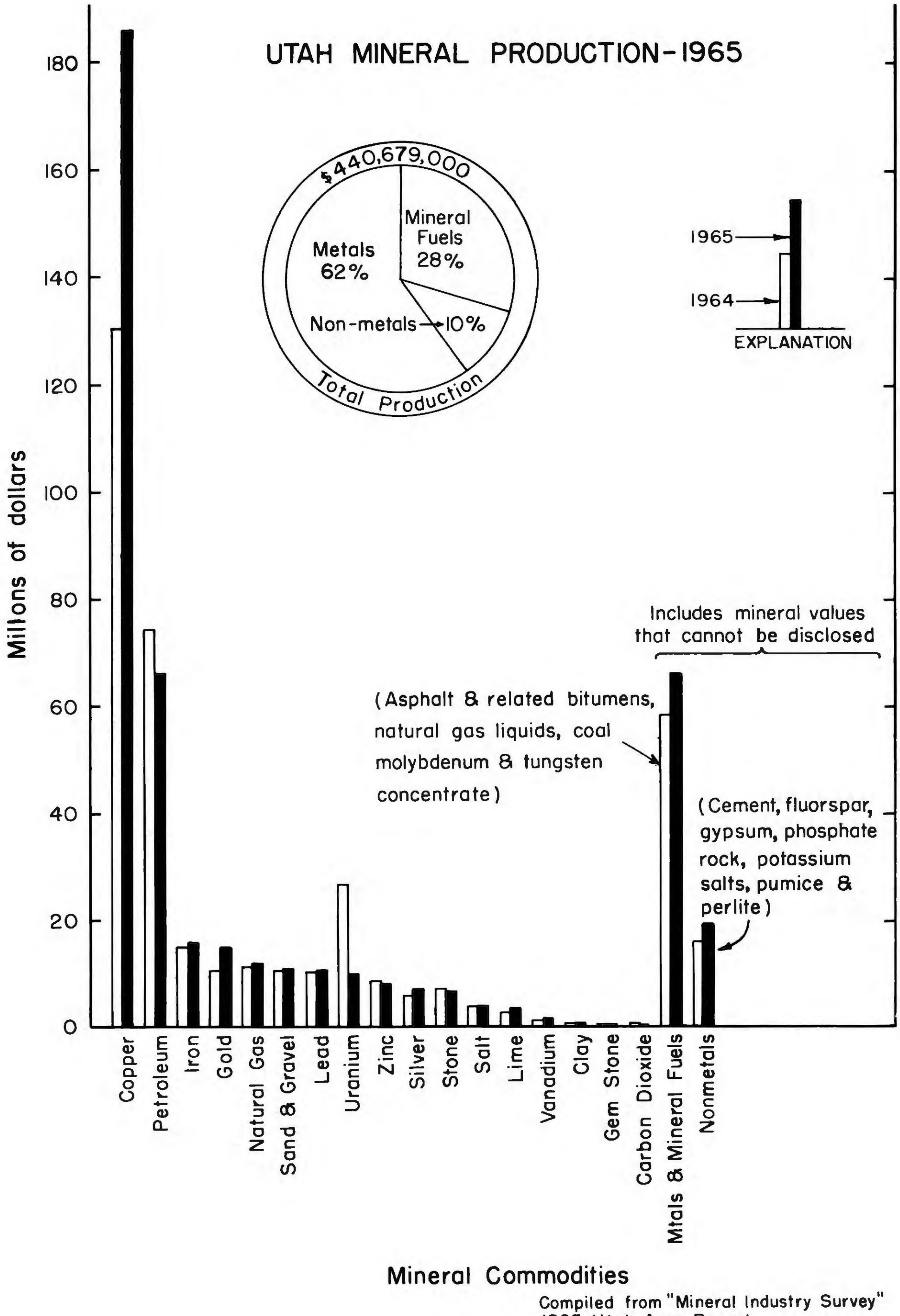
The Utah Geological Survey's fleet placed 28 buoys together with 14 tons of cement anchors at mid-lake stations. The buoys are to serve as markers for photographic control. (If they survive winter storms, some will be used as sample sites for chemical studies.)

Complete topographic coverage of the Great Salt Lake and adjacent shore areas involves the production of 47 (7½ minute) quadrangles (See map): *12* quadrangles along the northeast shore of the Lake extending northwesterly from Promontory Point, for which funds have been allocated; *14* quadrangles authorized for the southern one-third of the Lake; *15* unmapped quadrangles on the Lake's northwestern area; and the balance which will involve necessary revisions on previously - mapped quadrangles along the southeastern and eastern portions of the Lake.

The 14 quadrangles of the southern part of the Lake were authorized as the result of the concerted effort of the Water Resources Division of the U.S. Geological Survey, which recognized the urgency of obtaining topographic coverage of the Great Salt Lake and placed all of its mapping requests in this one area.

Other articles dealing with photography of the Lake appear on page 5.

UTAH MINERAL PRODUCTION INCREASES IN VALUE IN 1965



Compiled from "Mineral Industry Survey" 1965 Utah Area Report

The estimated value of the **Utah mineral production** for 1965 is **$440,679,000,** as published by the United States Bureau of Mines in their Mineral Industry Surveys: Utah 1965 preliminary area report. This figure represents an increase of 13 percent or $49.2 million over 1964 Utah mineral production.

Metals produced in Utah during 1965 accounted for 62 percent of the total mineral production or **$274.4 million; nonmetals** accounted for 10 percent or **$44.7 million:** and **mineral fuels** produced were valued at **$121.2 million** or 28 percent of the total State mineral production (see figure).

Increased mineral values in 1965 were due both to expansion of production and to freedom from serious strikes at Kennecott Copper Corporation's Bingham Canyon Mine. Dollar values of all commodities increased with the exception of uranium ore, zinc, and petroleum.

Increased prices for copper, lead, and zinc had a positive influence upon the dollar value of 1965 metal production. Copper increased in preliminary weighted annual average price from 32.6 to 35.6 cents per pound; lead increased from 13.1 to 15.8 cents per pound; and zinc increased from 13.6 to 14.5 cents per pound. All other minerals retained their 1964 price.

Crude petroleum and natural gas production dropped about 11 percent from 1964 but the recent discovery of Phillips Petroleum Company's No. 1-A Bridger Lake Fork Unit in eastern Summit County has stimulated renewed interest in the State.

Potash production increased due to the reopening of Texas Gulf Sulfur's Cane Creek Unit in Grand County.

The increase in the value of mineral products in 1965 progressed at a rate parallel to that of the Nation for the first time in five years.

Open File Preliminary Report

Gypsum Deposits in Garfield County, Utah

The Carmel Formation of Jurassic age is the only formation in Garfield County which contains **commercial quantities of gypsum.** The greatest thicknesses occur in the westernmost exposures which are found along and parallel to the eastern boundary of Boulder Mountain and the Kaiparowits Plateau.

Gypsum occurs both in veinlets and in thick beds. Most is white, massive, and finely crystalline.

Although the gypsum is abundant in Garfield County, early development seems unlikely due to lack of a local market, and to the fact that there are other deposits in Utah already under production.

Ten complete measured sections of gypsiferous sequences of the Carmel Formation are on file, including six original sectons and four previously published in Professional Papers of the U.S. Geological Survey.

Sources of 1964 Income from B.L.M. Lands in Utah

Mineral leases and **royalties** were paid in the amount of **$9,956,900** on oil and gas, coal, phosphate, potash and bituminous sands.

All other uses amounted to **$455,500** which was received from grazing permits for 1,068,841 sheep and 162,763 cattle, plus sales of timber and Christmas trees.

Source: Bureau of Land Management, Salt Lake City office.

Let Us Know Your Plans

We are still waiting for your response to the questionnaire enclosed with the November Quarterly, and hoping that the geologic activity of various investigators is not as severely curtailed as the response seems to indicate. **Please return the questionnaires.**

TAXES AND TACONITE

The inter-relationships between taxes and the development of the taconite industry of Minnesota have a special significance for Utahns who feel that our State's tremendous natural resources are not being developed to the fullest. The history of these inter-relationships is related by Dr. Edward W. Davis in the book, **PIONEERING WITH TACONITE,** (Minnesota Historical Society, St. Paul, 1964), which is the source for this article.

Taconite, a type of hard rock containing fine particles of iron ore, is found in extensive deposits in Minnesota. These deposits occur in the Mesabi Range area, which is famous for its high-grade ores. For years taconite was considered merely as another "waste" rock, known to contain iron ore, but such low grade (ranging from 30-50% iron ore) that it was impractical, if not impossible, to use. Thus for many years the status of taconite in Minnesota was very similar to that of alunite and oil shale in Utah today; a product of potentially great economic importance was tantalizingly present in extensive though low grade deposits, but could not be used because methods to extract it economically had not been developed.

As early as 1913 research scientists of the University of Minnesota's Mines Experiment Station realized that the iron in taconite might some day be of great economic importance. But it was to require 47 years of patient, determined and persistent research, thought, and hard work, with many interludes of trial and error, to discover and develop methods whereby taconite could become of major importance. In order for taconite to be a product of significance in an area where high-grade ores are abundant, these scientists — among them Dr. Davis — had to develop not only methods of extracting the iron from taconite (this could be done as early as 1919), but also of making it into a product superior to the iron from naturally rich high-grade ores (this was accomplished on a small-scale basis by 1945; by 1957 on a commercial scale), and at competitive cost as well (1960).

By 1940 the research efforts on taconite begun 27 years before were beginning to show great promise and the supplies of high-grade ore in Minnesota were diminishing rapidly. At this point, the large steel firms indicated that they would look elsewhere for high-grade iron reserves even if the research were successful, and they would not — could not afford to — build plants in Minnesota to process taconite because of Minnesota's extremely high mineral tax laws. Moreover, abundant reserves were soon found and developed in Labrador, Canada and South America. This was an unanticipated blow to the efforts of the research staff and their hopes for a taconite industry in Minnesota. Moreover, the effect on the economy of Minnesota, especially the northern counties of the Mesabi area which had long depended largely on tax revenues from the mines, was serious.

In 1940 mines in Minnesota were taxed at high rates by the state, the county, the municipality and the school district. The most serious tax burden was the "ad valorem tax" which required that a mine property be taxed according to its valuation from the time ore was discovered until all the ore was gone — so that a ton of ore in the ground would be taxed year after year until it was mined. One result was poor conservation; the best ores (high grade, high tax) were mined first, poor ones later (if at all). Another result was, as mentioned above, to discourage industry from further developments in Minnesota. The research scientists realized that if the ad valorem tax applied to the tremendous reserves of taconite, much

(Continued on next page)

Taxes and Taconite

(Continued from page 3)

of which would be in the ground for 50 to 100 years, the tax would be prohibitive and no use could ever be made of taconite, despite their years of research efforts. An intensive campaign was waged by the Mines Experiment Station and others concerned to inform the people of the Mesabi Range counties of the problem. In spite of their dependence on tax revenues, these people approved of proposed tax revisions, cooperated with the efforts of the scientists and then actually sponsored a tax revision bill for taconite. This bill reduced the ad valorem tax on taconite but applied one to the final product produced. It managed to pass the state legislature in 1941.

The results were evident very rapidly, "for the legislature had scarcely adjourned when several large mining companies began to take a more active interest in Minnesota taconite" (Davis, p. 108). Specifically, Reserve Mining Co. and Erie Mining Co., affiliated with Republic and Armco Steel Companies, were encouraged by the tax changes and the taconite pelletizing process to invest tremendous sums in pilot processing plants in Minnesota. These plants first produced pellets in 1955 and 1957, respectively; and by 1960 the pellets had proven themselves commercially, as they could increase production of pig iron by 60% while requiring 27% less fuel to do so (p. 191)!

In 1964 the only deterrent to full-scale development of the taconite industry in Minnesota was the "tax climate" which many companies still felt was unfavorable. Minnesotans realized that the tax reductions of 1941 actually resulted in an overall increase in tax and payroll revenues from iron production and were anxious to encourage further development. Thus, at the polls in 1964 the majority of all the people supported an amendment to provide an evén more favorable tax climate for the taconite industry: concrete recognition of the increased payrolls and prosperity made possible by the 1941 tax improvements.

Therefore the development of the use of taconite to produce iron ore pellets of superior quality required the continuing cooperation of the University of Minnesota's Mines Experiment Station, Industry, the people of Minnesota, and the Minnesota legislature over a period of many years. But the results of this cooperation, as reflected in the success of the taconite pelletizing process, have been far-reaching and are felt far beyond the boundaries of the state:

1. Steelmakers no longer have to take the ore as it occurs naturally, even in high-grade deposits — they can control chemical analysis, size and shape of the pellets, and operate at very high levels of efficiency, more than doubling their production.

2. Iron reserves have been reevaluated. Mines that produced in high-grade ore in Labrador, South America and Canada are being abandoned for lack of a market: operators cannot afford to use the natural ore! On the other hand the production of taconite pellets doubled in the first 3 years (1960-63). Tremendous iron reserves of low-grade ore have become available not only in the U.S. but on every continent, and new taconite plants are being planned and/or built all over the world.

3. Changes such as these are certain to cause severe economic adjustments — creating jobs and prosperity in some areas; unemployment and depression in others. Taconite operations employ many more men than do natural ore mines of similar size.

Interesting what tremendous local and world-wide effects resulted from some rather simple tax-law reforms; an informed populace; and the efforts of an ineffective, adequately financed Mines' Experiment Station, isn't it?

Bernice Y. Smith

Maria AND THE TAILINGS TEST

The Great Salt Lake Authority plans to conduct tests on the **Kennecott Copper tailings** to examine the possibility of selecting and emplacing tailings in the Great Salt Lake as fill for recreation areas and reclamation, or as dikes for water-control and roadbeds.

The Authority will first test the feasibility of emplacing select tails (+200 mesh) and will determine whether or not a 20-to-1 slope on the inlake emplacements can withstand the ravages of the Lake. The tailings are to be conducted to the Lake in a water slurry via 12-inch pipeline. The laying of the pipe, weighing about 20 pounds per foot, neared competion in late December, 1965.

The Salt Lake Authority which had successfully weathered the inclements of public opinion, was now faced with the vicissitudes of weather.

A strong Tooele "blow" developed on December 29 and removed a 1,200-foot section of new pipe from its supporting uprights. The section damaged was flanked on either side by undisturbed old pipe which was heavier, due to silt deposited in the pipe. Mr. A. Z. Rickards, consulting engineer for the Great Salt Lake Authority, calculated that wind gusting at near 80 mph was necessary to displace the pipe. (Winds of 52 mph were recorded December 29 at 6:20 A.M. at the Salt Lake Airport, 10 miles east of the test site.) This unpredictable weather complication will delay the proposed testing which was scheduled to begin on February 1, 1966.

"They Call The Wind Maria"

The Utah Geological Survey appreciates the generous donation of electric logs from wells drilled in Utah, given by **Shamrock Oil and Gas Company.**

SODIUM — *Schmodium!*

On January 18, 1966 a military aircraft sighted a white boat dead in the water of the north arm of the Great Salt Lake. On that boat shivered a sad crew: Messrs. Langford, Ames, and Hall of the Quality of Water Branch of the U.S. Geological survey. Subsequently the Federal Aviation Authority notified the Utah Geological Survey that a boat bearing its name was in distress on the Lake. A helicopter was dispatched to render assistance. Many attempts at dislodging the boat led to a final try at towing the boat by the chopper. This too failed. The boat engine was overheating, and only after continued short starts and much rowing was the boat beached at 8:00 p.m.

The "great liquid desert" is a marvelous yet cruel teacher whose principal discipline is her **hostile heavy brine.** In winter when the brine cools to a deadly 33°F it is supersaturated, its mineral load awaiting any disturbance which might allow it to precipitate from the brine. The Survey's boat, "the Clyman," provided the disturbance. Although the boat was equipped with a heat exchange system, the sodium sulfate effectively clogged the water-intake port. Examinations of the hull revealed that minute scratches and irregularities in the paint as well as sharp edges and protrusions on the bottom were also sites of sulfate crystalization.

This incident suggests other dangers of operating in the northern arm of the Lake. For instance, sulfate may clog the centrifugal brine pumps, or the propellors may become useless globs of sulfate. Treatment of the salting problems varies, however, depending on the particular conditions of the brine and on the type of equipment installed to counteract it.

Seiche ('sāsh) — A periodic oscillation of a body of water whose period is determined by the resonant characteristics of the containing basin as controlled by its physical dimensions.

Loading an amphibious unit with marker buoys for photographic control in Great Salt Lake.

MOSAICS ANYONE?

Intermountain Aerial Surveys has contracted to obtain the aerial photography of Great Salt Lake which will be used in preparing topographic maps. An uncontrolled photo-mosaic of the Great Salt Lake will be prepared on a scale approximately 1″ = 8,000′. Thus the overall size of the mosaic will be about 4′ by 5′. Each negative will be printed by the logatronic process to insure tone-matching of prints. Thirty-two mosaics have been ordered to date at a cost of $55.00 each. Because the United States Geological Survey has suspended flight operations on the Great Salt Lake Project until March, 1966, **there is time to accept additional orders.** Please submit your orders to the Director, Dr. William P. Hewitt, Utah Geological Survey, 103 Civil Engineering Building, University of Utah, Salt Lake City, Utah.

The mosaic should be available within two or three weeks following the completion of photography.

AERIAL PHOTOGRAPHY of the GREAT SALT LAKE

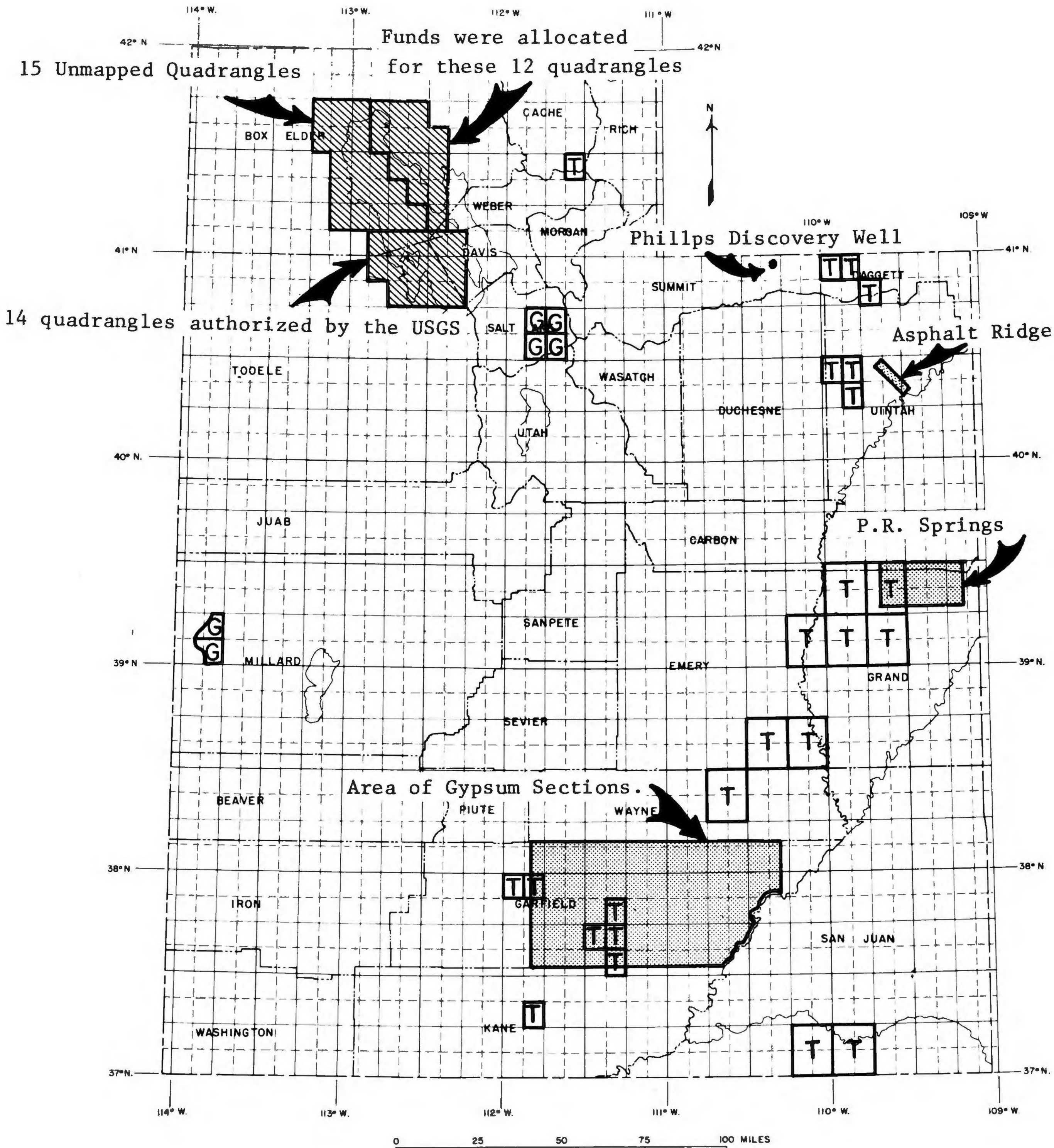
The difficulty of aerial photography of the Great Salt Lake during the winter months involves the following problems.

(1) Stimulated by the freezing conditions, **seed crystals of sodium sulfate** and possibly other minerals precipitate from the saturated brine and create a murkiness which is detrimental to mapping and photographic interpretation.

(2) Storms, which are most prevalent during the winter, push the water before them and frequently produce 2-foot wind-tides that drown the nearly flat grades of the relicted lands and in some places temporarily present a false shore as much as four miles inland from the true shore. At cessation of these storms, waters receding from the windward shore will slosh the length of the lake and pile up on the lee shore, then slosh back again. These **storm-induced seiches** may require four to six days to reach equilibrium. The seiches now have a period of six hours. Formerly, before the completion of the Southern R. R. fill, their period was about nine hours. Their full effect and the tenure of their hydrographic oscillation is not clear, but Mr. Milton Wilson, former District Chief of the USGS Water Resources Division District in Utah, produced evidence of their presence in the form of lake-level measurements along the south shore.

(3) **Low sun, prevalent cloud cover, fog-induced temperature inversions, smog and haze** occur singly or in various combinations to the detriment of quality control of photography during the winter season.

UTAH INDEX MAP



Geology of the Bituminous Sandstone Deposits of Asphalt Ridge — Open-Filed

Asphalt Ridge is a prominent northwest-southeast-trending hogback in **Uintah County,** Utah, which separates Ashley Valley on the northeast from the Unita Basin on the southwest. It is located in Tps. 4 - 5 S., R. 21 E., and Tps. 5 - 6 S., R. 22 E. (See map page 6.)

Asphalt Ridge was mapped to determine the surface extent, thickness and degree of saturation of the bituminous sands. Current interest of commercial operators in the bituminous deposits of the Asphalt Ridge area and the recent acquisition by the State of Utah of *in lieu* lands in this area from the Federal Government prompted the study. The geologic sections, geologic map, drill hole and core hole map, structural features map, and generalized geologic index map are available for $10 a set at the Utah Geological Survey (103 Civil Engineering Building, University of Utah, Salt Lake City, Utah).

Bituminous sandstones are likely prospects for production of hydrocarbons due to their low cost of exploration, and the ease with which reserves can be estimated.

Open-pit mining may be practicable in several areas, depending upon the thickness of the zone of saturation, the amount of overburden and the topography. Bituminous sandstone is currently being mined for paving material using the open pit method. (Uintah Co. asphalt pit, sec. 30, T. 4 S., R. 21 E.)

Production costs are being reduced with development of *in situ* methods. *In situ* methods are referred to as thermal methods because they depend upon the use of heat to lower the viscosity of the oils so that they will flow from the reservoir sands into a drilled well. Asphalt Ridge is well suited to *in situ* thermal recovery methods because of nearness of pipelines, good water supply, excellent reservoir haracteristics of the Rim Rock Sandstone, and large reserves. **Sohio Petroleum Co.** and **Gulf Oil Corp.** have both conducted thermal recovery tests on Asphalt Ridge.

Maps of the U. S. Geological Survey

(See map page 6 for areas)

Topographic maps published in 1965 or 1966: **7½-minute quadrangles:** Monte Cristo Peak, Phil Pico Mtn., Jessen Butte, Elk Park, Whiterocks, Lapoint, Ft. Duchesne, Grass Lakes, Barker Reservoir, King Bench, Tenmile Flat, Red Breaks, Sunset Flat, Horse Flat.

15-minute quadrangles:

Moonwater Point, Tenmile Canyon, Sego Canyon, Floy Canyon, Gunnison Butte, Bowknot Bend, The Flat Tops, Hanksville, Goulding, Mexican Hat.

Geologic maps published in 1965 or 1966: four 7½-minute quadrangles in Salt Lake County, numbers GQ377, GQ378, GQ379, and GQ380; and the larger part of the Conger Range quadrangle in Millard County, numbers I-435 and I-436.

Other items:

The Geologic map of North America, by the North American Geologic Map Committee, E. N. Goddard, Chairman, and compilation assistance by D. C. Bell. 1965. Scale 1:5,000,000 (1 inch - about 80 miles). 2 sheets, each 39 by 56 inches. $5.00 per set.

The Geologic map of New Mexico, by Carle H. Dane and George O. Bachman. Scale 1:500,000 (1 in. equals approximately 8 miles). 1965. Map with separate symbols sheet. $2.50 per set.

The above maps are available at the Public Inquiries Office, U. S. Geological Survey, Room 8012 Federal Building, 125 South State St., Salt Lake City, Utah 84111.

Worth Your Attention

"Some Possible Applications of Thermal Recovery in Utah," an article by Mr. Robert E. Covington, appears in the **Journal of Petroleum Technology,** November, 1965, p. 1277-1284.

P R Spring Open File Report

Roan Cliffs, Utah

The Utah Geological Survey has undertaken a **project to map the bituminous saturation in sandstones** which crop out on land recently acquired by the State of Utah from the U. S. Government. (See map page 6.) The sandstones belong to the Parachute Creek Member of the Green River Formation (of Tertiary age). Twenty-six stratigraphic sections of the saturated zones were measured.

The sections are available on nine 15 x 30 sheets. The map, together with the sections and an explanatory sheet will be available for $10 a set at the Utah Geological Survey. (103 Civil Engineering Bldg., University of Utah, Salt Lake City, Utah).

I.B.M. to the Rescue

The Utah Geological Survey presents its first effort at data retrieval: the **"Consolidated Index of Samples, 1961-1965" (Circular 48, postpaid 50¢).** It was coordinated by Mr. I.B.M. no 7044, a science fiction blob serviced by three wires — two hot, one cold.

Our former employee, Merriam Bleyl, convinced the Director of its merits, and her husband Robert Bleyl, now of Yale, laid out the possible data retrieval methods. Mr. R. B. Kayser of the Utah Survey and Mr. Roy E. Willie, Jr. of the University of Utah Computer Center worked together to program the data.

This technique is currently being used in the production of the **Mining Directory,** by R. F. Garvin. We hope eventually to assemble a catalog of prospects and former mines together with basic geologic and geographic data.

Following its successful debut, the **I.B.M.** will be used in preparing annual supplements to the Index of Samples, the Mining Directory and the Utah Geological Survey's records of drilling in Utah.

Library of Samples for Geologic Research

Wells Added Since the November Quarterly Listing

	Location	Operator	Well	Footage
UTAH —				
Carbon Co.	9-13S-14E	Mt. Fuel Supply	#1 Mt. Bartles	1305-9250
Duchesne Co.	5-9S-17E	Shamrock	Allen Fed. "A"-1	5020-6200
	29-3S-7W	Mt. Fuel Supply	#1 Cedar Rim	520-8100
Emery Co.	22-20S-7E	Pacific Nat. Gas	Behling 41-22	1700-8527
	21-20S-7E	Pan American Pet.	#1 Ferron Unit	400-10,020
	12-18S-8E	J. A. Minton	Wilberg 1X	330-2015
	2-20S-7E	Pan American Pet.	#4 Ferron Unit Fed.	504-3500
	14-20S-7E	American Pet.-English	#1-14 Fee	718-860
Grand Co.	4-17S-21E	Pacific Nat. Gas	#3 Segundo 23-4	200-9840
	9-17S-21E	Pacific-English	#1 Segundo Unit	400-9740
	22-16S-21E	Pacific Nat. Gas	Moon Ridge 22-22	3500-9650
	15-16S-21E	Pacific Nat. Gas	Moon Ridge 31-15	7600-10,250
	2-16S-22E	Pacific Nat. Gas	#1 Cherry Canyon	650-9500
San Juan Co.	28-30S-25E	Pacific Nat. Gas	#1 Little Valley	3350-9712
	29-30S-29E	Pacific Nat. Gas	#2 Little Valley	1400-9000
	18-36S-20E	Pan American Pet.	#2 Elk Ridge	0-4350
	22-41S-22E	Pacific Nat. Gas	North Boundary Butte 41-22	1000-6045
Uintah Co.	13-9S-19E	Shamrock	#1 Utland Mine	1000-5445
COLORADO —				
Dolores Co.	10-41N-19W	Pacific Nat. Gas	#1 Sitton	1600-5660
Mesa Co.	2-10S-97W	Pacific Nat. Gas	Shire Gulch 31-2	1870-8200
Moffat Co.	29-10N-95W	Pacific Nat. Gas	Greasewood Gulch Unit 33-29-1	400-8850
Pitkin Co.	29-9S-85W	Pacific Nat. Gas	NW Aspen 12-29-2	2585-3788
Rio Blanco Co.	28-3N-88W	English Oil	#1 Gov't Johnston	1089-1972
	10-1S-96W	Tintic Std. Mining	Gov't 1-1 0	260-2990
	36-1N-97W	Tintic Std. Mining	Gov't 1-36	280-2915
Routt Co.	7-4N-87W	English Oil	#1-31 Long-Sage Creek	250-5264
WYOMING —				
Big Horn Co.	7-56N-47W	Pacific Nat. Gas	NW Byron 22-7-1	0-6801
Lincoln Co.	1-24N-114N	Pacific Nat. Gas	Fontenelle 21-1-1	377-6350
Sublette Co.	28-36N-109W	Pacific Nat. Gas	#14-28-2 Willow Lake	50-6650
	28-36N-109W	Pacific Nat. Gas	Willow Lake 12-20	70-1120
Sweetwater Co.	31-24N-101W	Mtn. Fuel Supply	#1 Maxwell	90-5100

Forthcoming Publications

Going to press soon

Bulletin 77, Geology of the Deep Creek Mountains, Tooele and Juab Counties, Utah, by K. Bick.

A Directory of the Mining Industry of Utah, 1965.

In Press

Circular 47, Gold Placers in Utah. 25¢ postpaid.

Earth Science Education Series no. 1, Field Guide to the Geology of the Uinta Mountains and Adjacent Synclinal Basins, by G. E. Untermann and B. R. Untermann. 50¢

Special Studies 14, Geothermal Power Potential in Utah, by Edgar B. Heylmun. $1.25

New Publications

The following publications are available from the Utah Geological Survey, 103 Civil Engineering Bldg.

R.S. 92 - Gravity Studies in Utah, by Kenneth L. Cook. Reprinted from the American Geophysical Union Transactions, v. 46, no. 3, Sept. 1965, p. 569-573.

Library of Samples Consolidated Index. 50¢ postpaid.

Geologic Map Index of Utah (2 sheets) by L. F. Hintze and Lena Boardman, 1964. Not a new publication but always timely. Small-scale maps are indexed on sheet 1; large-scale maps are indexed on sheet 2. The total price is $1.00.

Geologic Map of Dinosaur National Monument, by G. E. Untermann and B. R. Untermann. $1.25

An Academic Contribution

Second fossil specimen — *Pseudoarchtolepis sharpi*

The discovery of a second specimen of *Pseudoarchtolepis sharpi* was made by Mr. B. J. Sharp (Geological Engineer, U.S. Atomic Energy Comm., Grand Junction Office). Mr. Sharp collected an unknown fossil from the Wheeler Shale of Middle Cambrian age at the southern portion of the Wheeler Amphi theater in the House Mountains o western Utah when a student of the University of Utah 1946 summer field course under the direction of Dr. Bronson Stringham. Through Dr. W. L. Stokes of the University of Utah, the fossil was sent to the University of Cincinnati and was described in a paper by H. K. Brooks and K. E. Caster, *Pseudo-arctolepis sharpi*, N. Gen. N. Sp. (Phyllocarida), from the Wheeler Shale (Middle Cambrian) of Utah: Jour. Paleontology, v. 30, no. 1, 1956.

In June, 1962, Mr. Sharp briefly revisited the type locality in search of the cast of the specimen, located the outcrop, and found a second fossil specimen in the rubble (See plate). The shale is very thin-bedded and contains no visible clue to the fossil's existence on the shale partings. As thin slabs must be split parallel to the parting planes in order to expose the fossil, the casts were probably lost as small fragments.

Perhaps other soft-bodied animals flattened by compaction and not normally exposed may be found in that locality.