

VERBATIM

“The idea of a federal betting parlor on atrocities and terrorism is ridiculous and it’s grotesque,” declared Sen. Ron Wyden (D-Oregon) last month. The project that so exercised him was the Policy Analysis Market, a trial program financed by the Pentagon’s Defense Advanced Research Projects Agency. The market was designed to allow participants to place conditional bets, such as: If there is a coup in Jordan in the first quarter of 2004, then economic activity (or terrorist casualties) in the United States will increase (or decrease) in the second quarter. Players would have staked their own money, and could have won as much as \$100 per correct prediction. The day after Senator Wyden made his comments, the agency shut the program down.

Robin D. Hanson, an assistant professor of economics at George Mason University, designed the market’s combinatorial betting system and helped select the policy questions at stake. He believes critics like Senator Wyden were grievously mistaken.

Q. Why might an “information market” provide better guidance than reports from the CIA?

A. I have a sort of general skepticism about experts. There are literally millions of people who know relevant things about what’s likely to happen in the Middle East. There are only a few hundred, or perhaps a thousand, credentialed experts, who have a small tap onto some of those things. The hope is to get input from other people, and to create a forum that encourages people to contribute when they think they know things, but to shut up when they know they don’t. Losing money is one way to do that.

Q. What about the concern that terrorist organizations might use such a market to profit from their attacks, or to mislead their enemies about what they’re up to?

A. The market wouldn’t have involved predictions about specific attacks—the question involved aggregate casualties on a quarterly basis. It’s the difference between predicting the crime rate and predicting which bank will be robbed next. . . . This was a research project, and we would have been glad to change elements of it in response to public concerns. No one ever came to us.

Q. How do you reply to the objection that betting on calamity is simply in bad taste?

A. Intelligence is fundamentally in bad taste. Intelligence is about paying people to tell you about bad things that might happen. If you’re repelled by the idea that somebody might profit from having told somebody about a bad thing that might happen, you’re repelled by intelligence.

In the name of intelligence, people lie, cheat, steal, and kill. Compared to those sorts of things, our proposal was very mild. We were simply going to take money from some people and give it to others based upon who was right.

—DAVID GLENN

RESEARCH

Whence Wine?

Blending chemistry and archaeology, a researcher tracks the origins of grape fermentation

BY RICHARD MONASTERSKY

PHILADELPHIA

THE PRICELESS SAMPLES rest inside a recycled cardboard box in the corner of the laboratory. Patrick E. McGovern reaches in and pulls out several plastic bags, each holding a sliver of dull orange pottery, baked some 9,000 years ago by people living in China’s Henan province.

To the uninitiated, the shards look like any others from the ancient world. But in his lab, at the University of Pennsylvania’s Museum of Archaeology and Anthropology, Mr. McGovern has detected unusual compounds within the clay that tell of a revolution in the making. The pottery contains the oldest-documented evidence of an alcoholic drink, one made most likely by fermenting grapes with rice and honey. In other words, the earliest known experiments with wine.

“We feel it’s a very solid case for some sort of mixed fermented beverage,” says Mr. McGovern, a senior research scientist at the museum.

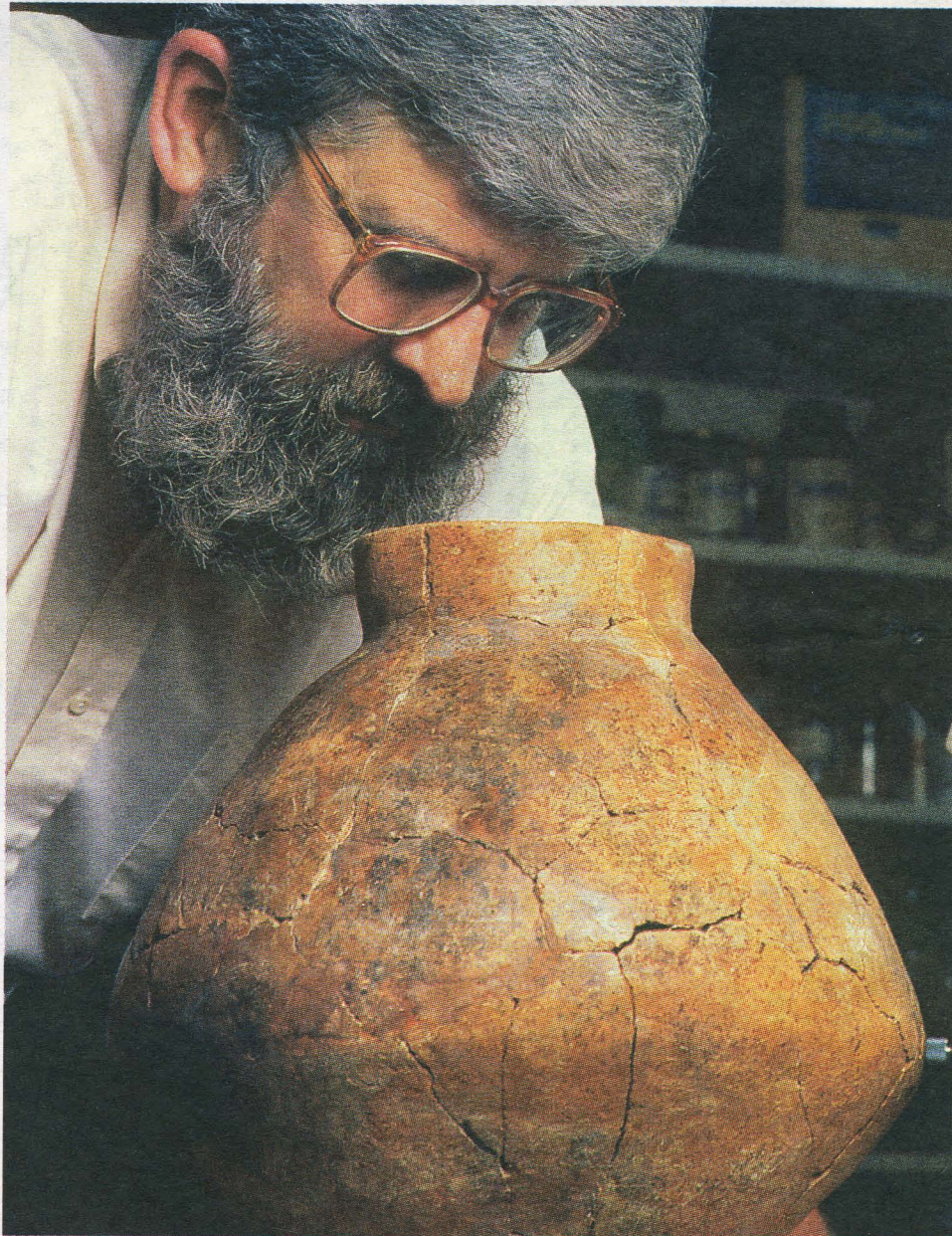
Elsewhere in the lab, he has shards from the Caucasus Mountains of Georgia that point to winemaking in that region more than 8,000 years ago. “In both areas,” he says, “people were experimenting with different kinds of natural products to develop fermentation systems and see which things worked best. I think it could have been a very exciting time for producing different kinds of fermented beverages.”

Mr. McGovern, who might be called an oeno-archaeologist, practices a subspecialty with just a handful of colleagues around the globe. Although he fell into the subject by accident 15 years ago, the work takes full advantage of his roving academic past, in which he wandered from chemistry to neuroscience to archaeology, with a brief stop in between at a German vineyard.

This fall Princeton University Press will publish *Ancient Wine: The Search for the Origins of Viniculture*, which details Mr. McGovern’s sleuthing through the ages for clues to how people began fermenting grapes. In the book, he provides the first reports on both the Chinese and the Georgian finds, which together document that people started their love affair with wine at least as far back as the beginning of the Neolithic era, near the dawn of agriculture and before the emergence of the first cities. “The history of civilization, in many ways,” he writes, “is the history of wine.”

It’s a heady claim, but one that other archaeologists are ready to toast. “Food and drink are at the center of human existence. That’s why this research is so important,” says Brian Fagan, an emeritus professor of anthropology at the University of California at Santa Barbara.

“Wine is all sorts of things. It’s a means of social interaction. It’s a means of entertaining people. It’s a political currency. It’s a commercial currency. It’s used to seal



DAVID PARKER, PHOTO RESEARCHERS

Patrick E. McGovern peers into a 7,000-year-old jar from Hajji Firuz, in Iran. Chemical tests show that such jars once held wine.

deals,” says Mr. Fagan, who calls Mr. McGovern the world’s authority on ancient wines.

THE WRONG KIND OF DOCTOR

Mr. McGovern’s parents did not have such a lofty distinction in mind when they sent him off to Cornell University in the early 1960s. There, the gifted student majored in chemistry and seemed on his way to an M.D., a goal his father had once held and later abandoned after serving in World War II.

But Mr. McGovern had other plans. “I was always torn between traditional science or medicine—because that is where my parents were really pushing me—and the humanities,” he says. The tug of war sent him reeling after graduation. He spent a year in graduate school studying neuroscience, then two years “sort of knocking around.” In 1969, he began a Ph.D. program in archae-

ology at Penn but had not completely abandoned the idea of medicine. He even took an examination for a New York State medical scholarship before dropping out once more to travel abroad.

For two more years, he hung out in the antiquities galleries of Europe’s finest museums, helped on an archaeological dig in Jerusalem, and studied Hebrew. He and his wife even raised some cash by working at a vineyard overlooking the Mosel River, in Germany.

When he returned from Europe, the path seemed clearer. Mr. McGovern declined the medical scholarship that he had won and finished up his archaeology degree at Penn. He has remained there ever since. Archaeology appeals, he says, because it “bridges the sciences and humanities to a great degree.”

His home for the past 24 years has been in the museum’s basement, in a room paved with faded linoleum and filled with furni-

ture from an age predating the science of ergonomics. Even the equipment in the laboratory has a well-worn look. An infrared spectrometer and a liquid chromatograph are hand-me-downs from nearby DuPont, which donated the instruments during a downsizing.

Mr. McGovern's principal collaborators have also come to the lab after decades of work elsewhere. Retired chemists from DuPont and Mobil have teamed up with Mr. McGovern and completed some of the more-complicated analyses.

Mr. McGovern is tall and slim, with owl-like horn-rimmed glasses and a bushy, gray beard more typical of the 19th century than the 21st. He speaks precisely about his research in an almost sleepy manner, but he has nonetheless drawn considerable attention to both his own work and the entire study of ancient wine. Several of his scientific papers have appeared in *Nature*, and his discoveries routinely earn mention in *The New York Times*. Even Robert Mondavi, the winemaker, is an admirer, having offered a blurb for Mr. McGovern's book and provided funds for some of his research.

PICKLED POTTERY

Mr. McGovern met the California vintner in 1991, when the Robert Mondavi Winery held a weeklong conference on the ancient history of wine. It was a true symposium, one that would have made Plato proud. The academic discussions went on long into the night, lubricated by many bottles of Mr. Mondavi's choice vintages.

At the meeting, Mr. McGovern showed how his team at Penn had managed to iden-

tify the chemical fingerprints of grapes in a 5,000-year-old jar from an ancient citadel called Godin Tepe, in the Zagros Mountains of modern Iran. A colleague had brought shards from the jar to Mr. McGovern because they had a reddish residue and she was convinced the stain was from wine.

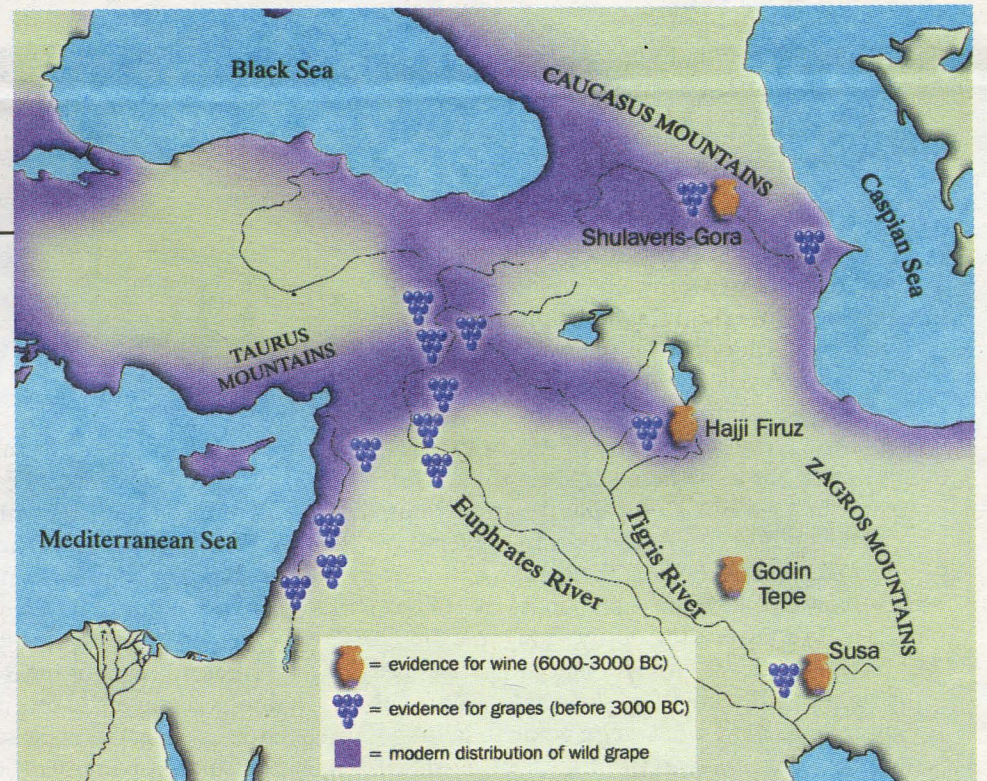
Certain signs on the pottery seemed to support that possibility. The residue appeared on only one side of the jar's interior, as if the container had been placed on its side and sediments had settled to the bottom. But the archaeological evidence alone did not yield conclusive evidence about the contents.

Turning to chemistry, Mr. McGovern bombarded a sample of the residue with an infrared beam to see what compounds absorbed the light. That test and others revealed the presence of tartaric acid, a common molecule in grapes. Other fruits also contain some tartaric acid, but they do not grow in the Middle East, says Mr. McGovern.

The tests proved that the jar, and others like it at Godin Tepe, once contained something made from grapes. But was it grape juice, wine, or perhaps even vinegar? Mr. McGovern argues that several lines of evidence clinch the case for wine.

"Once you've got a liquid grape product, that will start to ferment into wine in the first few days in a hot climate," he says, because yeast is present on grape skins.

He rules out vinegar as a possibility because the jars had long necks that were stoppered to keep out oxygen, which would ruin the wine. The residents of Godin Tepe went one step further to preserve their vintage. Chemical analysis of the residue showed that it contained resin from the terebinth



SOURCE: PRINCETON U. PRESS; CHRONICLE MAP BY DAVE ALLEN

tree, a substance that keeps bacteria from turning the alcohol in wine into acetic acid. Pliny the Elder described how Roman vintners used tree resin from terebinth, as well as from frankincense, myrrh, and pine, for that purpose. Even today, Greek winemakers produce a drink called retsina by spiking wine with pine resin.

Before Mr. McGovern's work on the Godin Tepe material, the oldest documented evidence of wine came from Roman amphorae found in a Mediterranean shipwreck. The Godin Tepe study—his first foray into the field—added 3,000 years to the annals of oenology, pushing the history of wine back to the highlands of Mesopotamia, near where the first urban centers were taking shape in the fourth millennium BC.

That success buoyed scholars at the conference, and they left with the promise of re-examining pottery in their museums for signs of ancient wine. "Possibly, even earli-

er evidence for the beginnings of viticulture and winemaking was right in front of our noses, waiting to be discovered and analyzed," writes Mr. McGovern in his book.

TIME TRAVEL

Some of the critical evidence, in fact, was hiding not far from his nose. A nearby storage room at the Penn museum held pottery excavated from a site called Hajji Firuz, in the northern Zagros Mountains of Iran. Mr. McGovern found that some of the pottery had a yellowish coating, which the original excavator had thought might be yogurt.

Chemical tests detected tartaric acid and a tartrate salt, calling cards left by grapes. The tests also picked up signs of terebinth resin, much like what was used at Godin Tepe. The Hajji Firuz site, however, dates from 7,400 to 7,000 years ago, a full two millennia earlier than Godin Tepe.

More recently, Mr. McGovern has pushed the history of wine in the Near East even further back. In a trip to the Georgia National Museum, in Tbilisi, he was given shards from a site called Shulaveris-Gora, about 8,000 years old. Those pottery fragments told a similar story: People in the Caucasus were making resinated wines even as far back as the dawn of the age of pottery.

The chemical evidence has won over some researchers, but not all. "I'm not too sure that the science proves conclusively that these claims are correct," says Andrew G. Sherratt, a professor of archaeology at the University of Oxford. Chemists he has consulted, for example, raise questions about whether tartaric acid is truly a definitive fingerprint of wine. But Mr. Sherratt says that the combination of chemical and archaeological evidence makes a strong case. "I'm sure the broad outlines of the story [told by Mr. McGovern] are correct. And it's a fundamental contribution to our appreciation of early history."

Mr. Sherratt views the development of alcoholic drinks as profoundly important to the emergence of civilization. Wine and other nonessential commodities are not simply signs of a developing society, he says. "They are civilization. That sort of more complex kind of consumption is what civilization is."

With so much riding on the history of wine, Mr. McGovern and others are striving to zero in on the birth of the drink. He considers the Caucasus or eastern Turkey the prime candidates for the origins of a true wine culture, one based on domesticated grape plants.

Almost all of the wine produced in the
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Couch potatoes, rejoice. Leading an active life can be hazardous to one's health. An estimated seven million Americans each year suffer injuries while engaging in sports and related recreational activities, according to a study in the June *Injury Prevention*.

Researchers at the Centers for Disease Control and Prevention gleaned information about injury rates from annual surveys conducted by the National Center for Health Statistics. The riskiest activity was basketball, which injures approximately 977,000 people per year. Bicycling came in second, with 649,000 annual injuries. Over all, men get hurt twice as often as women.

While most injuries happen at sports facilities, about 20 percent took place at schools. Strains and sprains were the most common problem, accounting for roughly a third of the total. More than 20 percent of the injuries involved fractures.

Of the people who sought medical attention, 20 percent of schoolchildren missed more than a day of school per year, and more than one-quarter of working adults missed more than a day of work. As doctors and health officials urge Americans to be more active, the study underscores the importance of promoting safer practices and policies, say the researchers.

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While you're on the couch, watch some reality TV. Derided as voyeuristic and vacuous, such programs may actual-

ly help viewers feel better. A researcher has found that watching *Joe Millionaire* cheered people up.

Cynthia Frisby, an assistant professor of advertising at the University of Missouri at Columbia, asked 110 undergraduates to describe their current moods and their thoughts about reality television. Then they watched an episode of *Joe Millionaire*, in which a male construction worker masqueraded as a millionaire and chose dates from among 20 attractive women, who believed that he was rich. Study participants recorded their thoughts and reactions during the program and took another survey after it ended.

Both male and female students' moods improved after watching the women compete for the man while he worried about whether they wanted him just for his supposed wealth. Ms. Frisby has submitted her results to the journal *Mass Communication and Society*. "These shows allow people to make comparisons with media images—comparisons that ultimately help them feel better about themselves and their personal circumstances," she writes in her manuscript.

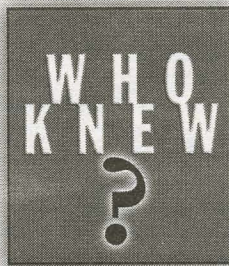
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Yet another popular behavior may be good for you, too—if you're a man. Researchers have found that men who mas-

turbate more face less risk of prostate cancer.

A research team led by Graham Giles, of the Cancer Council Victoria, in Melbourne, Australia, compared questionnaire responses from 1,079 men who had prostate cancer with those of 1,259 healthy men. All of the men in the study were less than 70 years old. The study found that the more a man had ejaculated, particularly in his 20s, the less likely he was to have developed prostate cancer. Men who had ejaculated more than five times a week in their 20s were one-third less likely to develop prostate cancer as they aged than men who had ejaculated fewer than three times a week. Dr. Giles guesses that frequent ejaculation prevents toxins from building up in the prostate.

Previous studies of sexual activity and prostate cancer had found no link or had found that having intercourse frequently can actually increase risk. Dr. Giles explains that that may be caused by infections from multiple sexual partners. Those studies had looked only at intercourse and not at the total number of ejaculations.

"Men have many ways of using their prostate which don't involve women or other men," he told *New Scientist* magazine.



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world today descends from a single subspecies of wild grape called *Vitis vinifera sylvestris*, which once thrived from Spain to Central Asia. The domestication of that grape could have happened anywhere in its natural range, at one site or multiple places. Mr. McGovern promotes a notion called the Noah Hypothesis, which posits that people domesticated grapes only once and then transplanted the vines to other parts of the world.

Molecular biologists are now joining the hunt for the ancestry of wine by comparing the DNA sequences of grapes found around Europe and the Near East. José Vouillamoz, a postdoctoral researcher at the Agricultural Institute in San Michele all'Adige, Italy, traveled to Georgia and Armenia in May to collect samples of wild and domesticated types of grapes. Preliminary results of his DNA-fingerprinting study indicate that the wild grapes of that region are most closely related to the domesticated variety, suggesting that the Caucasus was the cradle of grape domestication for the entire world, in keeping with the Noah Hypothesis.

But other researchers say the story is more complicated. Kristina M. Sefc, an as-

sistant professor of zoology at Austria's University of Graz, has studied domesticated grape cultivars growing in Austria, Croatia, France, Germany, Greece, Italy, Portugal, and Spain. Her DNA analysis has shown that grapes within each country are more closely related to each other than to grapes in other countries. That evidence and other data suggest that "local native grape

triguing that residents of Neolithic China were experimenting with fermentation at about the same time, 9,000 to 8,000 years ago, as did people in the Caucasus. There is no evidence of trans-Asian trade that far back in prehistory, so it seems likely that people in both regions developed the skills independently.

The story of the Chinese drink is more

**It wasn't only a matter of taste,
or the yen for a Stone Age buzz,
that led ancient people to imbibe.**

vines did contribute to the cultivars that are now used in the different European regions," she says. "This is something that hasn't been acknowledged."

Her study, which appeared this year in the *American Journal of Enology and Viticulture*, raises the possibility that people across Europe domesticated local strains of *V. vinifera sylvestris*, rather than simply importing a variety that hailed from the Caucasus.

In either case, Mr. McGovern finds it in-

complex because it apparently contained many different constituents: rice, honey, and either wild grapes or hawthorn fruit, another source of tartaric acid that grows in China. It's even possible that the early cooks used grapes and hawthorn; seeds of both are preserved at the Henan site. For some reason, though, the ancient Chinese later abandoned their experiments with fruit and focused on making wine from rice and other grains.

Other ancient cultures developed different types of alcoholic drinks. The arid lowlands of Mesopotamia, where grapes were not plentiful, developed into beer civilizations, with literally hundreds of types, says Mr. McGovern. His chemical analysis of pottery from Crete reveals that, 3,500 years ago, its people enjoyed a type of grog, consisting of resinated wine, barley beer, and mead.

It wasn't only a matter of taste, or the yen for a Stone Age buzz, that led ancient people to imbibe. "They really took a risk drinking just ordinary water because microorganisms in it would cause disease," says Mr. McGovern. "They must have appreciated that people who generally drank fermented beverages did live longer."

There is no telling when people made that discovery. Mr. McGovern will travel to eastern Turkey next spring to try to push the record of wine even farther back in time. He will look for residues on stone bowls to see if early villagers there were fermenting grapes before pottery was invented. And as always, he will sample the local production, raising a glass of modern wine to toast the vintages of the past. ■