



SURVEY NOTES

Vol. 11 No. 3

Service to the State of Utah

August 1977

MARIE CRANE DONATES MINERALS TO UGMS

The attractive mineral collection in the lobby of the UGMS offices is the gift of Mrs. Guy W. Crane. Marie was born in Eureka, Utah and grew up in Salt Lake City. She became interested in minerals when her father, an engineer, was requested to make a mineral distribution map of the United States and suggested that Marie help him with it. Her mineral collection was started when she was given two beautiful specimens from the Silver King Coalition mine at Park City.

Marie has worked as an engineering draftsman since her high school days. She has had a chance to know many geologists and engineers who have brought her mineral specimens from many parts of the world. She has a first hand knowledge of the Tintic, East Tintic, and Park City mining districts.

Marie is a charter member of the Mineralogical Society of Utah and the *(continued on page 6)*

Overthrust Belt Boom

Oil and Gas Discoveries in Rich County

The Overthrust Belt of southwest Wyoming and northern Utah (see Survey Notes, v. 10, no. 2, May 1976) is assuming a role of increasing importance in the U.S. oil and gas exploration scene as new oil and gas discoveries are indicated in Rich County, Utah and Uinta County, Wyoming. Drilling and completion of new wells continues, and production rates soar at the Pineview Field in Summit County.

The initial discovery in the present Overthrust Belt play was made in 1975 by American Quasar Petroleum at what is now the Pineview Oil Field, ten miles east of Coalville in Summit County. This was followed by Amoco Production's 1976 discovery of the Ryckman Creek Field, 15 miles north-northwest of Evanston in Uinta County, Wyoming. The Pineview discovery has grown to 12 producing wells with more than 1,300 acres proven productive within the field. Production exceeds 11,000 barrels of oil and 10.5 million cubic feet of gas per day. Industry sources credit the field with 135 million barrels of oil and 135 billion cubic feet of gas in place in the Nugget Sandstone and Twin Creek Limestone (Jurassic). Six drilling wells or announced locations were reported for the field in mid-July, and American Quasar had also announced plans to re-enter a dry hole on the west side of the field in an attempt to complete it as a producer. This well was drilled three years prior to the Pineview discovery.

The Ryckman Creek discovery has also been confirmed by two more wells and is being actively extended by additional drilling. Oil production here is from the Nugget Sandstone.

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Marie Crane shows Don McMilan, Director of the UGMS, one of the minerals from her collection. (UGMS photo)

SURVEY RELEASES

LATEST STUDIES

The latest publications of the Utah Geological and Mineral Survey are available through the UGMS Publication Sales Office, 606 Black Hawk Way, Salt Lake City, Utah 84108. When ordering by mail, add 10 percent for handling and mailing charges—minimum charge is \$.25.

Map 43, *Physiographic Subdivisions of Utah*, by Wm. Lee Stokes (\$.25; cost by mail is \$.50). Reprinted from Wm. Lee Stokes' article, "Subdivisions of the Major Physiographic Provinces in Utah," in *Utah Geology*, Vol. 4, No. 1, Spring 1977. Map is printed in three colors on 8½" by 11" sheet.

Reprint 100, *Satellite Microwave Observations of the Utah Great Salt Lake Desert*, by Fawwaz T. Ulaby, Louis F. Dellwig, and Thomas Schmugge (\$1.00). Reprinted from *Radio Science*, Vol. 10, No. 11, November 1975.

Bulletin 111, *Utah Mineral Industry Operator Directory 1977*, compiled by Carlton H. Stowe (\$3.00). Bulletin 111 lists by county the names and addresses of mineral operators and their properties in Utah. Operators are referenced alphabetically by the primary commodity they produce. Known mineral production is recorded. A map of Utah by county and by township and range helps the reader to locate the area of the operation.

Miscellaneous Publications. *Collector's Guide to Mineral and Fossil Localities in Utah*, 114 p, compiled by Carlton Stowe, UGMS Mineral Information Specialist, with the assistance of Walter Elieson of the Mineralogical Society of Utah, Dave Lewis of the Wasatch Gem Society, and members of the UGMS staff (\$2.50; cost by mail \$2.75). This is a preliminary release of a guide to localities where interesting rocks, minerals and fossils can be collected in Utah. Localities are listed by counties, with descriptions of minerals and fossils to be found and notes on useful equipment and climate. Maps of each county are provided to show the best access roads.

UGMS has its unpublished Reports of Investigation on open-file. These
(continued on page 3)

DIGGIN'S

LAND SURFACE STABILITY MAP

Of interest to Salt Lake City residents, a map published by the U.S. Geological Survey shows the inferred relative stability of the land surface during earthquakes in the Sugar House quadrangle (900 South to 7000 South, 500 East into Wasatch Mountains). Differentiation of the land into "most," "generally," "moderately," and "least" stable areas was accomplished by computer analysis and is shown by colored symbols. The most stable areas are to the east in the bedrock of the Wasatch Mountains with instability increasing westward to the valley floor. Proximity to the Wasatch Fault zone does not assume as much importance as does the incompetent and water-saturated nature of the sediments filling the lower part of the valley.

The map and text by Richard Van Horn and J. Nicholas Van Driel is: *Computer Composite Map Showing Inferred Relative Stability of the Land Surface during Earthquakes, Sugar House Quadrangle, Salt Lake County, Utah*, U.S. Geological Survey Miscellaneous Investigations Series, Folio I-766-O. It is available for \$1.50 at the U.S. Geological Survey Public Inquiries Office, 125 South State in Salt Lake City.

SEISMIC COUNCIL HAS INITIAL MEETING

Utah's newly created Seismic Safety Advisory Council met for its first session in the UGMS conference room Wednesday afternoon, July 6. The group mainly concerned itself with organizing, consideration of office space, and hiring of staff. Members of the council were appointed by Governor Matheson and confirmed by the Senate at the recent special session of the Legislature.

The council consists of 11 members representing various governmental organizations, professional fields, and the public interest. The roster includes: Joyce Miller, Logan, Utah League of Cities and Towns; Harvey Merrell, Moab, Utah Association of Counties; Stanley Crawley, Salt Lake City, Architect; Jerry Barnes, Salt Lake City, Planning; Harvey Hutchinson, Alpine, Public Utilities; Winfred O.

Carter, Logan, Structural Engineer; William Gordon, Salt Lake City, Geotechnical Engineer; Bruce Kaliser, Salt Lake City, Geologist; Robert Smith, Salt Lake City, Seismologist; and Genevieve Atwood, Salt Lake City and Donald Peck, Helper, Public at Large. Representative Atwood and Mr. Merrell also bring geological expertise to the panel. Mr. Hutchinson was elected interim chairman.

THRUST BELT FIELD MEETINGS

The Utah Geological Association will cosponsor, with geological associations in Montana and Wyoming, a field conference and symposium entitled "Rocky Mountain Thrust Belt, Geology and Resources." The meetings and field trips (some by air) are scheduled for September 13-17, 1977, based at Teton Village, Jackson Hole, Wyoming.

Registration blanks are available through UGA and from UGMS (over the counter only). Principal sponsor is the Wyoming Geological Association, Casper.

UGMS BOARD CHANGES

The terms of four of the seven members of the board which governs UGMS policy expired in March 1977. Paul M. Dougan, chairman, and Kenneth R. Poulson were reappointed. William E. Mead and Ned F. Parson have been succeeded by Elliot Rich of Logan and Harry Perry of Cedar City. Carryover members of the board are: Robert W. Bernick, Benton Boyd, and Mrs. Philip Mallinckrodt. The new appointees are the only members of the board not from the Salt Lake City area.

Board members are appointed by the Governor with the advice and consent of the Senate. Term of office is four years.

NEW U.S. DEPARTMENT

The new U.S. Department of Energy is expected to have 20,000 employees and an annual budget of 10.6 billion dollars. This is equal to about \$3.65 for every barrel of crude oil expected to be produced in the U.S. in 1977 and enough people to provide crews for more than half the rigs drilling for oil and gas in the U.S. today.

UTAH MINERAL PROPERTY VALUATION DROPS

Two factors, loss of over \$50 million in net proceeds by Kennecott Copper Corporation and loss of some \$20 million in oil and gas property values, account for a drastic fall in Utah's 1977 mineral property valuation.

Total for 1977 is \$430,542,437, a decrease of \$70,591,361 from the \$501,433,798 assessed in 1976. It also falls short of the 1975 assessment of \$493,052,022.

Both mining and oil and gas properties suffered losses. Mining property valuation for 1977 is \$215,297,103 compared to 1976's \$266,863,332. 1977 oil and gas assessed valuation is \$215,245,334 compared to 1976's \$234,570,466.

In a statistical study of records from the Mineral Property Division, Utah State Tax Commission, 1977 mine occupation tax totals \$8,413,065—down somewhat from the 1976 total of \$8,571,686. Largest mine occupation tax was \$5,915,867 paid on oil and gas properties. Chevron Oil Company paid the highest amount, \$1,190,467 from its Altamont, Bluebell and Red Wash fields. Shell Oil paid \$1,189,177 from its Altamont properties, followed in third place by payment of \$711,020 by Texaco, Inc. from Greater Aneth and other properties. Other payments exceeding \$100,000 were made by American Quasar Petroleum, Flying Diamond Corporation, Gas Producing Enterprises, Gulf Oil Corporation, Koch Exploration, Mapco Inc., Phillips Petroleum, Superior Oil, Tenneco Oil, and Union Oil of California.

In the mining industry, Kennecott Copper Corporation paid \$2,032,411 from its Utah Copper Division properties.

In 1976, Kennecott's payment was \$1,588,003. Rio Algom Corporation's occupation tax on its Lisbon uranium properties amounted to \$40,750 and the United Park City Mines Company paid \$78,864 from the Ontario Group mines. Iron mining companies paid \$64,285 from the Iron Springs district, and \$44,566 was paid by Chief Consolidated Mining Company and Kennecott Copper Corporation from the Burgin properties.

Forty-six oil and gas companies paid 1977 Utah occupation tax from 88 oil and gas field operations. Twenty-six uranium companies made payments from 44 mines. Eight copper, gold, lead, silver and zinc producers in Utah paid occupation taxes on as many mining properties. Five companies in Utah are producing iron ore, beryllium and/or tungsten.

Latest Studies

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recent reports may be examined at the UGMS offices:

Report of Investigation No. 116, Great Salt Lake South Arm Deep-Shallow Brine Interface Study, by J. Wallace Gwynn, May 1977, 11 p. Includes design for a new Minimal Disturbance Water Sampler developed by Walt Katzenberger for taking unmixed samples of water at any given depth.

Report of Investigation No. 117, Mineral Potential of the Deep Creek Mountains, Bureau of Land Management Wilderness Withdrawal, Juab County, Utah, by Hellmut H. Doelling and Lee I. Perry, June 1977, 9 p.

UTAH SPARKLES

with

Gem & Mineral Shows

A surge of interest in mineral collecting in Utah is being created by two important gem and mineral shows held in Utah this summer.

The first was the "Gemboree of the Rockies" gem show, held in the Salt Palace in conjunction with the Rocky Mountain Federation show and convention in Salt Lake City on the 10th, 11th, and 12th of June. This show was sponsored by the Mineralogical Society of Utah and the Wasatch Gem Society.

The second show, the "77 Empire of Gems" National Gem and Mineral show of the American Federation and Northwest Federation of Mineral Societies, and sponsored by the Golden Spike Gem and Mineral Society, is to be held on August 18, 19, 20, and 21 at the Weber State College Campus at Ogden, Utah.

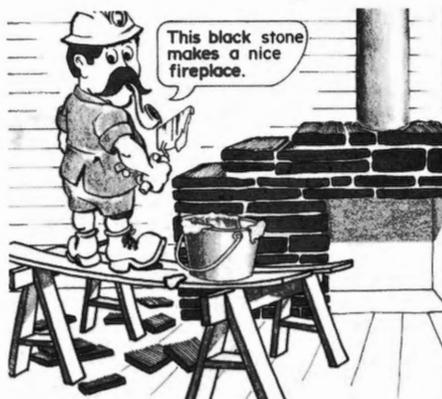
The UGMS manned booths at both shows to offer rockhounds information on the geology, minerals, and collecting areas of Utah.

Howard Ritzma, UGMS Assistant Director, presented a lecture and slide show on "Geology and Scenery of Utah" to a "Gemboree" session on Saturday morning, June 11.

To meet the interest created by these shows, the Utah Geological and Mineral Survey has released a preliminary issue of the "Collectors Guide to Mineral and Fossil Localities in Utah." See list of new UGMS publications in this issue.

by Greg McLaughlin

ROCKY RIDGES



OVERTHRUST BOOM

(continued from page 1)

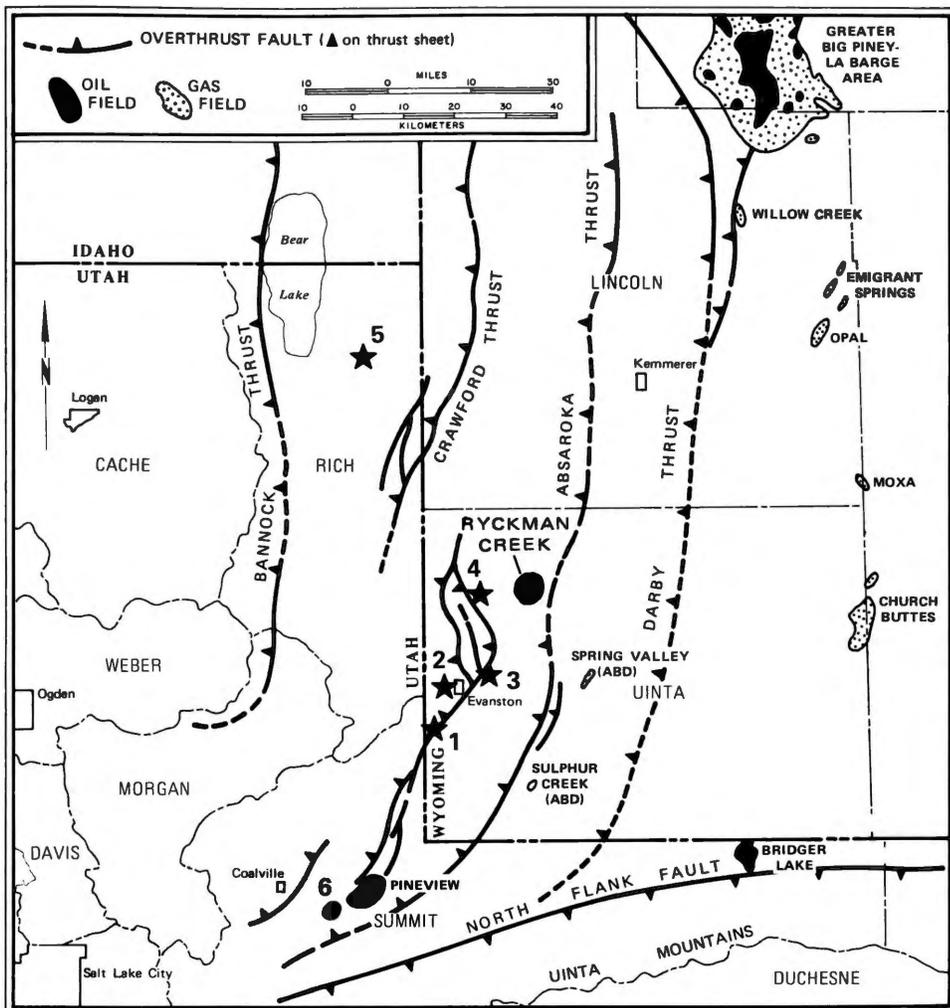
Other indicated discoveries are indexed on the accompanying map by number:

Uinta County, Wyoming

1. **Yellow Creek**—an indicated gas-condensate discovery in 1976. Production from Twin Creek (Jurassic) has now been established and offsetting tests have been drilled and are being tested. Located about six miles southwest of Evanston almost on the Utah-Wyoming boundary.
2. **Unnamed**—Amoco No. 1 Champlin-375 Amoco-A is an apparent oil discovery in the Twin Creek. Located on the west edge of Evanston.
3. **Pleasant Valley**—Chevron No. 1-6 Pleasant Valley-Federal is an apparent oil- and gas-condensate discovery in the Nugget (Jurassic). Located four miles north-east of Evanston.
4. **Whitney Canyon**—an indicated gas-condensate discovery by Amoco in the Dinwoody Formation (Lower Triassic) and Phosphoria Limestone (Permian). Located about ten miles north of Evanston.

Rich County, Utah

5. **Hogback Ridge**—a new indicated discovery by American Quasar Petroleum is drilling about midway between the south end of Bear Lake and the Utah-Wyoming boundary. The No. 20-1 Hogback Ridge flowed gas at a rate of more than 15 million cubic feet per day on drillstem test of a 54 foot interval in the Woodside-Dinwoody (Lower Triassic). Depth of the test was 9,440 to 9,494 feet. The test was of short duration because of the high volume of the gas flow and high pressure. The well is being deepened and has also found gas at 10,300 feet in the Phosphoria (Permian). When completed, this well will be the



Generalized structure of Overthrust Belt, southwest Wyoming and adjoining Utah. Indi-

cated discoveries (as of July 15, 1977) shown by stars. Numbers refer to references in text.

first production in Rich County. The Dinwoody pay zone is reportedly thick, and the structure defined by seismic mapping is large. The well is only five miles west of Northwest Pipeline's 22" gas pipeline. Rich County appears to have a bright future as prospective gas and oil territory.

Summit County, Utah

6. **Unnamed Field**—American Quasar Petroleum, Energetics, Inc., and North Central Oil have completed their No. 35-2 Union Pacific Railroad well pumping about 50 barrels of oil per day from the Dakota Formation (Cretaceous) at 11,190 to 11,385 feet. This small discovery is about six miles southwest of Pineview Field. Another

significant test is drilling about halfway between this field and Pineview.

The Overthrust Belt has not been without its share of very expensive and frustrating dry holes. One such well, followed closely by the industry, was the recently abandoned test by Colorado Energetics, Fuelco, and Impel Corporation, the No. 13-3 Weber Coal Company test about 1½ miles northeast of Coalville in Summit County. Drilling and testing to total depth of 17,300 feet took more than a year and is reported to have cost 4.5 million dollars.

In mid-July there were about 15 announced locations and eight active drilling locations in Summit and Rich Counties. A considerable number of dry holes have been reported in the area in

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In UGMS Sample Library

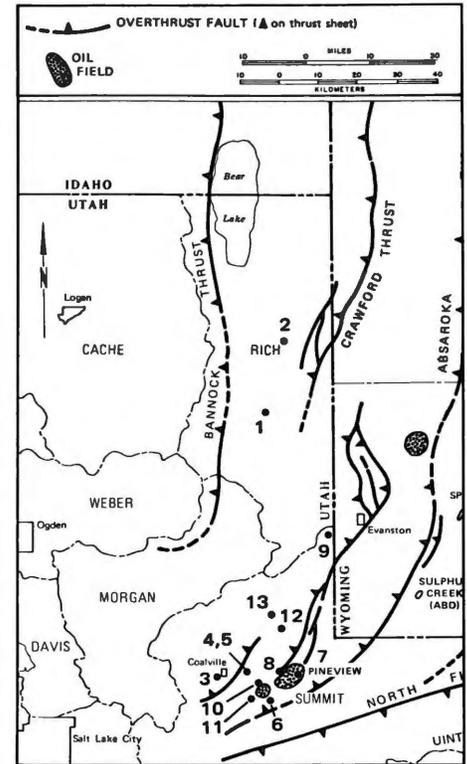
OIL WELL CUTTINGS NOW AVAILABLE

Cuttings from 13 petroleum exploration wells drilled in the overthrust belt of northern Utah are now stored in the UGMS Sample Library at 606 Black

Hawk Way, Salt Lake City, Utah. The following list gives the well name, location, and the footages for which cuttings are available.

Well Cuttings in UGMS Sample Library, July 1977: from Petroleum Exploration Wells Drilled in the Overthrust Belt of Northern Utah

Well and Lease	Location Section T R	Cuttings Depth in Feet
Rich County		
1 Am. Quasar No. 23-1 Putnam	23 9N 6E	90-14,183
2 Am. Quasar No. 31-1 Hoffman	31 11N 7E	1,000-15,400
Summit County		
3 Ohio No. 1 Wilde	9 2N 5E	9,200-11,100
4 MFS No. 1 Chalk Creek	6 2N 6E	950- 2,345
5 Texota No. 1 Utah Fed	6 2N 6E	190- 3,700
6 Am. Quasar No. 35-1 UPRR	35 2N 6E	1,500-17,053
7 Am. Quasar No. 1 Newton	4 2N 7E	1,700-14,500
8 Occidental No. 1 Pineview	5 2N 7E	50-10,525
9 Utah Southern No. 1 Hatch	28 6N 8E	300- 8,637
10 Amoco No. 389A Champlin	15 2N 6E	60- 4,500
11 Amoco No. 390A Champlin	29 2N 6E	710- 4,500
12 Amoco No. 387A Champlin	7 3N 7E	0- 4,500
13 Amoco No. 406A Champlin	25 4N 6E	0- 5,000



Locations of wells in overthrust belt of Utah for which cuttings are available in the UGMS Sample Library.

OVERTHRUST BOOM

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the past three months. However, the drilling statistics have been somewhat distorted by a large number of shallow wells which have been drilled to obtain geologic information and to meet lease commitments. These have been drilled rapidly and abandoned or suspended with release of little information. Some of these wells may be re-entered and deepened at a later date when larger drilling rigs become available.

Exploring the Overthrust Belt is proving to be costly and complicated, but an extraordinary ratio of success has been maintained to date. Hard formations have made drilling slow and difficult. Geology is complex. However, the play is moving ahead rapidly rewarded by new gas and oil reserves of substantial magnitude.

MINIMAL DISTURBANCE WATER SAMPLER

Walt Katzenberger, UGMS lake expert, has developed a new sampler for obtaining undisturbed samples of water from lakes or bodies of open water.

A description and diagram of the sampler can be seen at the UGMS Publications Office in Report of Investigation No. 116, Appendix F.

AAPG STUDY ON RADIOACTIVE MINERALS

Migration of Uranium and Thorium—Exploration Significance, by John W. Gabelman (1977): American Association of Petroleum Geologists, Studies in Geology, No. 3, 168 pages, 50 figures, 7 tables, keyword index. (Order from AAPG, P. O. Box 979, Tulsa, OK, 74101).

This scholarly and comprehensive study is actually a treatise on the whole subject of uranium and thorium and

almost every facet of geology related to these elements. For any geologist in the field of energy minerals, this volume is a must for reading, study, and reference. More than 225 references are listed in the bibliography.

AAPG MEETS IN WASHINGTON

Howard Ritzma, UGMS Assistant Director, attended the national meeting of the American Association of Petroleum Geologists, Washington, D. C., June 12-16.

PALEONTOLOGISTS VISIT COALVILLE

One day of the 5-day field trip (by air, bus, and foot from Utah to Kansas) of the North American Paleontological Convention II (Cretaceous) was held in the Coalville area, Summit County. Howard Ritzma attended the Coalville-Rockport sessions and acted as field-trip guide for part of the trip on August 3.

U.S. Geological Survey Open File Reports

Unpublished reports by the U.S. Geological Survey that describe the geology of Utah are kept on open-file at the Utah Geological and Mineral Survey, 606 Black Hawk Way, Salt Lake City. Because UGMS has only one copy of each report, they must be inspected at its offices and cannot be taken out. These reports may also be inspected at the USGS Public Inquiries Office Federal Building, 125 South State Street, Salt Lake City, where arrangements can be made to obtain copies.

Reports received at UGMS in late 1976 and the first half of 1977 are:

76-303. Geology of the north end of the Salt Valley Anticline, Grand County, Utah, by Leonard M. Gard, Jr., 1976.

76-875. Radon Emanation on Active Faults, by Chi-Yu King, 1976.

77-41. Geophysical Logs of Test Holes from the Henry Mountains Coal Field, Garfield and Wayne Counties, Southeastern Utah, by Ben E. Law, 1977.

77-121. Paleotectonic Biostratigraphic, and Economic Significance of Osagean to Early Meramecian Starved Basin in Utah, by Charles A. Sandberg and Raymond C. Gutschick, 1977.

77-133. Lithologic and Geophysical Logs of Holes Drilled in the Wasatch Plateau Known Recoverable Coal Resources Area, Carbon, Emery, and Sevier Counties, Utah, by L. F. Blanchard, E. G. Ellis, and J. V. Roberts 1977.

77-176. Survey of Geologic Research on Green River Oil Shale, by John R. Dyni, compiler, 1977.

77-269. Preliminary Geological Map and coal resources of the Collet Top quadrangle, Kane County, Utah, by H. D. Zeller, 1977.

77-304. Leasable mineral and waterpower land classification map of the Grand Junction quadrangle, Colorado, Utah, compiled by E. M. Pera, J. E. Smedley, D. A. Decicco, E. G. Allen, and G. A. Lutz, 1977.

77-495. Map of Suspected Fault

Scarps in Unconsolidated Deposits, Tooele 2° Sheet, Utah, by R. C. Bucknam, 1977.

77-508. Preliminary Geologic Map of the Thermo 15-minute quadrangle, Beaver and Iron Counties, Utah, by Peter D. Rowley, 1977.

77-513. Summary of the Geology, Mineral Resources, Engineering Geology Characteristics, and Environmental Geochemistry of East-Central Utah, by Philip T. Hayes, Thomas A. Ryer, Louise W. Kitley, Joseph R. Hatch, Frank W. Osterwald, C. Richard Dunrod, and Jon J. Connor, 1977.

77-568. Mount Belknap and Red Hills Calderas and Associated Rocks, Marysvale Volcanic Field, West-Central Utah, by C. G. Cunningham and T.A. Steven, 1977.

77-569. Revised Stratigraphy and Radiometric Ages of Volcanic Rocks and Mineral Deposits in the Marysvale Area, West-Central Utah, by T. A. Steven, C. G. Cunningham, C. W. Naeser, and H. H. Mehnert, 1977.

4339-6. Geologic Appraisal of Paradox Basin Salt Deposits for Waste Emplacement, by Robert J. Hite and S. W. Lohman, 1973.

UGMS Represented at National Meeting

Donald T. McMillan, UGMS Director, attended the annual meeting of the Association of American State Geologists, Newark, Delaware, June 5-9.

MARIE CRANE

(continued from page 1)

Rock Artisans of Utah. Ten years ago Dr. William F. Hewitt, then director of the UGMS, saw her exhibit of Utah minerals at the National Federation of Mineral Societies Show at Salt Lake City. She asked him if her collection could be given a permanent display in the state or at the University of Utah. Today, in the new UGMS offices, this display has become a reality. She has an additional collection of uranium minerals which could be added to the display when space becomes available.

HOT NEWS

Greenhouse Heated With Geothermal Water

Geothermal heat is being used in greenhouses north of Ogden, Utah, and has proved very successful. Hot water from Utah Hot Springs radiates heat through flexible polyethylene tubing. The hot water has supplied enough heat to maintain a suitable environment for tropical plants even during cold weather in December and January.

Utah Hot Springs is near Interstate 15 north of Ogden in sec. 14, T.7N., R.2W. The hot water, which is about 136°F where it issues at the surface, is probably warmed by deep circulation through fault zones. The water contains 18,900 to 25,200 ppm total dissolved solids, primarily sodium and chloride, and more dissolved iron than has been reported for any other hot spring in Utah (214 to 460 micrograms per liter). As the water cools, a bright orange sludge is deposited.

Greenhouses were constructed west of the springs around 1968, and an initial effort was made to grow tomatoes by a hydroponic process, using the hot spring water directly in the nutrient solution. The high concentration of sodium chloride made this impractical, and the enterprise failed.

In 1976 the greenhouses were leased by the Allan Plant Company and have been used this winter to grow house plants. David Allan devised an effective system to heat the greenhouse by bringing the hot water into the greenhouse through an existing 8-inch concrete pipe. The water flows through several lines of inexpensive 4-inch diameter 3-mil polyethylene tubing, which is laid in loops on the concrete floor. The cooled water flows into an existing drain system. When the tubing becomes clogged by sludge or develops too many leaks, it is simply discarded and new tubing is laid.

To irrigate the plants fresh cold water is brought from a spring to the north.

Hydraulic Fracturing of Uinta Sands Enhances Oil and Gas Recovery

Three MHD (massive hydraulic fracturing) projects are in various stages of drilling, coring, and testing in the Uinta Basin of northeastern Utah. All are part of the extensive program of cooperative research of the U.S. Energy Research and Development Administration and the oil and gas industry to enhance recovery of oil and gas from thick, low permeability sandstone reservoirs.

Massive hydraulic fracturing is a technique of injecting fluids under high pressure into wells to enlarge existing fractures and create new ones in well cemented, "tight" sandstone reservoirs. The fluid used is water with acids and other chemicals added to dissolve cements and flush out clays and other materials that clog passage of gas and oil in the enlarged fracture systems. "Prop-pants," rounded and sorted sand grains or glass beads, are injected with the "frac" fluid to prop the fractures open and maintain free flow of gas into the well bore. The technique has been used for decades in oil and gas fields, but the scale on which it is being tried in the Uinta Basin is new and requires innovative equipment and techniques and special safety precautions.

The first project, by ERDA, Texas American Oil, and Western Oil Shale, was carried out in the No. 1 Home-Federal well in sec. 34, T. 10 S., R. 19 E., Uintah County, in the Turtle Shell Unit. Massive hydraulic fracturing of a 1,665-foot interval of Mesaverde Formation (Upper Cretaceous) from 7,768 to 9,433 feet yielded a flow reported as 1,440 million cubic feet of gas per day with 3 barrels of condensate. The well, completed in March 1977, is classified as a new field discovery as yet unnamed.

The second project, by ERDA and Gas Producing Enterprises, involves fracturing of a number of wells in the Natural Buttes Unit, Uintah County, which covers 89,813 acres and is Utah's largest unitized gas producing area. Target for the fracturing is a 4,500-foot interval of Wasatch (Tertiary) and Mesaverde sandstones that are considered typical of gas sands estimated to contain 600 trillion cubic feet of gas, in the Uinta and Piceance Basins. Two wells have been completed. Drilling, coring, fracturing, and testing is under

way in several more.

The Sand Ridge area fracturing test is in the Pacific Transmission Supply Company No. 23-25 PTS-Federal well in sec. 25, T. 8 S., R. 23 E., Uintah County. This involves stimulation of gas production in the Castlegate Sandstone (Mesaverde) at depths around 9,000 feet and in the Farrer Facies of the Mesaverde from 6,500 to 8,000 feet.

Financial commitments to the projects as of the end of 1976 have been listed by ERDA as follows: Turtle Shell Unit (ERDA—\$150,000, contractors—\$764,000); Natural Buttes Unit (ERDA—\$2,155,000, contractors—\$4,826,000); Sand Ridge Area (ERDA—\$1,099,000, contractors—\$1,297,000). The total for the three projects exceeds ten million dollars. The Turtle Shell Unit work is scheduled to be completed in September 1977, Natural Buttes in 1978, and Sand Ridge in 1979.

RAIN DANCE

Too Much of a Good Thing

Cloudbursts which dropped three inches of rain along the Wasatch Plateau triggered flash floods down Spring Canyon, Consumers Wash, Price Canyon, and other drainages on July 4. The Price River, almost dry in this drought year, quickly overflowed its banks and spread tons of silt, mud, and debris into flooded streets and yards from Helper downstream to Carbonville. Rock slides and mud blocked many secondary roads, and irrigation ditches were clogged by mud and debris.

Hardest hit was the Carbon Country Club which had, up to that time, been plagued with a shortage of water. The No. 5 tee of the golf course, site of a rain dance Sunday night during a club party, was under almost three feet of water Monday afternoon.

Ironically, the flooding, estimated to be the most severe in 25 years, occurred in a year when the Price area has recorded almost no rainfall for many months.

SINKHOLES

Source of Contamination?

Sink holes located in Covered Bridge Canyon, midway between Thistle and Spanish Fork, have been shown to interconnect with springs in the Spanish Fork drainage.

Bruce Kaliser, Chief of Urban and Engineering Geology, UGMS, had tests made on June 16 and 17 by introducing water through a fire hose into one of the sink holes. Within 1½ hours leakage was noted at the bottom of the hole, and there was a rejuvenation of the collapse features. Fluorescent dye was added to the water in the hole and near-by springs tested. Traces of the dye were detected in Birch and Cold springs with a precision fluorometer.

The tests showed that a hydraulic connection exists between the sink holes and two large springs in the Spanish Fork drainage. These findings create a serious question concerning the suitability of the terrain as a sewage lagoon site.

It is also possible that any strong earthquake along the Wasatch Front near the mouth of the Spanish Fork Creek might cause further collapse of the sink holes.

HEADING OUT DOORS ?

Take a 'Topo' Map

USGS topographic maps are particularly useful for vacationers who want to get away from the beaten paths. Outdoorsmen and women are expected to buy more than 10.5 million copies of topo maps in 1977. The most popular maps for recreational use are the standard 7.5 minute quadrangles, which have a scale of 1:24,000 (one inch on the map equals 2,000 feet on the ground) and the 15 minute quadrangle, which has a scale of 1:62,500 (one inch represents nearly a mile). These maps sell for \$1.25 each. New pre-folded pocket-size editions of 24 of the quadrangles are being tested this year. If they are enthusiastically received, other similarly folded maps will be offered.

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STAFF CHANGES

There have been a number of changes in the UGMS staff:

Research Geology Section:

Peter Murphy, geologist from Joliet, Illinois, has joined the UGMS staff to work on problems related to geothermal water. He is completing a study in hydrology for his M.S. degree in geology from the University of Wisconsin, Milwaukee.

Carol Peterson, geologist, resigned in February to join a consulting geological firm in California.

Urban and Engineering Geology Section:

James L. Rogers, geologist, of Boise, Idaho, has been named to join the UGMS staff as an engineering geologist. He was most recently employed by Alyeska Pipeline in Alaska.

UGMS is recruiting geologists to fill two positions created for this section by the 42nd Legislature (House Bill No. 48). A geotechnical engineer and an engineering geologist will be added to the staff.

Environmental Geology Section:

Fitzhugh Davis, UGMS Geologist, has been named head of the Environmental Geology Section. Fitz has his degree in geology from the University of

Utah and worked for the Utah State Highway department before joining the UGMS staff as an economic geologist in 1974.

Dave Crockett resigned to join the staff of the U.S. Energy Research and Development Administration in Idaho Falls, Idaho.

Editorial Section:

Roger Stewart, editor, resigned in June to become geological editor for the Idaho Bureau of Mines and Geology, Moscow, Idaho. He is succeeded by Martha R. Smith who assumes the newly created geological editor's position for UGMS.

Heading Outdoors ?

(continued from page 7)

With a little practice in reading contour lines on the maps, the outdoorsman can determine the height of a hill, the depth of a valley, and the approximate elevation and slope of the ground at any point. The maps show ridges and trails, streams, springs, ponds, lakes, and areas covered by woodlands or grasses as well as campsites and areas of historical or scenic interest. Hunters, fishermen and hikers use the topo maps to plan the best routes to the areas they want to reach.

Topo maps are available in Utah at 8102 Federal Building, 125 South State Street, Salt Lake City.

LAKE LEVEL DROP CONTINUES

Great Salt Lake levels recorded (in feet above sea level) this spring by the U.S. Geological Survey are:

Date	Boat harbor (south arm)	Saline (north arm)
May 1	4,200.65	4,199.25
May 15	4,200.50	4,199.20
June 1	4,200.70	4,199.40
June 15	4,200.60	4,199.30
July 1	4,200.35	4,199.10
July 15	4,199.95	4,198.85

Lack of precipitation and diminished inflow from Utah Lake and other tributaries are causing the lake levels to drop steadily. June 1, normally the peak level of the year, was .05 lower than the April 15 level. A wet May contributed to the slight rise in June. The level at the boat harbor was 1.6 feet lower on July 15, 1977 than on the same date in 1976.

UTAH GEOLOGICAL AND MINERAL SURVEY SURVEY NOTES

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Department of Natural
Resources *Gordon E. Harmston*
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