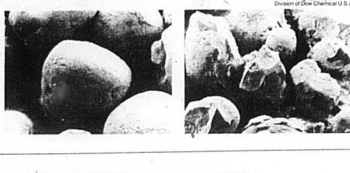


Researchers are finding more natural gas

Unlocking Gas from Sandstone



JELLYLIKE POLYMER, oozing out of a chemist's hand at the Dowell Division, Dow Chemical in Tulsa, Okla., is one of the keys for unlocking natural gas imprisoned in tightly packed, concrete-tough sand. The gas is released by factoring the sandstone



with a high-pressure mixture of water, special sand, and the polymer. The hard, round, large-grain sand (photomicrograph left) jams upon the fractures. Ordinary sand (photomicrograph right) is too fine to keep cracks open for maximum gas flow.

National Geographic News Service
WASHINGTON — "More gas than we ever dreamed of, through the centuries," may well await searchers who have so far underestimated or ignored "unconventional" sources, National Geographic magazine reports.

By David Hodgson, in the November magazine, says that as a result of increasing numbers of engineers, scientists, and production men now reject predictions that the United States gas resources will soon run out.

At least one potential mother lode of natural gas, dissolved in brine trapped in sand and sandstone, lies beneath the Gulf Coast region, Hodgson was told by Dr. Paul Jones, a veteran hydrogeologist.

"There's good scientific evidence that this brine could contain as much as 50,000 billion cubic feet (TCF) of gas," Jones said. "That's equal to 1,500 times our present yearly production."

Estimated Quadrupled
"If we recover only a small percentage of all this gas," Hodgson quotes a government researcher, "we'd more than quadruple our present estimates of potential resources." But this is scarcely mentioned as a possibility in our energy plans.

Hodgson reports that six types of unconventional gas sources are found within the United States.

Geopressure zones: In the United States, they center on the 150,000-mile sandstone belt beneath the Gulf Coast region.

Deep basins: Drillers are finding large quantities of gas at depths between 15,000 and 30,000 feet.

Western "oil traps": New extraction methods have been tapping concrete-hard sandstones in the Rockies which may hold as much as 80 TCF.

Coal seams: Some 80 TCF of gas is believed held in the seams of America's coal.

Devonian shale: This dense rock underlying 90,000 square miles of Appalachia may trap more than 1,000 TCF.

Methane Hydrates: Enormous quantities of natural gas may be captured beneath permafrost and in deep-ocean bottoms where methane and water have combined in an ice-like substance, called methane hydrate.

Developing these unconventional sources has long been dismissed by many geologists as too difficult and costly.

"But we could drill a thousand exploration wells," Hodgson quotes a government researcher, "for the cost of one coal-gas plant."

80 by 1985
In addition to coal-gas conversion plants, efforts to ensure adequate supplies of gas in the United States focus on importing liquefied natural gas and on building a pipeline to the Midwest for new fields in Alaska.

Engineering and construction costs of these methods of supplying natural gas will mean a consumer cost of about \$5 per thousand cubic feet by 1985 or earlier, Hodgson says.

Of the six unconventional natural gas sources, deep basins are already producing. Robert A. Hefner III expects to produce 70 to 300 TCF of gas from wells 15,000 to 40,000 feet deep that his company is drilling in western Oklahoma's Anadarko Basin.

The basin is one of the nation's most productive from conventional wells. "But this basin," he emphasizes, "has 22,000 cubic miles of sediment below 15,000 feet — and only one percent of it has ever been touched by a drill."

Near Baton Rouge, La., a geopressure test well — a 12,000-foot probe into sandstone soaked with gas-saturated water — proved highly promising. The Department of Energy hopes to complete at least three geopressure wells by late next year, and two major oil companies are reported to be planning privately financed projects.

In Wyoming, Montana, Utah, Colorado, and New Mexico 20,000 wells have been pushed into the region's sedimentary basins. The tight sands, more dense than concrete, are proving worth drilling for gas, thanks to such new techniques as forcing fluids at great pressure underground to crack the rock and free the gas.

Commercial light sand wells already are producing billions of cubic feet a year from reserves estimated in the

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What to do with kids on a Snow day
How many of you parents have said, "If school doesn't start back, some thing drastic is going to happen." Our attitude shows in more ways than physical abuse. Words can put children down, feed his fears, and make him feel unloved and unsure. Such tactics as beating, sarcasm, harsh criticism, impatience and anger can be harmful to the child. We need to find friendlier, more constructive ways if relating to our children.

THE CARING CORNER
"But if any one has the world's goods and sees his brother in need, yet closes his heart against him, how does God's love abide in him?"
1 John 3:17
The sign says, "A little love with a big heart." In other words, it says this is a community that "cares." Interestingly enough we have an opportunity to show our neighbor, our community, and ourselves that we care about the youth in our town.

The Optimist Club under the leadership of Andy Dudley is providing all of us just that opportunity... to say "I Care" in a tangible way. Who will respond?

How many times have we said to ourselves... "Well, if I knew what to do, I would!"

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How to amuse kids on a snowy day

respect and they will learn the art of respecting others.

We should learn to use a friendly tone of voice. If you're upset or under stress, find ways of expressing it that isn't frightening. You can tell them what action is upsetting you and turn your voice on the action and not the child.

Sarcasm is dishonest, not open in communication. Yelling is an assault on your child's dignity. How would you feel if a big person said that to you in the same tone. Teasing can be painful and very crushing to the person's self image. Humiliate destroys a person's confidence.

Try positive communication. Praise your children every day you can and learn to play with the children.

Snow days and shut in days can be enjoyed with games, checkers, puzzles and art. Here are some activities to make with your child or your grandchild.

Crystal Garden Recipe
This strange crystallized salt garden grows and changes daily. It's fascinating to watch. The result is almost indescribable. Maybe it resembles an eerie Martian landscape.

Grow the garden in a shallow glass pan or aluminum pie tin. Collect porous materials — such as tangerine, driftwood, lava rock, cork and pieces of pottery. Arrange them in the container, spilling them out to make a jumbled surface.

Mix up this solution: 4 tablespoons mentholated table salt, 4 tablespoons liquid bluing, 4 tablespoons water, and 1 tablespoon ammonia. Spoon it over the bits of porous material. Make sure the solution covers the bottom of the container. Drip just a little food coloring (one or two colors) over the garden.

Set the garden where you won't have to move it. Watch it change over the next four days.

As the liquid travels to the surface, the water in it evaporates leaving a salt and water solution behind. Salt crystallizes from this and keeps growing until the solution dries out.

Crayon Melt Prints
To make these glorious prints, you need a food warming tray that is covered with aluminum foil. When the tray is warm, make a crayon design on the foil. The crayon melts as you draw, producing beautiful trails of color.

To make the print, lay paper over the crayon design. Put on oven mitts and carefully smooth the paper down. Lift it off with a rag and start a new print.

Baker's Clay
This terrible-tasting dough is wonderful for sculptures. You shape it and bake it. The result is a very hard, permanent cookie but you wouldn't want to eat it.

To make the dough, mix 1 cup flour to 1 cup of salt. Add just a little water until the dough feels like modeling clay — not too dry and not too sticky. You can color small amounts of the dough with food coloring — or wash and paint the finished cookies with poster paints.

Shape the dough just as if it were clay. Start with a rolled out slab; then cut the slab into pieces you can model with your fingers. Experiment with kitchen utensils to mark designs or to cut out shapes.

Bake the cookies in a 200 degree oven until they are very hard. Check them after 5 minutes. The baking time depends on the size of the cookies. A very big one may take a whole hour.

The plover rides on the crocodile's back and serves as a lookout, emitting shrill cries when danger seems imminent.

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