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Volume XXXI, Number 1
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SPECIAL ISSUE ON COVID-19

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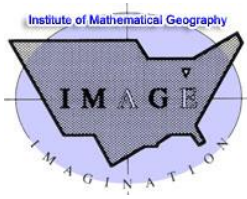
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31 YEARS OF PUBLICATION!

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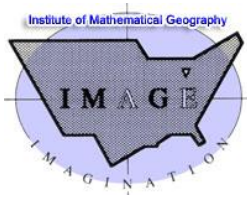
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Contents

Frontmatter	3
Isolation in East Central Mississippi: Virtual Pub Games in Meridian	5
Isolation in East Central Mississippi: From Fiction to Non-Fiction	21
Project My Heart / Your Heart^: Update on the Mississippi Connection	63
Endmatter	64



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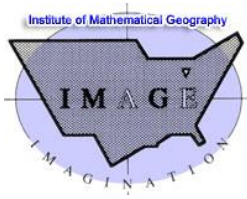
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Frontmatter

Solstice was born digital in 1990, before the advent of the Internet. Early volumes were typeset using the digital typesetting language, TeX. The digital files were sent to subscribers via email and the receiver printed out the TeX code, if desired, to produce a typeset-quality journal, on-demand. Selected monographs in the IMaGe Monograph series contain typeset versions of *Solstice*, printed from the code transmitted as the original version of that issue of *Solstice*. Later, when the Internet became available, *Solstice* switched to the Internet as the platform for transmission, writing documents in html rather than TeX.

Early in *Solstice*'s production history, some authors worried that their electronic files could be maliciously altered by random readers and uploaded to replace their own writings. Of course, that could not have happened (because everything was passworded). However, as reassurance to prospective authors not yet familiar with the mechanics of servers and such, early documents were edited to introduce deliberate errors in spacing, inserted by hand, that a random word-processed document would fail to automatically duplicate. Hence, a bogus copy could be detected simply by overlaying a 'new' printout on the 'old' printout on a light table. The hand-insertion of erroneous spaces motivated the oriental rug motif, photographed from a Bokhara rug from the 1964 New York City World's Fair; that symbol is carried forward (although the practice itself is not) in *Solstice* today, as a subtle reminder of one element of the journal's history.

Over the years, *Solstice* has gained media attention from a variety of sectors: from *Science* (AAAS) and *Science News* early on. A bit later with interaction with a museum, the Exploratorium (San Francisco), and the TV show, *Nova*. For all these notices, as well as for those in more conventional academic arenas, our primary thanks go to our contributors, volunteers, and readers who have been with us for so many years. Best wishes to all!



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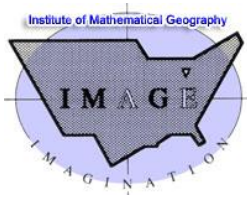
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*Former (Deceased) Board Members: William D. Drake, Frederick L. Goodman.

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Isolation in East Central Mississippi: Virtual Pub Games in Meridian

Written by Sandra L. Arlinghaus, Ph.D.*

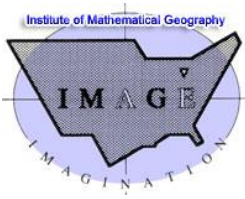
Based on field work from William E. Arlinghaus* and Daniel Rushing*

Introduction

During the late Winter of 2019 and Spring of 2020, the disease caused by the 2019 novel coronavirus (named COVID-19 by the World Health Organization, see link below) was sweeping around the World. Beautiful animated (and static) scientific and artistic map and graphical models, based on evolving data sets, tracked the progression of this disease in various creative ways, each telling its own story. Links are provided to selected examples in the 'In-text Indirect Citations' section near the end of this article.

What we tell here, that is a different slice of life, is the story of a single effort devoted to keeping people sheltering in place. Staying at home is not hard...at least not for a while. However, after some time, a sense of uselessness, isolation, and loneliness sets in (for many). Sheltered individuals might wonder, "What did we do? We lost our jobs as a result of something we cannot see—nothing we did caused the loss." While we comprehend the notion of the enemy we cannot see, rationality can give way to emotion and frustration.

Beyond sympathy for such feelings, there is, however, the problem that these feelings can be a source of real danger—if they cause the frustrated parties to quit and just go out and find some fun with others, outside the home and risk getting involved in close



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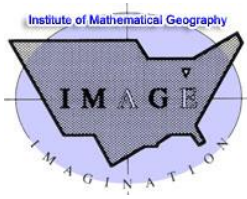
contact with others and consequent disease spread. It is that danger that motivated one business to provide virtual opportunity, documented here.

COVID-19 in Mississippi

On March 11, 2020, the first case of COVID-19 was reported in Mississippi. On April 3, 2020, Governor Tate Reeves issued a Shelter-in-Place Order (see Facebook page). That order, coupled with the order of Mayor Percy Bland (see Facebook page), of Meridian, for a curfew in the City from 9:00pm to 6:00am each day, shut down most activity in the City (other than that deemed 'essential'), initially until the end of April. In May, there followed a series of plans, from both the Governor and the Mayor, for the gradual reopening of the economy of the State of Mississippi. The daily updates from 'Team Tate' were readily available on various digital media and were eagerly awaited by many as they followed the articulate native-Mississippi Governor.

Additionally, residents followed the diffusion of the disease nationally on various sites as well as locally on locally-created mapping facilities by Dr. Dobbs and others on Team Tate. Each morning, the State Department of Health mapped, by county, the spread of the disease. Folks captured the daily maps and animated them in temporal sequence to gain an idea of the spread over time more local than that afforded by the grand global animations. All one needed was a computer, a laptop, a smartphone, or any device that could access the Internet.

One style of spatial analysis/modeling I did not see online was a Hägerstrand (1967) simulation of diffusion involving a grid and Monte-Carlo style simulation using a random number floating Mean Information Field grid with seed values plucked from Wuhan and transplanted in Seattle (and elsewhere) with grid cell size of 6 feet—a



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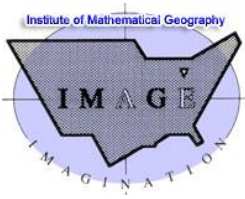
project for another time, perhaps derivative of earlier ones (Arlinghaus, 1990; 1998)—once sufficient data is readily available. Most of the models were based on S-shaped curves rising exponentially to an inflection point beyond which the curve became logarithmic before it plateaued (at saturation) and tapered off. The models were interesting to follow; as often happens with models, less experienced folks place too much value on their predictive character, not really grasping that models are just that...only a very simple-minded, scaled down, view of things, often with very little to do with reality (Arlinghaus, 1994).

Entertainment

What became clear, however, as one watched the diffusion of the disease through a single state and the world, was the need to keep people sheltered, especially the vulnerable ones, independent of their feelings of isolation. Entertainment became important, but conceivable, because of the presence of the Internet. Many grasped the obvious importance of using the Internet to keep people sheltered. One site in the United Kingdom employed professional entertainers to appear on a regular basis; to give people in their homes what they had become accustomed to seeing in nightclubs (Wiegand, 2020). Our local site in Meridian, the Brickhaus Brewtique, independently employed a conceptually similar strategy, developed by William ('Bill') E. Arlinghaus and implemented by him and Daniel ('Danny') Rushing.

History

Over the course of the past four years or more, Pub Games at the Brickhaus developed a regular following. Tuesday night was "Name That Tune;" Wednesday night was "Live Trivia;" and, Thursday night was "Bar Fight." Friday and Saturday



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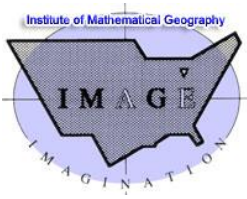
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evenings were reserved for concerts on either the indoor or outdoor stage or other special events. When none was available, the stage was turned over to a Karaoke host. For the three Pub Games, Danny Rushing (local professional musician) served as the host. Bar owner, Bill Arlinghaus, created the games and wrote questions, generated prize programs, and all else associated with the games. When played live in the bar, the Pub Games awarded prizes the players enjoyed—frequent gifts of free pitchers of draft beer to winners (contributed by local beer distributors in exchange for publicity) and gift cards for Brickhaus craft beer or pub food. A steady stream of regular local customers looked forward to the games each week and these were often supplemented by out-of-town players from local motels, snowbirds, SEC football fans traveling across the South, or others.

The challenge

Once the 'Shelter-in-Place' orders took effect, from various government authorities, there were no more Pub Games or entertainment from that regular local source. No more dinner at the Brickhaus followed by a lively game with prizes. The dinner part was straightforward: local patrons could still order food and pick it up curbside or have it delivered to their homes. They could also pick up craft beer, curbside, but not via home delivery (local law). It was the provision of food service, however, that was critical: it moved the Brickhaus into the 'essential' service category. The challenge to continuing good times, however, came in how to 'deliver' Pub Games to Brewtique patrons.



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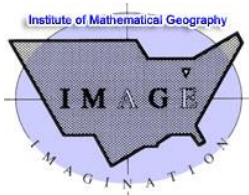
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Delivery of Pub Games

Bill and Danny experimented in responding to that challenge with equipment they had on hand, given that there was less income than usual and therefore no funds to purchase anything extra or new. From March 18, 2020 to April 3, 2020, they used Danny's laptop camera to 'telecast' games using Facebook Live; after April 3, 2020, they used Bill's smartphone camera with resolution and stability superior to those of the laptop (the throughput from the smartphone was vastly superior to that from the laptop, which broke up, or pixelated, on occasion). Thus, Danny was now using two smartphones, a laptop, and a microphone, simultaneously, while engaging the audience and grading answers and keeping track of prizes. On occasion, he played his ukulele and sang. His was an amazing multi-tasking effort!

For the viewers, the aspect ratio on the smartphone camera, adopted after April 3, suited the mobile players better than did the landscape orientation of the larger laptop screen. Naturally, the smartphone could be rotated through ninety degrees to adjust orientation views; however, the native portrait format remained generally more satisfactory than the rotated one, as suggested in Figures 1a, 1b, and 1c.



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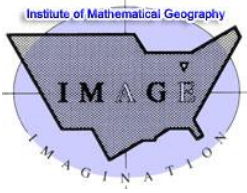
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Figure 1a. Screen capture displayed in native portrait orientation shows entire image and fills iPhone screen.



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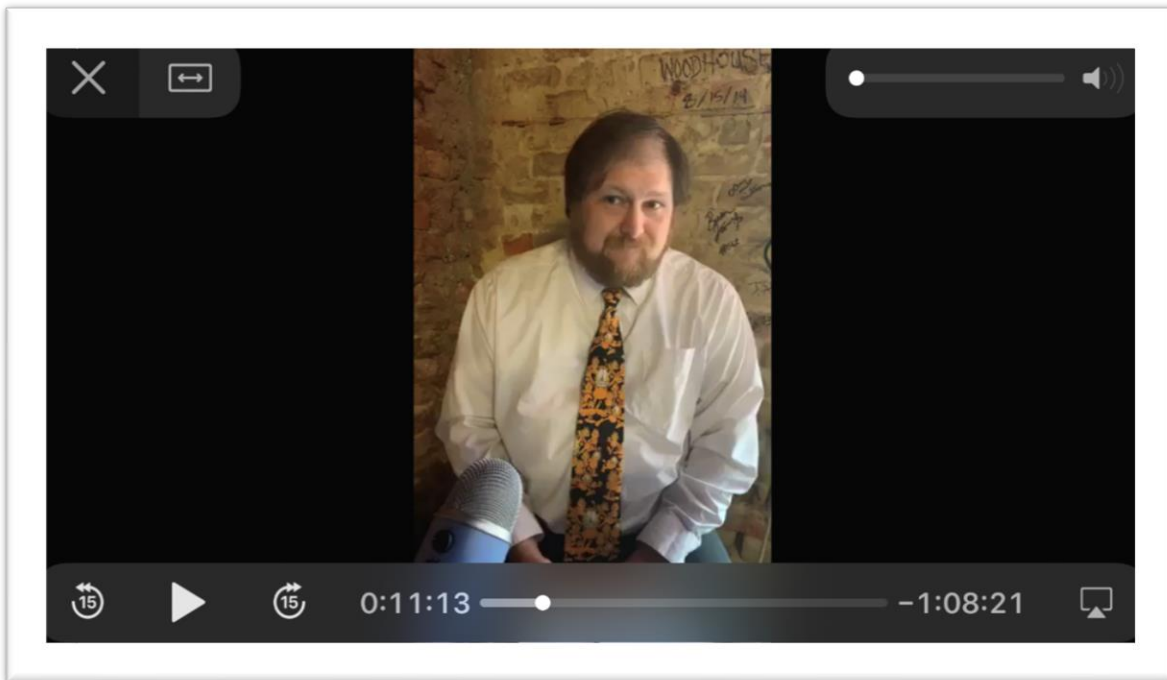


Figure 1b. Screen capture displayed in landscape orientation by rotating iPhone; does not fill screen but does show entire image of Danny.

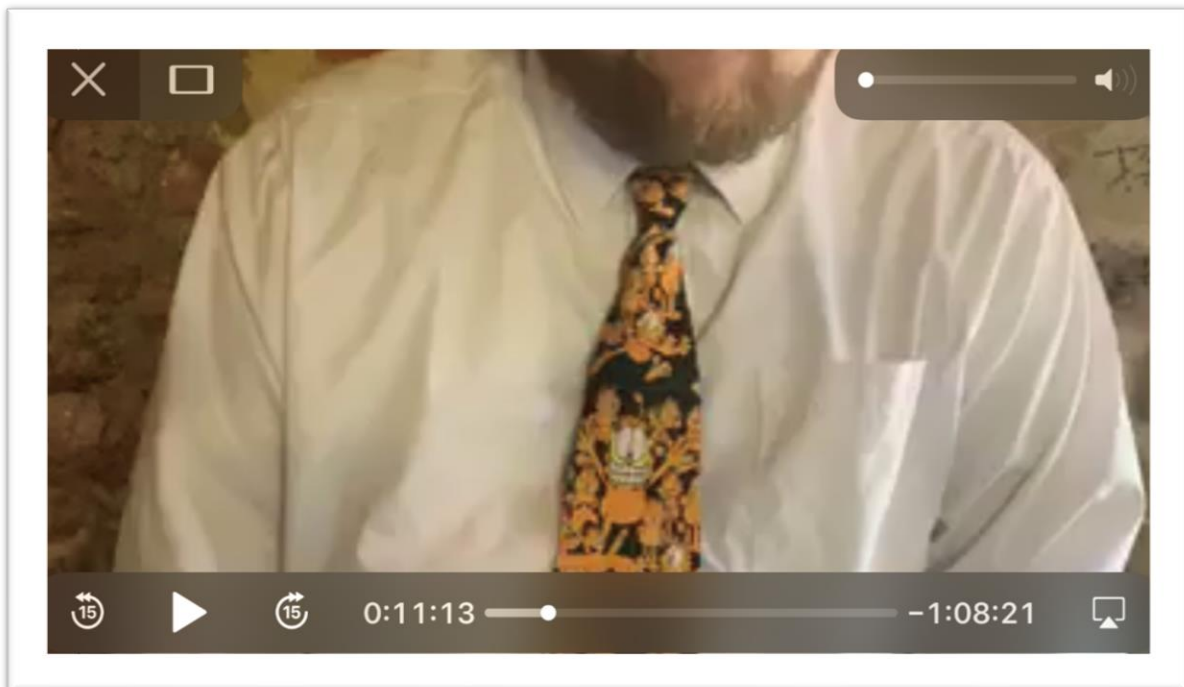
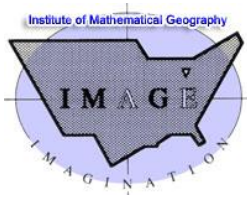


Figure 1c. Screen capture from Figure 1b set to fill screen; image is truncated.

One form of user display that enhanced socialization, a bit, was to use an iPhone to link to Apple TV and display, through screen mirroring, the live feed from Facebook on a contemporary flat screen television set (Figure 2). In a large living room, there was ample room for four players to sit more than six feet apart from each other, thereby maintaining physical distance disease-avoiding legal guidelines.



Figure 2. Pub game displayed on home TV.



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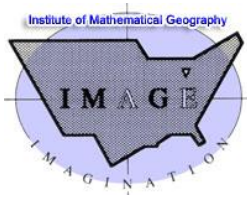
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Danny read the questions and viewers looked at him and listened to him on the Brickhaus Facebook page and then texted in their answers to Danny's smartphone. Players could also chat with each other in the Comments section of the Facebook Live display. Folks seemed to enjoy the games and the sort of socialization it provided.

After an experimental period, Bill decided to 'crowdsource' donations from viewers in order to create prizes and bootstrap his business operation. Viewers were informed that they could make a voluntary donation to the game, using digital fund transfer with either CashApp or Venmo. All donations (not required in order to play the game) were pooled into a single kitty for the night. Half of the kitty went to the Brickhaus business in order to help keep it afloat during the current tough times; the other half was won by the top three scores for the game that night. First place received 25% of the kitty; second place 15% of the kitty; and, third place 10% of the kitty. As 'prizes' the winners chose either a Brickhaus Gift Card with their winnings, for use at an appropriate later time for Dine-In at the Brickhaus. Or, they donated their winnings to one of four non-profit charities designated by the Brickhaus—three in Meridian and one out of town (in Ann Arbor, Michigan): [Love's Kitchen](#), [Care Lodge](#), [East Mississippi Animal Rescue](#), and [Project MyHeart/YourHeart](#) Pacemaker Reuse. Thus, players from other states could actually 'win' something and, if they wanted, feel good about giving back to the larger community through non-profits.

The Pub Games and Prize Program had begun as an addition to the food and beer curbside delivery and to the home food delivery service. Soon, however, it became apparent that it was the Pub Games program that was the dominant revenue generator for the business—at least during the time that the Brickhaus could not legally serve



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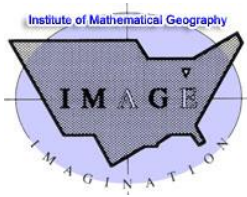
dine-in food and drink. The experiments undertaken by Bill and Danny had worked. The business survived.

When reopening, at least partially (to 50% of legal capacity), became possible in early May, playing the game within the bar once again became possible. However, the model created in tough times endured until the time that all businesses could reopen, albeit in restricted mode, on June 1, 2020. Once that policy went into effect, folks had many places to choose from; online games played from home lost their appeal as cooped-up folks wanted to get out. As states throughout the nation began going back to business, the appeal for remote players to play games from home also became minimal.

The Appendix below provides links to all the videos of the games, as they were played, presented along a calendrical timeline (with temporal gaps so one has the sense of how it felt to game players to plan weekly activities, as one might in forming a Geographical Events Ordering Maps Archives and Timelines, aka GEOMAT, tool (Arlinghaus, Kerski, Larimore, Naud, 2019)). The winning situation created for a single business not only kept it afloat during hard times, but it also added to winnings for non-profits outside of the bar walls—real or virtual. Necessity had once again been the Mother of Invention...as it must have been in countless other locales during these tough times around the world. We wish to honor all of them by relaying a single story from East Central Mississippi!

Appendix: Timeline Video Archive of Linked Online Brickhaus Pub Games

Over the course of this Archive, there were players from a number of different U.S. States: Mississippi, Louisiana, Texas, Oklahoma, California, Tennessee, Kentucky,



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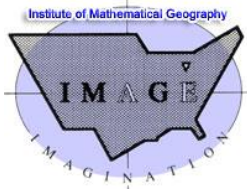
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Illinois, Ohio, Michigan, Alabama, Florida, Georgia, South Carolina, Maryland, and Connecticut. Players were encouraged by the Host (Danny Rushing) to order food and/or make donations.

2020	Pub Game Name
March 18, Wednesday	Live Trivia
March 19, Thursday	Bar Fight
March 20, Friday	Name That Tune
March 21, Saturday	Live Trivia
March 22, Sunday	Closed
March 23, Monday	Closed
March 24, Tuesday	Name That Tune
March 25, Wednesday	Live Trivia
March 26, Thursday	Bar Fight
March 27, Friday	Name That Tune
March 28, Saturday	Live Trivia
March 29, Sunday	Closed
March 30, Monday	Closed
March 31, Tuesday	Name That Tune
April 1, Wednesday	Live Trivia
April 2, Thursday	Bar Fight
April 3, Friday	Name That Tune
April 4, Saturday	Live Trivia
April 5, Sunday	Closed



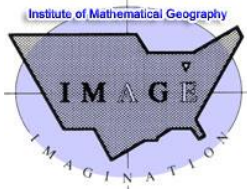
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April 6, Monday	Closed
April 7, Tuesday	Name That Tune
April 8, Wednesday	Live Trivia
April 9, Thursday	Bar Fight
April 10, Friday	Name That Tune
April 11, Saturday	Live Trivia
April 12, Sunday	Closed
April 13, Monday	Closed
April 14, Tuesday	Name That Tune
April 15, Wednesday	Live Trivia
April 16, Thursday	Bar Fight
April 17, Friday	Name That Tune
April 18, Saturday	Live Trivia
April 19, Sunday	Closed
April 20, Monday	Closed
April 21, Tuesday	Name That Tune
April 22, Wednesday	Live Trivia
April 23, Thursday	Bar Fight
April 24, Friday	Name That Tune
April 25, Saturday	Live Trivia
April 26, Sunday	Closed
April 27, Monday	Closed
April 28, Tuesday	Name That Tune
April 29, Wednesday	Live Trivia



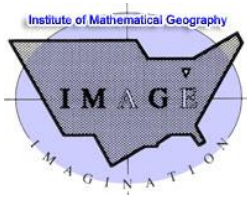
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April 30, Thursday	Bar Fight
May 1, Friday	Name That Tune
May 2, Saturday	Live Trivia
May 3, Sunday	Closed
May 4, Monday	Closed
May 5, Tuesday	Name That Tune
May 6, Wednesday	Live Trivia
May 7, Thursday	Bar Fight
May 8, Friday	Name That Tune
May 9, Saturday	Live Trivia
May 10, Sunday	Closed
May 11, Monday	Closed
May 12, Tuesday	Name That Tune
May 13, Wednesday	Closed; water main break
May 14, Thursday	Bar Fight
May 15, Friday	Name That Tune
May 16, Saturday	Live Trivia
May 17, Sunday	Closed
May 18, Monday	Closed
May 19, Tuesday	Name That Tune
May 20, Wednesday	Live Trivia
May 21, Thursday	Bar Fight
May 22, Friday	Name That Tune
May 23, Saturday	Live Trivia



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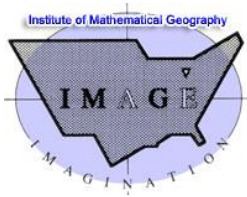
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May 24, Sunday	Closed
May 25, Monday	Closed
May 26, Tuesday	Name That Tune
May 27, Wednesday	Live Trivia
May 28, Thursday	Bar Fight
May 29, Friday	Name That Tune
May 30, Saturday	Live Trivia
May 31, Sunday	Closed
June 1, Monday	Closed
June 2, Tuesday	Name That Tune
June 3, Wednesday	Live Trivia
June 4, Thursday	Bar Fight
June 5, Friday	Name That Tune

In-text Direct Citations

- Arlinghaus, S. L. 1990. Beyond the Fractal, *Solstice: An Electronic Journal of Geography and Mathematics*, Volume I, Number 1. Format as originally transmitted and typeset for full hardware. Printout from the transmitted document made available in the Monograph Series of [Institute of Mathematical Geography, Monograph 13](#), 1990. Animation from [related teaching materials](#), available in the NRE530, Fall 1998, Lecture 11, set of linked class notes.
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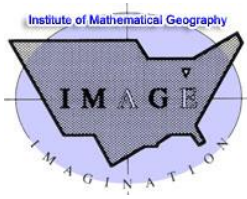
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Mississippi

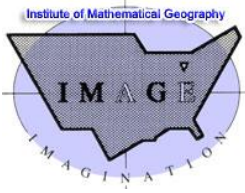
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Related Readings Suggestions

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Disclosures

- Sandra L. Arlinghaus is co-owner of the parcel of land housing the outdoor Courtyard adjacent to the indoor business, Brickhaus Brewtique.
- William E. Arlinghaus is General Manager of the Brickhaus Brewtique.
- Daniel Rushing is hired by the Brickhaus Brewtique to host pub games (run equipment, read questions, and provide entertainment).



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Isolation in East Central Mississippi: From Fiction to Non-Fiction

Sandra L. Arlinghaus

With input from William E. Arlinghaus and Weston Lindemann

Along with William C. Arlinghaus, Billie and Douglas Hall, Sonya Ross, and Pamela Stuckman

The material below contains a fiction piece, inside the box, with an associated non-fiction piece as an Appendix. The non-fiction piece will be pursued with local government as enthusiasm builds and returns following a period of isolation in the Spring of 2020 (in association with the global 2019 Coronavirus pandemic).

Fiction, in the golden-shaded box

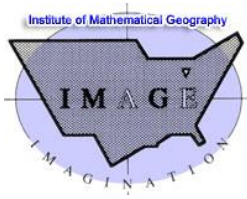
Meridian: A Place without Parallel

*Water, water, everywhere
And all the boards did shrink,
Water, water, everywhere
Nor any drop to drink.*

Rime of the Ancient Mariner, 1798
Samuel Taylor Coleridge

“Wow! Charles, listen to this,” noted Judy Earl, to her husband Charles Earl. The couple had been to many places together in their more than 50 years of marriage but had now settled in the comfortable small city of Meridian, Mississippi, near their son, Ed. Both the Earls still worked—Judy at her academic job she had held her entire adulthood, and Charles, a retired academic who now devoted most of his time to what had previously been his hobby: tournament duplicate bridge. “In USA Today,” continued Judy, “in an article entitled ‘Toxic ‘forever chemicals’ found in drinking water throughout US’ it says”:

The report, published by the Environmental Working Group, found that 20 cities and regions nationwide—including Washington D.C., Philadelphia, Miami, and Louisville, Kentucky—contained PFAS levels of at least 10 parts per trillion. Forty-three areas,



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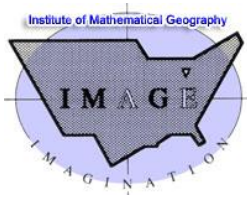
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including New York City, Nashville, Las Vegas and Sacramento had detectable PFAS at least 1 part per trillion.

Only one city, Meridian, Mississippi, which uses well water 700 feet below the surface, found no PFAS, while Tuscaloosa, Alabama and Seattle had levels lower than the 1 part per trillion limit advised by the EWG. Joshua Bote, Jan. 23, 2020.

“Imagine that, Charles, our new hometown of 30,000 or so, is the national leader in something...and it’s water! Why it’s a veritable Garden of Eden...the Fountain of Youth...people will be travelling from all over the world to come to Meridian to enjoy its natural non-toxic waters...spas will open, breweries and other industries making heavy use of water will flourish, people will flock to Meridian.” Charles measured his thoughts carefully, in his heavily trained mathematical mind, and then said, “Judy, let’s don’t go overboard here. I agree that this is all exciting news; and, I agree that it might well offer extra economic and tourism opportunity. But please remember that development of such items takes time. Not everyone will seize on this relationship and even in the set of those who do, there will be naysayers who resist change, no matter how favorable.” “Hmmm,” Judy replied, “you might be right, but nonetheless I intend to devote a large chunk of my time to investigating various aspects of this opportunity once we get home. I suppose there may be some who don’t get the significance of PFAs and health....I’ll send you a link from the EPA: <https://www.epa.gov/pfas/basic-information-pfas>”

The Earls were in their car, driving home from a bridge tournament in the beautiful Gulf community of Orange Beach, Alabama. Soon they would arrive at their spacious Tudor home in Meridian, where Judy would have full access to her considerable collection of electronic and other investigative tools. Judy’s comment to spend time on the water topic was not an empty comment. Both of the Earls had investigated 10 murders over the years, mostly at bridge tournaments, and both had considerable published academic research in both mathematics and, of particular relevance here, in Judy’s field of Geography, together with her practical community service in Urban and Regional Planning. Investigations of various sorts were second nature to both.



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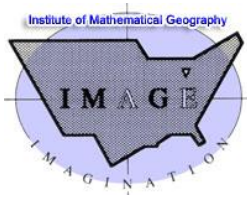
At the Beer Haus...

"Let's go to Beer Club early; I don't feel like cooking tonight," Judy commented to her husband. "Sure thing; our son Ed will be happy to see us," Charles said. So the couple headed off to the Beer Haus (aka 'Brewtique') the bar and restaurant owned by their son, Ed, in the downtown Meridian Historic District. Every night at the Beer Haus there was a different fun event. Tonight, Wednesday, there was Beer Club, at 6:30 followed by live Trivia at 8:30. Charles and Judy went around 6:00 to touch base with their son, following the trip to Orange Beach and to get a head start on some of the excellent deep fried southern food to go with beer from one of the 63 taps or 60 other choices from bottles. Judy had the hand-cut cheese sticks with ranch-fried mushrooms with a Mississippi-brewed Bourbon-barrel aged brown ale. Charles ordered his usual, more sedate, hand-cut chicken tenders and a soda pop. The family had a nice time.

Soon, Beer Club regulars began filtering in the door. Beer Club was an invention of Ed's to expand the tasting horizons of his clientele. The State of Mississippi does not permit the sale of beer in excess of 10.3 percent alcohol by volume (ABV). Yet many fine craft beers brewed in various part of the country exceed that percentage. It is illegal to sell beer in excess of 10.3. It is not illegal to give it away. Beer Club is open to anyone who comes to the Beer Haus. Regulars who travel a lot, bring back beer from elsewhere that exceeds 10.3 ABV. Then, it is given away at Beer Club. A regular group of about 8 individuals participates and brings beer as they have it. Others join in, sometimes swelling the group to as many as 20. Beers are rated using an online app on smartphones (Untappd). However, the rating/tasting component is only a small part of the adventure; the socialization, discussion of municipal matters, of academic matters, of personal successes, and so forth, grows as the event progresses. Typically, there are about 5 different beers, passed around the table in 5 ounce glasses. In addition, Ed makes pints of one fine Mississippi beer (his choice) available at half price during Beer Club. As the beer flows, so too does the conversation in many interesting and varied directions.

Arrival of Beer Club Regulars

The first to arrive was Wyndham Wynn, local City Council Person for the District that contains the Beer Haus as well as the residences of most Beer Club regulars. Locals who were his friends all



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called him 'Wyn' so that his name, Wyn Wynn, reflected his political philosophy of wishing to create win-win situations in resolving municipal issues of various sorts.

Jean and Hal. Married couple. Jean is a retired banker with a major national bank. Hal is a retired civil/mechanical engineer with national-level experience in various locales. Residents of Meridian for the past decade.

Sylvie. Beautiful local woman with French background. Operates a hair salon and dreams of more.

Bonnie Brown. Bakes 'Brown's Brown Bread'—an artisanal bread she shares on a selective basis. Beer Club special sandwich—open face grilled cheese and tomato with a beer-based béchamel sauce. She was also a landscape architect and a parks planner for a city ranked number one in the USA as most livable city. She is a snowbird, migrating between Mississippi and Michigan.

Mike. A musician who moonlights driving for a local franchise of an on-demand passenger service, using his own vehicle, and other delivery services.

Blaise. A first-responder and ambulance driver. Active in local community service.

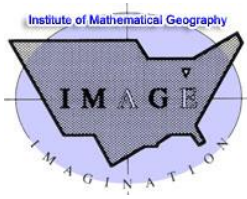
Walt. A local beer creator who currently engages in putting his creations out for contract brewing but might like to do more.

Beer club regulars identify themselves by wearing a pair of mismatched colorfully patterned socks (courtesy of Bonnie).

Beer Club Discussion

"Wyn," Judy said, "I want to talk about the terrific opportunity the water ranking involving PFAs offers to Meridian. Let me see if I can enumerate my many and disparate thoughts in a somewhat organized fashion." And, Judy did so, while taking advantage of some of the display boards, including antique blackboards, on the walls of the Beer Haus.

- The unique ranking is for water as it comes directly from the aquifer.
 - We need to preserve that quality as it moves from the aquifer into the distribution network.
 - Make sure piping is first-rate.



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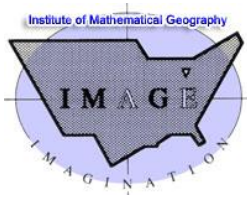
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- Ensure careful ordering of municipal services. For example, when streets are fixed, take advantage of the ripped-up surface to fix what is under the surface. Do not lay new street surface first, possibly for political benefit of looking-good, and then later rip that up to fix subsurface infrastructure.
- We need to ensure that aquifer recharge is with first-rate water.
 - Runoff from rain storms needs to be carefully managed
 - Require onsite retention basins on new development.
 - Limit impervious surfaces; require pervious surface as far as possible.
 - Roof runoff needs similar thoughtful management, possibly involving interesting gutter alternatives/additions, French drains, and so forth.
- Invasive species management. Invasive species have the capability to disrupt the balance of vegetation that has existed over time and that has apparently been effective in water quality management from and to this aquifer. First species to deal with is kudzu. Please see the handout on this topic (in Appendix).
 - Kudzu control
 - Kudzu opportunity zones; kudzu energy credit trades. Urban kudzu zones will often be in the poorer areas of town, on abandoned or foreclosed properties.
- Implementation of economic development opportunity, in geographical zones and in municipal documentation. Perhaps the most important result here is to draw the first two bullet points together to create a 'SWAP' opportunity to entice businesses from elsewhere to locate in Meridian, hopefully enhancing local opportunity and in creating unique business opportunities for firms that would benefit from being located near the source of a PFA-free municipal water supply.

Assignment of Beer Club members to work on parts of the outlined program

- Judy: takes the lead in creating the general plan and working on parts where she has specific expertise according to her credentials. She also captures the entire project in writing, photos/images, and maps, as appropriate (see for example, [Spatial Thinking in](#)



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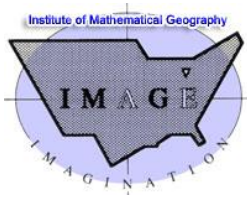
[Environmental Contexts: Maps, Archives, and Timelines](#), 2019). All for sharing in various ways.

- Charles: takes the lead in analysis of detail and in checking of mathematics, all in accordance with his credentials.
- Ed: takes the lead on local economic development ideas. For example, approaching a major national brewer to locate a high-end specialty brewery to produce fancy, limited production brew, advertising... 'a unique beer made from the finest waters!' Also with officials from Amtrak. And with other local business leaders.
- Wyn: takes the lead on local governmental issues. Works with Ed and Judy on invasive species issues and on Environmental/Development SWAPs.
- Jean: works with Charles on accounting issues of various sorts; cross-checking matters.
- Hal: questions matters associated with engineering.
- Sylvie: investigates, with Ed, the possibilities of expanding Sylvie's into a spa, taking advantage of the water situation.
- Bonnie: works with Judy on urban planning matters as they relate to parks and other natural and man-made features. Also with Judy and Wyn on zoning issues to preserve water/aquifer quality at all levels. And with Judy on culinary matters at the Beer Haus.
- Mike: keeps a log of his trips to feed into the data sets.
- Blaise: an emergency first responder who works with needs of fire department for water. Also with Charles and Judy and Bonnie on needs for redundancy in water delivery network: so a large fire does not dry up water for Sylvie's spa needs, for example.
- Walt: works with Ed on water matters in relation to local brewery needs—possibly for Walt's own proposed brewery.

Beer Club Investigative Team Goes to Work

Judy Goes to City Hall

"Charles, will you please give me a ride over to City Hall? I have an appointment to see Al Dixon, our Chief Economic Officer of the City," Judy asked her husband. Once at City Hall, Judy entered



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the impressive office, decorated in a conventional Deep South style, where she was greeted with a friendly welcome by Dixon's office staff.

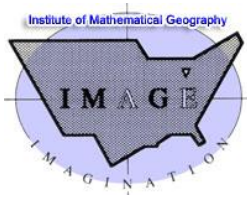
"My dear Dr. Earl," a booming voice announced, "how wonderful to see you again. I always so much enjoy visiting with you, your kind son, and brilliant husband. Meridian is so fortunate to have the Earl family as some of the leaders of our renaissance vision. What can I help you with today, Dear? Just say the word, and I'll do my best to make it happen!" Al Dixon was always super-pleasant, at least superficially; today was no exception.

"Al," Judy countered, "have you see the article in USA Today noting that Meridian was the only city in the USA with municipal water free from PFA pollution? It seems to us that that offers a gigantic opportunity to bring in some much-needed new business...business centered on having a fine water supply. Breweries might be one such idea. I am sure the smart people in your office must already be thinking of various opportunities of this sort. So, really I just wanted to talk to you a bit about such opportunity and where it might go, sort of putting our heads together to create win-win situations for business and for Meridian."

"Sounds like a fine idea to me," Al said. "What do you have in mind? Yes, of course as you say, we are working on this, but the opportunity is so great that really we do want to encourage input from any thoughtful citizen, such as you, who would wish to share. You know we pride ourselves on being open and transparent; receptive to constructive input designed for the betterment of our local population."

"Wow," thought Judy, "he is really on his patronizing political stump today; wonder what is really going on in his mind..." Judy kept those thoughts internalized and proceeded simply to explain some ideas. "Suppose," Judy continued, "that I construct an example of a model industry and how it might all work; then you and others might see that model as one that can be altered to suggest possible guidance in similar, but not identical, situations?" "Perfect," said Al, "proceed."

"So," Judy said, "let's consider a brewery example. Suppose one of the major craft beer breweries in the US, from Michigan, considers locating an offshoot brewery here in Meridian to take advantage of the unique waters located here. They decide to brew a new, top-of-the-line craft beer here and advertise it as the finest beer in the US made with the finest water...some sort of



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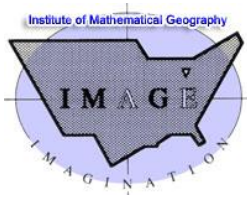
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marketing strategy of that sort. It will be produced in limited quantity, so as not to draw down too much on our water supply. Price per bottle will of course reflect the high quality and limited production. But, based on some of their seasonal brews they already produce in Michigan, where people stand in line outside in the frigid winter weather, just to pay 30 dollars for a small 12 ounce bottle, they understand that one can engage in such limited/seasonal production of fine beer. Different vintages of course have different flavors. Imagine a beer produced taking advantage not only of our unique water situation here but also of our proximity to other interesting ingredients not commonly available to their other brewery locations: fresh-picked pecans, kudzu flowers, hibiscus flowers, and more. All of these can be used to brew beer, as interesting local flavors. The beer is then aged in local whiskey barrels, perhaps even moonshine barrels... 'Meridian Moonshine Brew' or some such. The brewery should be located in the downtown, close to the railroad tracks, where supplies such as whiskey barrels can be brought in. The most expensive element of transport of beer is the water. So it should be close to where it can access easily the amount of our Meridian water that it needs."

"Now that's the general idea," Judy said. "But, there is far more to it than that. There are urban planning issues. After all we want the brewery to be an asset to Meridian so it needs to be planned in a way that it will not damage the infrastructure and, in fact, will add to it. So, suppose they purchase a site in the downtown with an existing blighted building on it. They pay to remove the building. They pay to clean up any onsite contamination. And they pay into the City's public 'Kudzu Removal Fund' to clean up kudzu along existing public corridors. All of this they should be willing to do, although the contribution to the Kudzu fund might sound, at the outset, to be a bit strange. However, they wish to enjoy the privilege of using some of the world's finest waters to create their premium upscale product. Now the water is directly drawn from the aquifer underlying the eastern part of Mississippi, about 700 feet down, below the level of the water table (which serves as a sort of cap on top of the aquifer). The aquifer needs to be protected. Its quality is a reflection of the entire hydrological cycle at a broad regional level, including the balance of surface vegetation. Evidently, that balance of native plantings, conifer and deciduous, has been pretty good for quite a period of time. We need to keep it that way in order to protect the aquifer. So, the



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invasive species are relative newcomers; we need to get rid of them so that the native species continue to thrive and offer one element of balance to the broad landscape. Hence, the contribution to the City Kudzu fund.”

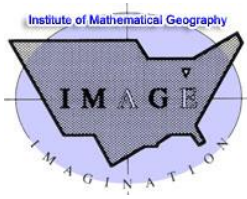
“In addition to contributing to the City Kudzu Fund,” Judy continued, “the brewery must also engage in other practices that will ensure clean recharge into the aquifer so that it is sustainable over the long run. For example:

- Onsite retention of water should be required. Roofs need to be sloped, and water from the roof channeled into gutters and downspouts leading to French drains that funnel roof runoff into onsite, aerated, retention ponds.
- Roofs might be green roofs.
- No added impervious surface should be permitted on the site. Parking lots, driveways, sidewalks, and so forth should be made from pervious surfaces.

Then, as balance on the part of the City, the municipality must provide a state-of-the-art water distribution network so that the cleanliness of the water, as it is withdrawn from the aquifer and piped to the brewery, is not compromised. This idea is critical; do not let naysayers note that lots of cities have water that needs work to clean it up; we are unique because we have no PFAs—most other stuff can be filtered (or otherwise treated) out of the system; PFAs cannot. This fundamental issue is of paramount importance.”

“Naturally, such improvements to the underground water distribution network should be made in advance of any proposed projects involving roads or anything else on top of the water distribution network. Not a good idea to pave it, only to have to rip it up, and then repave...very bad use of precious taxpayer dollars. Also, the wastewater network needs to be analyzed at the same time; clearly any settling ponds or other wastewater management facilities must be located so as not to discharge upstream from river water intake or aquifer access. It may be that the City would wish to implement these improvements in stages, gradually opening up parcels for investment only after all is right within a given zone.”

“And, a further give-and-take should take place on the zoning regulations. There may be height restrictions on buildings in particular zones. There may be historical requirements in certain zones.



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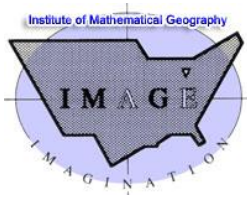
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Of course, all of these and any other standard planning regulations need to be honored. I am just trying to think of a few extra things here. But, we may need to put an upper bound on the amount of new water-based development that we can sustain. I believe that we need a full-time professional hydrologist as well as a full-time professional attorney, salaried and not paid by the hour, as regular members of City Staff, and regular participants in the development of planning, zoning, Planned Unit Developments and other variances, and so forth. They should sit with Planning Staff on Planning Commission, City Council, and related meetings, as should law enforcement experts with experience in the security of urban water systems. We have a unique, valuable resource. It is penny-wise and pound-foolish not to give it the best protection. Well,“ Judy concluded, “I think that’s enough for today...I have to run along and I know that you must have work to do...but I’ll be back and I’ll encourage some others I know to come and talk to you, as well.” Al thanked the ambitious woman, put on his sport coat, and headed out for happy hour at his favorite local hangout.

At the Beer Haus

Al Dixon left his lavish office, headed down the stairs of City Hall and across the expansive manicured front lawn, under the oak and sycamore trees and across to the sidewalks lined with crepe myrtles, blooming with abundant lavender, pink, burgundy, and white blooms. He loved Meridian...it’s natural beauty, old-school Southern charm, and friendly people. The air was slightly crisp, the sky was blue; he enjoyed a few deep breaths of the clean, fresh air. All was right with his world—all this plus the exciting possibility for huge economic advance for the area that his friend Judy had just laid out at his feet.

Al opened the front door of the Beer Haus and greeted Judy’s son Ed, “your mother sure can talk! I think I need a nice pint!” “She inherits that from me,” Ed chuckled. “We have some nice new beers today, from local breweries; that is, from local Mississippi breweries, not from local Meridian breweries. There is not yet any beer actually brewed in Meridian...just contract brewed, off site...in Jackson, Hattiesburg, or elsewhere. I dream of the day when we can actually have brewing right here downtown...would be great for the downtown at large,” Ed noted. “Ok,” Al said, ‘tell me what you have as specials today and then let’s get down to brass tacks.” “Well, in addition to an



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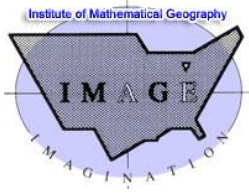
outstanding beer brewed with hibiscus petals, on special, we have a sandwich with a soup and two sides for 8.95...just during happy hour. The sandwich is made on Brown's Brown Bread, today a dill bread variant; the soup is a beer/cheese soup called "BeerGator Soup"; and, the two sides are beer-steamed sauerkraut and potato salad. The beer used in the marinating/cooking process is all Mississippi beer, so our specials have a truly 'special' character! Recently, we had a tasting of the soup and paired bread—I'll show you photos. By the way, the copper double boiler, that holds soup in some of the photos, and the accompanying ladles, are all antique French copper, from my grandmother, Alma, who was a great French Chef. I think you know that my parents own a chain of restaurants in the Midwest, called "Alma Mater"—in her honor. Meridian isn't large enough, and perhaps doesn't have a suitable target population....yet...to support one. But, who knows... It was really quite an event; Bonnie also brought her pet teddy bear, Betty Bear, who is unique; Bonnie's late mother (Betty) created and made the bear, by hand—hence, the name. We were happy to have Betty there, too. You will see a place set at the table for Betty, but she was too short to physically join us (we all have fun with this). My family has a whole set of teddy bears. We have fun with them; they even made it into mystery stories of various sorts. In fact, sometimes we invite a 'guest bear' to participate with the regular team of bear sleuths. I think there are ten stories featuring various bears and other stuffed animals. It's kind of a humorous hobby. Anyway, that's why my parents were happy to play along with Bonnie who also has a pet bear! Some people may find the whole thing a trifle unusual; but it's just plain and simple fun. People have long had such fun; look at the literature—A. A. Milne, Lewis Carroll, and no doubt many others. Fostering imagination and creativity is important in children and at least as important in adults. After all, it's the adults with imagination who create fine art of all sorts as well as teaching the next generation to proceed creatively. Creative works are what separate humans from others. At least that's one viewpoint and certainly not unique to me. But, perhaps I digress..."



Bonnie Brown, fresh-baked bread, and homemade soups.



BeerGator Soup, made with Abita AndyGator beer, swirled into the ceramic-lined copper double boiler, with a green bean floated on top to simulate a gator swimming in the soup. Full bowls with a full pot for seconds.



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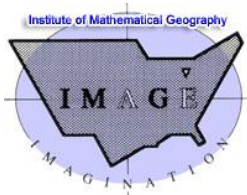
Ed, Wyn, Hal, Charles, Sylvie, Bonnie at soup and bread tasting. Seconds had been enjoyed by all (note the empty pot). Setting for Betty Bear next to Bonnie. Judy is taking the photograph.



Betty Bear.

Ok,” Al said, “you sold me on the meal...I will have all of that...sounds good. I see what you mean...you do talk at least as much as your mother does!” Soon, Ed brought Al his food and beverage, at which point Al said, “now, sit down with me and tell me all the intricacies of running a brewery. Your mother has been discussing planning issues associated with such and I would like to hear more, so tell me about it and bring along any others in here who might also have insight to offer.” Ed left.

He soon returned with Bonnie, Walt, and Blaise. “Al,” Ed said, “please meet Bonnie...yes, she bakes bread, but in her professional life, she has been a Parks Planner for a northern city that was recently selected the most Livable City in America. So, while we think about a brewery from one vantage point, we might also wish to think about it in terms of the impact it has not only on the built environment downtown but also on the Parks element too. Parks are important in a downtown; for beauty, for livable outdoor space, and for filtration of storm runoff. Walt is a local brewer who



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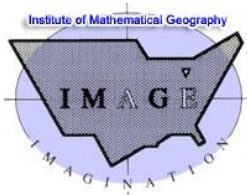
produces a fine kudzu-based beer. He can help us with detail involving the mechanics of running a brewery. And Blaise is an emergency first-responder for the city; tall buildings can have an impact on the water network. It takes extra pressure to fight fires in tall buildings. Furthermore, in the event of terrorist activity associated with the water network, it is important to have redundant linkage in the underlying distribution network. He can help us with the ins and outs of such issues.” With that, the remainder of the group ordered more craft beer and food and sat down and discussed matters, for the next four or five hours, associated with building a brewery in the downtown.

A Private Conversation

“All right folks,” Ed announced, “it’s ‘last call’ and then we close in 15 minutes after that.” Soon, the Beer Haus began clearing out. Ed asked Al to stay for a bit beyond that so the two could talk for a bit, alone. Ed locked up and got himself and Al one last fine brew while the two of them sat down to discuss business.

“Al,” Ed began, “there are a number of legal issues associated with opening a brewery anywhere in Mississippi. These are unique to Mississippi. I want to go over them with you for a bit. No doubt you already know about them, but I just want to reinforce their significance when it comes to locating a brewery in this state.

One important issue is what we are allowed to sell in any establishment. Currently, it is illegal to sell beer that is more than 10.3% Alcohol By Volume (ABV). That means that if a brewer wants to produce a fine craft beer that is more than 10.3 ABV that he is out of luck. Many of the really fine craft beers produced in other states are well above that cutoff. So, if I wanted to locate a new brewery somewhere, the State of Mississippi might be my last choice. This law must be changed, for various economic reasons, but certainly for the ability to attract new brewing business to our State. Also, there are overly-restrictive laws about producing and consuming beer on the same parcel. No other State has such laws, so once again, breweries will not locate here. This, too, needs to change. I don’t know if there are old-fashioned social or cultural issues behind these laws, but for purposes of economic development, they *must* change.



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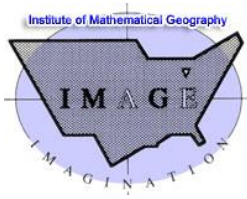
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Also, the fact that our State, along with Tennessee and Kansas, are dry by default on a county-by-county basis, means (among other things), that it is technically illegal to transport alcoholic beverages across dry counties. This law is, from a practical standpoint, unenforceable. So, it too should go. As should the bizarre law that groups 'wine' with 'spirits' rather than with beer. Once the ABV limit is removed, 'wine' should be grouped with 'beer' on the same license. 'Spirits' require a separate and more stringent license. There is no doubt in my mind that most abusive behavior in here, and there is not much, derives from folks who drink shots across the street and then come over here to drink beer. Beer and wine cause very few problems of that sort; most are caused by consumption of spirits. I would happily sell wine, as well as beer. Often, with married couples, the husband comes in for beer with his wife who would really prefer a glass of white wine. Some sets of women, particularly those who are concerned about body image and weight, will not drink beer for fear it will make them fat. So, the current licensing restricts my ability to capture a large set of customers only because of this behind-the-times legal arrangement. Again, that too should change.

Now, I am willing to make a strong pitch to bring a brewery here to create a really fine craft beer. I know brewers from all over the country. But, as the legal situation is now constituted, I do not have the power to sell them on the idea. Legal change must come first. And, it must come at the State level.

In general, I am happy to discuss this issue with anyone. However, I need your help here. YOU know that I am an honest and well-meaning businessman." "I certainly do!" echoed Al. "And, that is why, in particular I need YOUR help," Ed continued. "Perhaps you recall, from a previous business I owned locally, that your counterpart at the State level, Bertha Blake, seemed to have a hard time comprehending the creative economic model I had formed to ensure the perpetuity of that business. She didn't understand it, even though it greatly assured such perpetuity far in excess of conventional models she had seen. She got very nasty and assumed that because she hadn't seen such a model that therefore it was not a legal model. Wrong, it was fully legal. But, she didn't want to learn the merits of having separated elements of a portfolio so that my stock market business investment plan (which did great) did not get co-mingled with the conventional part of the



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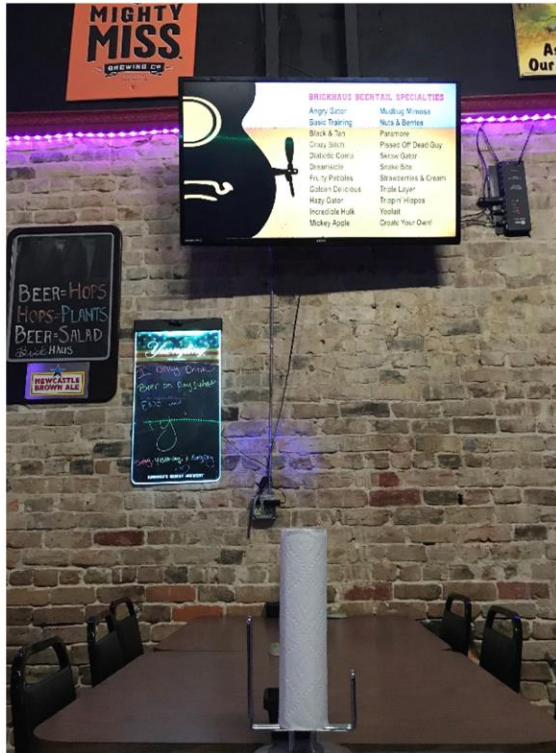
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business. So, what I am once again presenting, but in an entirely different context, is the opportunity to use a creative business strategy to generate large sums of revenue for the State...but we need to have Bertha put her imprimatur on the project and I suspect that only you can do that. Will you please help with that, as well as with getting the laws changed? I'd like to keep a low profile on my history with Bertha." "Yes, Ed," Al said, "I am always happy to help you; you know that." "And," Ed continued, "I am sure that Wyn can handle local urban planning issues on the SWAP matters, freeing you up to work with Bertha on these necessary legal issues." "Hmmm," Al said, "I suppose that makes sense in a certain way, but I have my differences with Wyn, you know." "I am confident I can make it all work; I know you both," Ed said. With that, the two men parted company.

Beer Club, Again

As Beer Club members began arriving once again at the Beer Haus, Ed set about getting the small tasting glasses set for the group, along with a pitcher of water, for rinsing glasses between tastings, and an empty pitcher for tossing disliked brews and rinse water. Soon the group was seated, and Ed had Chris bring out the beer. "Now," said Ed, "let's get down to business. Since we last met, we have made quite a bit of progress in investigating the issues surrounding opportunity that our unique water resource might bring to the downtown.

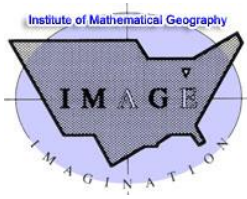
I will begin by saying that Judy met with Al Dixon, our Chief Economic Officer. She already emailed you the content of that meeting so I won't bore you with repeating it here. Later, she sent along preliminary content of the Kudzu Ordinance/SWAPs, as a sort of Appendix. Beyond those two items which you already have, I had a one-on-one meeting with Al, regarding the laws that need changing at the State level. He has agreed to help us in our communication with Bertha, his counterpart at the State. I would prefer to spend my time working on other topics; and, I do not seem to communicate well with her...better to let someone else do that. Wyn will do a great job here on municipal matters in Meridian while Al is working with the State. Now, let's get on with the results of what we talked about the other day when Blaise and Bonnie and Walt and I had the chance opportunity to talk with Al when he was in the Beer Haus after his meeting with Judy."



All set for Beer Club at the Beer Haus.

Report of Blaise

“Originally, I was just worried about what would happen if there were a fire in a tall building and the amount of water, drawn from the distribution network were excessive...that fighting a fire high up, requiring extra pressure, might cause a drop in pressure elsewhere with a subsequent back up of bacterial problems in more remote parts of the network forcing shutdown and decontamination. All a public health hazard as well as an inconvenience to the local economy and loss of income to businesses. I thought one way to deal with this issue might involve redundant connection in the distribution network. I will be consulting with Charles and Judy on that; I gather there is a branch of mathematics, called ‘graph theory’ that deals with such issues.



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Then, I heard some of Bonnie's discussion with AI and decided that perhaps there are a number of concerns that need to be integrated. Perhaps and this point it would be prudent for the entire group to hear a bit from Bonnie."

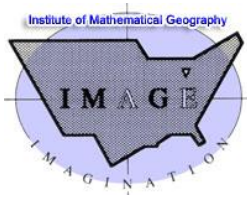
Report of Bonnie

"A lot of what I told AI simply reinforced what Judy had already told him, especially regarding the need for onsite retention of rain water, impervious surface limitation, and so forth, all in the deeper interest of protecting the aquifer and our unique, valuable, natural resource. I also echoed the critical need to control invasive species for similar reasons.

But one other matter I wanted to reinforce was the critical need for security on the water distribution: both from theft of various sorts, to local terrorist activity as from teen agers engaged in 'pranks', to international terrorism seeking to poison an entire community that might become overconfident in their water supply network. I found, to my good fortune, that Judy had already worked on such a project in a large northern city and had direct experience in analysis and implementation in such protections (Arlinghaus and Nystuen, 1988). So, she and I and Charles sat down and talked for a while; then I shared what I had learned from them with Blaise, in terms of thinking about how results from this international study might find use here in Meridian."

Blaise Weighs in Again

"After our conversation, I became convinced of the need for some sort of security for the water distribution network, beyond what is already there. Personally, I thought it reasonable to consider protecting against possible destructive action or theft. I remember a few months ago, when I was out on an ambulance run, being sent to one of our local large parks to pick up a group of teenagers injured in an explosion. I had to drive the vehicle off the road and back into the woods to pick them up. It was beyond me how there was an explosion back there, but of course I was focused on caring for the injured...my job as an emergency first responder. I never did find out exactly what happened. But Judy told me that routine security for access to the water distribution network might be to place access points in out-of-the-way places. She knew of one incident where a bunch of teenagers had gone into a forest preserve, found a pipe opening to the local water distribution network and returned on the Fourth of July to pack it with fireworks and then set them off to create



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a massive chain reaction of explosions that reverberated underground, opening a chasm of fire. Naturally, they were severely injured and so was the water distribution network. The solution to these and related problems was inexpensive and generally effective. Acts such as these are generally executed in a simple-minded manner. Take a wrench and a pair of pliers and unscrew the nut that secures a lid on top of the pipe access. These tools work on a principle of opposing arms to create leverage. The nuts typically used are either square or hexagonal nuts. A wrench or pliers can easily grip the nut and turn it because there are diametrically opposed sides to the nut because it has an even number of sides. The City replaced all nuts with a pentagonal nut (five-sided) rendering the quick and simple use of pliers and wrenches ineffective in loosening the nut. It worked like a charm to prevent this sort of opportunistic terrorism by locals.

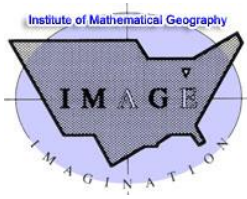
On the international front, more sophisticated and more expensive measures had been undertaken by various governments. In Germany, for example, covered trucks were loaded with bags of fresh water. The trucks circulated throughout Germany on a regular basis as almost a moving shell game with a week's worth of water for the entire population. There seemed no need for such extreme measures here. At least not now, but it is at least good to know about them.

In addition, Bonnie told me about a study that Judy and a colleague had done in using graph theory to create a redundant urban supply of water in a large city (Arlinghaus and Nystuen, 1988).

Redundant linkage could avoid the sort of problem I had originally worried about with a fire in a tall building causing a drop in water pressure with associated public health matters. Strategically placed linkage provided alternate routes when one route became blocked...much as in a rectangular downtown block, if one wants to walk from the northeast corner to the southwest corner, and the route heading west initially becomes blocked, one can simply take the sidewalk around the block the other way, starting by heading south. Again, a simple fix that comes from careful analysis and clear thinking."

Report of Walt

Walt offered an extended discussion about breweries, cleanliness needs, contract brewing as opposed to local brewing, creation of local job opportunities at a variety of levels. There was more



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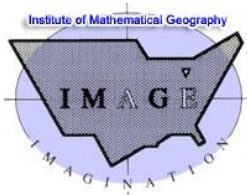
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content in his report than the local group could readily assimilate. They referred him, along with Ed, to talk more to local bankers and law makers.

Report of Wyn

“Prior to our recent City Council meeting, I had the opportunity to talk to Al. He was bragging to me about ‘his’ idea of environmental for developmental SWAPs and how they could generate a great deal of capital for the City coffers. Politics, as usual, I guess. I didn’t bother to correct him because I wanted to hear what he had to say. He appeared to be in a talkative mood. Anyway, he told me that over the past few weeks (since Judy had communicated these ideas to him) he had taken the opportunity to talk to a number of businesses and to encourage them to come here to enjoy the advantage our wonderful water might offer to them. He said he had contacted five different national breweries, soft drink bottling plants, bottled water divisions of major corporations, and more. He became positively glowing as he greedily reveled in describing how much money he would bring to the City and how many jobs all this would create. He never mentioned any part of the SWAP....that is, what would all this do for the environment...where was the win-win situation? So I let him ramble on for a while; I hadn’t known he could talk so much (and certainly not to me).

Eventually, however, I decided to insert some of my two-cents worth into this otherwise one-sided conversation. I started with a simple question and asked him if he had consulted with Ed, the owner of the Beer Haus, or with our local brewers. He said no, but that he appreciated the question and thought it was a good idea and certainly would do so. Then, I asked him how the accounting for this would be handled in terms of budgetary matters and where the influx of capital would appear in the City records...both in terms of initial input and in terms that would permit for independent cross-tabulation of where the funds were at any given point in time. He glared at me, and they smiled and made some sort of superficial comment noting that of course our fine Treasurer would have all the answers and that we didn’t want to let concerns of this sort stand in the way of the larger picture. I played along with him a bit, and then circled back and complimented him on his astuteness in keeping focused on the larger picture, and then in that ‘larger’ context, asked him what had been the reactions of the various businesses when they heard about various site plan requirements involving environmental SWAPs such as kudzu removal. At that he



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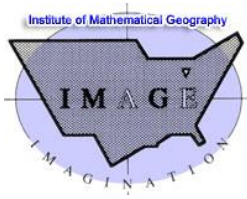
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blanched, commented under his breath that there was no room here for a bunch of environmental Yankee-hippie idealist tree-huggers, and then fell silent. I did not say what I was thinking, but just told him that I was quite interested in hearing more about these ideas, and his view of their implementation, whenever we both had more time. Then, I left. I came away, however, with the very strong view that we need to keep an eye focused on this. I can do that to a large extent, but I would like some behind-the-scenes checking up on it from folks he does not know.

Ed and Walt, I will want to hear from you as to whether Al contacts you as he said he would; he knows you both personally because he goes to the Beer Haus, but I don't think he knows of our association. Charles, I think he knows you, but I know you would be very helpful on the math that is involved here and of course with administrative advice as well as helping to coordinate a sub-team with me. I believe he is more than a bit of a sexist, so Jean and Bonnie, does he know the two of you? Good, I am glad he doesn't; then he won't take you seriously or listen to you; he will simply pop-off trying to impress two women. Jean, please find out what you can about how the accounting is going to be managed. Bonnie, please work with me and with Judy on what sorts of environmental SWAPs and creative urban planning he is attempting (or not attempting) in negotiating with business owners from elsewhere. And, for my part, I will continue to check up on him, particularly in regard to seeing that he doesn't give away the farm...there are limits as to how large a business we want taking water. From my initial conversation, I don't believe he is thinking about that...just thinking about money, more and more of it. When I see that, it causes me to reflect on what one set of politicians often says about business...that 'money is the root of all evil' which then fuels their hatred of business and of successful people. However, the correct phrase is 'love of money is the root of all evil'...a huge difference. Money, by itself, has no human capability of good or evil; it is, rather, what people choose to do with it and how they approach it. The approach that I think I see Al taking does not look too good to me—based in greed or self-aggrandizement perhaps. We are trying to create a fine public/private partnership here as a winning situation all around; I don't think Al is doing that so I will keep monitoring this situation and report back. I look forward to hearing from y'all too!



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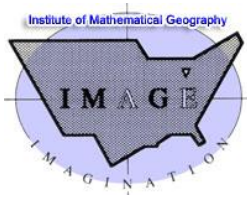
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A Month Later...At the Beer Haus...

“Greetings, to all,” said Judy, “I know it has been a busy time for us this past month, but let’s at least check in and see what we have learned in regard to SWAPs and where we need to go so that Wyn can get to work with City Council to implement language for Planning Staff and legal requirements with the City Attorney.”

“I will start,” said Ed. “Really nothing can proceed until the State changes its laws regarding allowing ABV of greater than 10.3 and changes its views on requiring separation of brewing and serving beer. Thus, I am absolutely delighted that Wyn has been successful in getting a bill in front of the State to make the required changes. It was my pleasure to supply him with some language, written as well as verbal, but he did all the critical legwork and arm-twisting. A real coup. The plan is that the State will pass the legislation during this calendar year. The ball is now in their court, but I think we can expect a favorable bounce back in ours later. So, it is time to work on other angles. In that regard, I would note that Al comes in here at least once a week for one or more of our craft beers. Often, he talks to me. In all those conversations, he has not said a word to me about any of what he told Wyn he would follow up on. Walt, has he followed up with you?” “No,” Walt said, “he has not said a word to me. I have seen him a couple of times and he merely engages me in casual chit-chat involving brewing...I think he is fishing for information from me about brewing but he is not sharing his thought process or agenda at all. Those remain under the table.”

“That’s been my experience, too,” commented Jean. “I got a copy of some correspondence he had had with the Treasurer regarding setting up a separate spreadsheet for accounting for new businesses. (I befriended some of the very nice secretaries, took them food they needed to heat in their little kitchen, and then got a glance at their computers while they were gone). Naturally, I photographed their screens with my smartphone camera, but I spent the precious time I had looking at the syntax underlying the various formulas that had been written in individual cells. I am guessing that the secretaries did not write those formulas but rather were presented, *fait accompli*, with the spreadsheets with formulas already in them. When I was in charge of the Collections Department for a large national bank, that’s the way we did things. Staff was simply to enter data; not to make decisions on its analysis. It’s a good way to do business so I assumed that is what the



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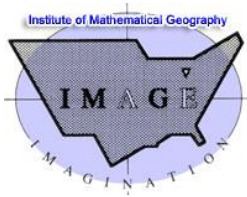
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City was also doing. Most of the formulas appeared to be in order; perhaps not my preference for accounting (sometimes I like using macros to link sheets; those are powerful but can be problematic), but nonetheless, acceptable and certainly fine when only working with a small number of transactions. There was, however, one cell that had a formula in it that looked as if it were for 'intake' but then that was divided in half. There were no entries in the cells; just the formula applied so that when entries were typed the underlying formula would take hold. Strange...."

"Well," commented Bonnie, "my experiences might not have been as productive as yours, but here's what I found. The Planning and Parks Staff at the City are great: friendly, interested, and willing to share. I spent some time talking to the various folks there and sharing my experiences working with City departments in Michigan. We had lunch together various times, and we have a good relationship. I enjoy the time I spend with them. What is of interest to this group, however, is once again the lack of information from them. They had heard about using our favorable water rating in order to attract new businesses, but they had heard nothing of any environmental swaps or any limits to growth. They thought both were good ideas, but had not heard of such from Al. In fact, they seemed to think that Al just wanted to bring in as much business as fast as possible."

"All very interesting; it sounds to me," Charles said, "as if our next steps involve figuring out what is going on behind the scenes at City Hall. Wyn, is there any way you can get your hands on that spreadsheet with the strange formula in it? My sense is that that might be a key to a number of things."

"I will see what I can do," Wyn said. "Recently, I have been focused on working with Bertha Blake at the State in regard to getting this bill on the table for the State to pass so that we can move forward. She is not easy to deal with. I do get along better with her than Ed does, but still, it's not a good relationship. Thank goodness her higher-ups are people I do have good relations with. So, my focus has been on not offending her; she is no rocket-scientist you know...can't understand multi-tasking in the slightest...just a 'good ol' girl' who knows of only one way to do things...'the way we always have'...if you do anything different, she gets angry and uses her long-standing network to try to intimidate you. Very hard to deal with; Ed knows that...creative people have a hard time with her. She doesn't understand them; she has no sense of adventure, no imagination,



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and no sense of humor. So, when smart people do something she doesn't understand, she assumes they are doing something crooked. I'd like to think that that attitude is simply a function of her own lacks; however, I do sometimes wonder if she looks for crooks under every rock because she is a crook. Who knows."

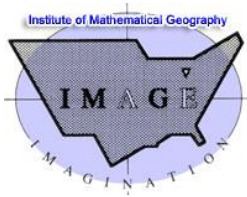
"Wyn," Charles continued, "you are very perceptive. I think those are valuable observations. Perhaps I will try to get to know this woman...put on my nice suit, go to the State Capital, play some bridge with some powerful people I know, and work at getting an 'in' with her. I'll let you know if anything comes of that..."

Bridge Tournament in Jackson, MS

"Hi, Bill," Charles greeted his old friend and former colleague, of nine years, on the Board of Directors of the American Bridge Congress (ABC). "Let's go...off to the Open Pairs...I'm ready for some competition!" Charles was one of the top 500 bridge players in North America and certainly the top player in Mississippi. His good friend Bill was second. The pair rated to do well and they also rated to be able to make all the connections Charles might have wished; his friend Bill had been in real estate development in Mississippi for well over 50 years. Bill knew everyone; he had a charming bedside manner, but he also knew how to get what he, or his friends, wanted.

The pair had a fine game in the afternoon. Bill often wanted to take Charles out for a fine dinner and show off all the interesting places in the Deep South to his northern friend (turned southern). Generally, Charles insisted on going Dutch. This time, however, he let Bill take charge. Then, Charles asked him for a favor.

"Bill, do you know a woman named Bertha Blake? I would like to be able to get to know her; I am involved in some interesting projects in Meridian and I think she might be able to be helpful." "Well, now Charles," Bill replied, "of course I know her, but you know she is a very high maintenance woman...a real mind of her own...and totally controlled by others on many items. Perhaps if you tell me more about what you have in mind, I can suggest a connection that would be easier to deal with. Although, I can tell you that you dressed right to please Miss Bertha...nice suit with pocket hanky...she would like that...good haircut and cute smile...yes, she might be reasonable with you as long as you patronize her nicely. But, it would be no pleasure for you...I don't like to think



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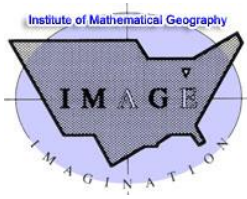
unkindly of anyone, and certainly not of a lady...Miss Bertha is an exception, I think, for most people." "Still, though," Charles said, "I think I'd like to meet her...here's why." And Charles explained to Bill the whole SWAPs plan and the necessary State involvement coming from Bertha's office involving adjustment in liquor laws necessary to implement the SWAPs program.

"Oh, all right," Bill said. "I saw Hy playing bridge over there...he is a terrible player, dumb as a post, but he is one of the guys at the State who does know how to pull Miss Bertha's strings. I'll find him and then let me take the three of us to dinner." Soon Bill returned with a somewhat gaunt, creepy-looking guy in tow. "Charles, this is Dr. Hy Jeckel...his parents had an interesting sense of humor. His first name is really Hyde, but he naturally prefers something else, so we just call him 'Hy' Hy, this is Dr. Charles Earl, but we just call him Dr. Charles, the Yankee Mathematician. He's here in the south now, working on an interesting project in Meridian. I am sure it would interest you and it might be that Miss Bertha would find it interesting too, although of course I am sure she has so many important things on her plate that she would have no time to meet Dr. Charles...." The men shook hands, exchanged pleasantries, talked a bit about the bridge tournament, and left to go to a leisurely dinner.

"Now Charles (may I call you that, Sir)," Hy said, "tell me all about what y'all are doin' over there in Meridian." So, for the next hour or so (and a number of drinks later) Charles explained the SWAPs proposal to Hy. "Why, Charles," Hy announced, "you think like a good southern boy—we love plans that bring money to the state...best to Jackson of course, but anywhere else is good too. How about if I fix you up with Miss Bertha for luncheon tomorrow? Wear that nice suit again...she likes 'her' men to look nice."

Luncheon with Miss Bertha

"Why Hy, who is this handsome man you have fixed me up with for lunch?" Bertha oozed, "I just love your decorative pocket hanky...very attractive...I just want to grab it, and you, if you know what I mean." "Bertha, behave yourself," Hy admonished, "Dr. Charles is a distinguished mathematician who has given a lot of thought to generating money for the City of Meridian. His plan may also be one that can be transplanted to other Mississippi towns, such as Jackson, and even sold on a consulting basis to cities elsewhere in the south and anywhere kudzu grows." "Why how



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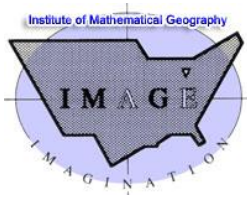
fascinating” Bertha cooed, “you must tell me all about it, Dr. Charles.” And so Charles did explain it all to Bertha. She promised to support him and to expedite the needed law changes through the State Legislature.

All very convenient, Charles thought...the dollar signs in her eyes suggest some agenda I can't quite see yet. Nonetheless, Charles continued to flatter the vain woman and the two parted as apparent, but superficial, best friends. As Charles drove back to Meridian, he thought about his encounter. Hy had seemed reasonable; Bertha on the other hand was all that Ed, Wyn, and even his friend Bill, had warned him about. It was easy to see why Ed and Wyn could not deal with her; they were substantially younger than she was. Her vanity needed an older man to 'flirt' with; these 'boys' simply would not do. And, her own worries about her losses in life as she neared the end of hers would not permit her to see any good in the next generation; so, she always found one reason or another to go out after them...rather than to try to help them (nothing in that for her).

Back in Meridian

“Judy,” Charles commented to his wife, “I think I had an extremely productive time in Jackson. We will see what Hy and Bertha come through with. I think that before I went, the best we could have hoped for was for the powers in the State to consider the needed law changes within the next year or so. Now I hope that that process will accelerate and will produce the needed outcome. I will stay in touch with them and keep 'encouraging' action... But, tomorrow morning I think I will touch base with Al. That's enough for today!”

Al Dixon had his affable Chief Economic Officer face on as he boomed out, “Good Morning, Dr. Charles, delightful, as always, to see you. What can I do for you today?” “Actually,” Charles replied, “I was hoping to be able to work constructively with you on this SWAPs project. No doubt there will be a considerable amount of computing associated with reaching across various City departments. I know you have very capable people here in all departments; however, it has been my experience that sometimes when folks are asked to devote time to developing interactive computing experiences that cut across academic disciplinary boundaries, things can become a bit difficult because people are being asked to work outside of their own particular expertise. When that happens, sometimes frustration sets in and a good project does not get developed as it should



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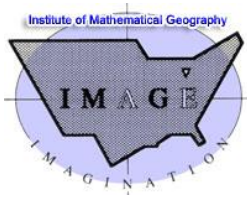
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be because of participant and clerical frustrations. I have to imagine similar situations might arise in government when folks are asked to create interactive computing experiences that cut across governmental departmental boundaries (as opposed to academic disciplinary boundaries). But, you are the expert there...is that correct, AI?" "Oh, yes, yes, absolutely, Dr. Charles...you are so on track!" AI replied. "All right, then, here is my offer to work with you and staff members you wish," Charles said. "I have a great deal of experience with developing these sorts of computing experiences. Not only have I taught others to do so, from design through to implementation, I have also restructured an entire university, cutting across all departments. So, I teach, AND, I do—contrary to the old saying that "those who can, do; those who can't, teach." In that regard, I think my credentials will show that I am one of the leaders nationwide in this particular skill. I would like to share that skill with you, at no cost to you, simply because I care about Meridian. What do you think? Sound good to you?"

"Dr. Charles," AI replied, "that is an amazing offer; of course I enthusiastically accept. Just tell me when you want to begin, next month? Or what?" "How about today, right now?" Charles countered. AI looked a bit taken aback...typical administrator slowness, Charles thought. "In particular, AI, I would like you to issue a statement to all your department heads explaining what is going on and giving me free and open access to your computer files. I can provide you with evidence of security clearance. I want to see how to integrate files across departments to make the integration of this new SWAPs program as easy, seamless, and complete as possible for your regular staff to execute. I will wait here and work on a group email with you; then I want to begin collecting materials today...no time like the present...right, AI?" "Oh, sure, yes, by all means," the bewildered AI replied.

For the next two hours Charles and AI drafted the email to be sent to all department heads. AI transmitted it shortly after lunch and let the recipients know that Charles might be appearing on their doorstep as early as a few minutes after the note was sent. "All right, Dr. Charles, all done. Now, which department would you like to begin with?" AI asked. "Right here, AI" Charles said "you are the heart of the matter....it is your office that will have the master documents that coordinate everything. So, I will start there so that I have a game plan to communicate to the individual



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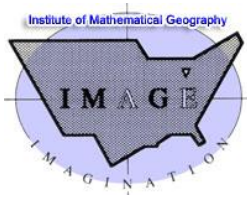
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departments. People are often leery of offsite consultants that come in and roll over them with erudite verbiage; I want to have something concrete to show them where they fit in. Have them participate in taking ownership of the project, right from the outset. Make the chain of command clear, too. And, provide for a transparent process and keep things clearly on the up and up...I'm sure you would agree?" "Of course," Al noted in a distracted manner. "Al, you are my friend and colleague; I am not trying to steam roller you; but there is merit in getting going...right?" Charles said to reinforce his relationship with Al. "Oh, yes, Dr. Charles, I am sorry, just had my mind in a number of different places at once....please, just tell me what you would like."

Over the course of the next hour, Charles met with Al and various of Al's staff including Technology people. During that time, Charles had them set up a designated directory on the City server designed to hold documents. It was secured according to City protocol. Then, Charles got all electronic documents related to the SWAPs program included in that folder. Charles also created a "ReadMe" file to instruct City staff how to name files so that previous versions were not overwritten with newer ones and so that related files carried the same first word (for searching purposes). He also included detail on the use of consistent upper case and lower case schemes, drawing primarily on what he had observed when the City IT person walked him through all file names presently on the server. Then, Charles sat down at the desk and computer that had been allocated to him, within Al's office complex, and spent the rest of the day and into the evening studying the files on the server.

Six Months Later...At Beer Club

"I think we need to do a bit of catching up tonight; looks as if we have some particularly fine beer that Jean and Hal brought in for us to try. It's from New Orleans and some of it is quite high in alcohol...Ed, what are they?" Judy asked her beer-expert son. "They are 14.3 and 15.1; yes, quite high," Ed said.. "Both are aged in bourbon barrels. You know, in Mississippi, at least, they measure the ABV before they age it, so when the beer is aged in a barrel that has held a high alcohol drink, such as bourbon, we assume that the ABV is actually higher than what the official measure is...the beer picks up a bit from the barrel—hence, the typical 'boozy' flavor." "All very interesting...that's why we come to Beer Club, I'm sure," noted Judy. "But, before we get into all



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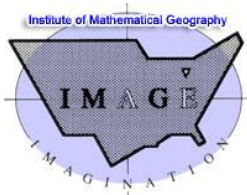
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this fascinating detail about high-end beer and the intricacies of brewing it, let's see where we are with the SWAPs project. If you don't mind I will kick it off and summarize what one subset of us has been doing.

Over the past few months, I have been working with Ed, Bonnie, Sylvie, Blaise, Hal, and Wyn together with appropriate City staff in Planning and Parks to create documents to implement all that we talked about earlier in regard to Environmental SWAPs for Development. Al Dixon is extremely enthusiastic about this project and has recruited at least a dozen potential clients. I am a bit concerned that he is going overboard with it; he clearly sees the money angle, but I am not so sure he embraces the environmental component as readily. So, one of our main focal points has been to get documents created that really nail down the environmental elements. While Al may not care that much about them, there are staff members in Planning and Parks who do and so I think we have a good plan written down now. Wyn seems to think so too, so when we are ready to present to City Council, he should feel as if he has a product he can sell to the others and hopefully have Council pass the SWAPs program into law by a unanimous vote! Of course, he has been an integral part of the team getting the documents into the form most useful to him. Bonnie is our team's expert on Parks Planning; Sylvie is our spa expert and she and Ed can speak as experts on downtown business planning. Blaise and Hal were both terrific in dealing with Emergency Planning issues and associated engineering and related transportation issues. I hope you will all be as pleased with the documents we have produced as our little team is! (Copy of some summarized materials appear in the Appendix here.) Now, let's turn it over to Charles; I think you all know about his trip to Jackson, so let's have him pick up after that," Judy said as she passed the baton to her husband.

"Well," Charles said with enthusiasm, "I have great news...the State just voted, at the end of last week to update their laws to allow the sale of liquor on a basis that is competitive with most of the other US states. We are no longer functioning as if we had only partially emerged from Prohibition. Wyn will be free to move forward with the fine documents that Judy described, whenever he is ready. We are no longer encumbered by antiquated laws." Big smiles and cheers went up around the table...something to really toast!



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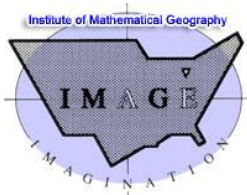
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“So,” Charles continued, “that is the good news. Now there remain some puzzles, or ‘bad news’—well maybe not actually ‘bad’ but a bit different—puzzling. As you know, I have full access to the City files. What Wyn told us he saw in the preliminary spreadsheet, with the input cells divided by 2, was a critical observation, I think. I worked with Ed and Jean and Hal to try to understand what was happening. The name of the spreadsheet was SWAPs2020.xlsx. I took the original one and made a copy for a separate folder. I called the copy SWAPs2020_01.xlsx. In it, the column that tracked the initial money derived from SWAPs clients was divided by 2. A strange item in itself, as Wyn pointed out when he saw it before there were any sets of data entered into the sheet. But, after about three months, I noticed that the file SWAPs2020.xlsx had been overwritten, replacing the earlier one—contrary to my directions. When I opened it, Jean’s quick banker’s eye caught that now the entries that had been divided by 2 in the past were divided by 3. So, there was less money recorded for the City, in the early entries, than there had been in the previous version. There were also six additional entries. Thus, if one added up all that was to come to the City from the first spreadsheet and compared it to the later sum of all the entries in the second spreadsheet, the total value in the second spreadsheet was much larger than the sum in the first spreadsheet even though it was in fact less than it should have been. Again, I copied this second spreadsheet and saved it as SWAPs2020_02.xlsx. So, you can compare them and see what I mean.

Now why would someone do this? I doubted that the staff entering data would do this. They all answered to Al, either directly or indirectly. But why would Al make such adjustments in the underlying cell formulas? Seems odd, and it’s still a piece of the puzzle we are working on. I think we need more insight of some sort before we can draw a reasonable and plausible conclusion.

The Next Morning...

“Charles,” Judy announced, “your phone is ringing...it’s 9:00 am...” Charles reached over and picked up the phone off the night stand; it had been a long night at Beer Club and he was not up at his usual 5:30 am. It’s Ed...”Hello, Hi Ed. What’s up? Oh...OK...terrible, no that’s ridiculous...I will be there within 15 minutes..” “What’s happening?” Judy shrieked. “Well, it appears that my friend from Jackson, Hy, found a dead body on the front lawn of City Hall here. Apparently, Bertha had come down to look over the downtown in regard to our SWAPs project. When she didn’t come



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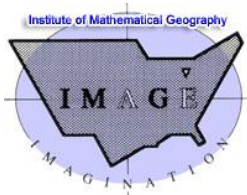
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home last night, the folks in Jackson sent her friend Hy over here to fetch her, figuring she had gotten waylaid, having a good time showing off to the local municipal authorities. Far from it, however. When Hy approached City Hall, he saw her body swinging in the breezes, reminiscent of an old-fashioned 'public hanging'. Naturally, he got the police on it right away. They knew of Ed's previous difficulties with her and so have now picked him up on suspicion of murder. And, I gather that they also asked Wyn to come in to answer a few questions, although I do think he has a greater beef with Al than with Bertha, but who knows how all these things get interpreted and misinterpreted in times of great stress. I will stop by our friendly attorney's office on the way down to the police station and get him to come with me. We do not need a lot of 'fake news' surrounding this...poor Ed has seen enough of that in the past, particularly in conjunction with Bertha's name. We'll get him loose and then work at adding this to our list to figure out, as our top priority.

Charles Analyzes the Situation

"All right, I needed to get Beer Club together again tonight; I will buy each of you a nice pint of a Mississippi brew, Charles announced to the assembled group. "I think," he continued, "that you all know what happened on the lawn of City Hall this morning. The police have no suspect. They questioned Ed and Wyn, but we shook them loose from that by noon. Certainly no issue there. The police need to look somewhere else. I have been working hard at it this afternoon. Here's a possible scenario. See what you think.

- Al Dixon, City of Meridian Chief Economic Officer, sees the possibility of attracting business, without regard for environmental issue, on an unlimited basis and charges kickback fees for preferential treatment. Naturally, these kickbacks go straight into Al's offshore bank account. The amount is half of what the charge is; hence the denominator of two in the first spreadsheet. He puts half of what should have been the 'assignment fee' (read 'kickback for preferential treatment') paid to the City, into his own personal account, leaving half for the City.
- Bertha Blake, State of Mississippi Chief Economic Officer, catches wind of what Al is doing and blackmails him. To shut her up, Al is forced to split the kickbacks with her. Hence the



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denominator is now 3; one-third of the 'assignment fee' goes to the City, one-third to Al, and one-third to Bertha. She came yesterday to pick up her money.

- So that no one finds out, Al, is able, by reporting totals only, to hide what's going on. So, on the first six properties, he recorded half the fee to the City. But when Bertha came along, he was forced to adjust that to one third on each of the first six to the City. Naturally, he could not explain this difference to the Mayor and City Council, so he delayed reporting to them until he had another six, allocating one third to the City. Then, just reported the totals which of course were substantially more for 12 clients than they had been for six clients, no matter whether the assignment fee was divided by two or by three. Wyn supplied the observation, that turned out to be critical, when he observed the odd formula underlying spreadsheet cells. Great job, there.
- Eventually, of course, Al decides not to put up with this and plots to murder her.
- Mike, in his logs, finds that Al used his passenger service to and from City Hall early this morning before the body was discovered; presumably, Al did not want his own vehicle there, to be recognized. This fact is also important in terms of establishing opportunity.

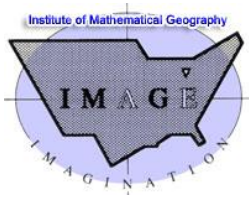
I think the police will be very interested to hear how, in the course of executing their urban planning investigation, the Beer Club stumbled across others who had different ideas of how to use the new ranking for Meridian water. I will, with your approval, move immediately to explain all of this to the Mayor and the Chief of Police; we do not want Al leaving town for a "sudden emergency"!

Finale

The full Beer Club nodded its approval and sent a rousing 'Cheer for Charles' throughout the bar. Then, Charles ordered pitchers of Mississippi's finest brews for the table to enjoy along with giant burgers and chicken wings...a true celebration of appreciation all around!

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Non-Fiction. Appendix: Benefit Swaps—Developmental for Environmental Resource Protection

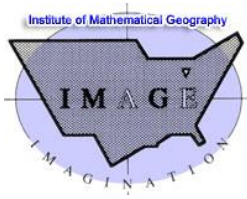
According to local municipal authorities in Meridian, one reason that Meridian boasts this top water resource ranking is because the City draws its drinking water directly from deep wells (at least 700 feet below the surface) in the aquifer. The other cities in this study all draw their drinking water from sources closer to the surface. Surface waters become contaminated by runoff containing PFAs from various sources. The aquifer under Meridian and much of East Central Mississippi apparently does not have great exposure to PFAs, at least not near where the water was tested.

Thus, Meridian needs to protect its unique resource and keep it free from such contaminants if this benefit is to accrue substantial economic and environmental interest over time. Rainwater offers much to aquifer recharge. Thus, it is important for rainwater to infiltrate the soil vertically, directed downward toward the aquifer, rather than directed laterally across surface lands laden with possible contaminants.

There may be a variety of ways to ensure such directed vertical water movement. Clearly, what has happened in the past has worked. But, as new development is encouraged to enter the picture, it needs to do so in a way that will protect Meridian's precious resource and preserve the existing favorable environmental balance.

SWAP CONCEPT

Meridian has a systematic plan review in place for new and revised project development. The idea here is simply to offer to a prospective developer, extra opportunity for development in exchange for extra input on his/her part in regard to



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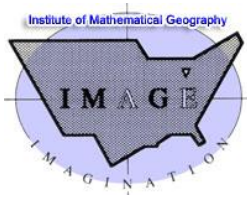
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preservation and enhancement of environmental amenities, focused particularly on the one we have that is unique: water free of PFAs. For example, on any plan that triggers site development review, a business might receive an extra benefit that does not harm the environment, such as accelerated project approval, a tax advantage, permission for increased building height or density, or variances involving setbacks or open space coverage. In exchange, the business offers increased environmental amenities beyond current requirements, that enhance the local environment by implementing such improvements either on the proposed site or offsite on public (or possibly private) lands. We assume that City of Meridian Planning staff will know about zoning opportunities for projects, including PUD (Planned Unit Development) possibilities, as a basic form in which to execute a swap of extra development benefit for extra environmental amenities.

THE ENVIRONMENTAL END OF THE SWAP: KUDZU

Planning Staff already has ways available to implement encouragement of increasing vertical flow of rainfall runoff, through use of various hydrological tools, such as (but not limited to) requiring onsite retention of water, curb and gutter positioning, use of rain gardens or barrels, requiring reduction of impervious surface or increase of pervious surface, and so forth. Thus, we focus on what we see as more out-of-the-conventional environmental amenities that might come from systematic urban development.

Kudzu, often viewed as 'the vine that ate the South' is a well-known invasive plant that kills the plants it drapes over. Any advantage it offers is apparently offset by the plants it kills as it drapes itself over trees, shrubs, and more. So, we assume, it has no net physical advantage. Until recently, folks might have thought of kudzu only as a



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nuisance and looked only at physical advantage. However, scientists at various universities have seen it as far more (Georgia Tech, University of Virginia, Clemson University). It is of particular importance in part because, in addition to its obvious physical problems, it is a carbon emitter rather than, what one might assume, a carbon capturer (as a green plant). The logic is explained by scientists at Clemson University.

“Clemson University scientists are shedding new light on how invasion by exotic plant species affects the ability of soil to store greenhouse gases. The research could have far-reaching implications for how we manage agricultural land and native ecosystems.

In a paper published in the scientific journal *New Phytologist*, plant ecologist Nishanth Tharayil and graduate student Mioko Tamura show that invasive plants can accelerate the greenhouse effect by releasing carbon stored in soil into the atmosphere.

Since soil stores more carbon than both the atmosphere and terrestrial vegetation combined, the repercussions for how we manage agricultural land and ecosystems to facilitate the storage of carbon could be dramatic.

In their study, Tamura and Tharayil examined the impact of encroachment of Japanese knotweed and kudzu, two of North America's most widespread invasive plants, on the soil carbon storage in native ecosystems.

They found that kudzu invasion released carbon that was stored in native soils, while the carbon amassed in soils invaded by knotweed is more prone to oxidation and is subsequently lost to the atmosphere.

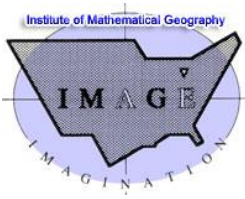
The key seems to be how plant litter chemistry regulates the soil biological activity that facilitates the buildup, composition and stability of carbon-trapping organic matter in soil.

This layer of decomposing knotweed will eventually form soil organic matter in invaded ecosystems.

‘Our findings highlight the capacity of invasive plants to effect climate change by destabilizing the carbon pool in soil and shows that invasive plants can have profound influence on our understanding to manage land in a way that mitigates carbon emissions,’ Tharayil said.

Clemson University, July1,2014, <https://phys.org/news/2014-07-kudzu-soil-carbon-global.html>

So, how much kudzu is there in the US? The estimated US load of kudzu is 7.4 million acres. Those 7.4 million acres emit about 4.8 metric tons of carbon. That is roughly



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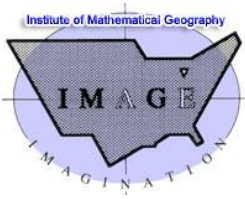
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equivalent to the amount of carbon emitted by consuming 540 million gallons of gasoline or burning 5.1 billion pounds of coal. At a national level, that translates to being equivalent to the annual carbon footprint for a city of one million people (<https://arstechnica.com/science/2014/07/invasive-kudzu-drives-carbon-out-of-the-soil-into-the-atmosphere/>). Kudzu clearly adds an important negative element to the annual urban carbon footprint. When removed, therefore, it obviously has the potential to reduce the carbon footprint, as well as any other physical and related GHG issues.

Thus, we focus on creating an environmental swap involving kudzu removal for increased development benefit—that is, we adopt a simple underlying fundamental philosophy.

IN A REGION ALREADY BOASTING CONSISTENTLY GOOD AIR QUALITY, WHATEVER CARBON YOU TAKE OUT THROUGH KUDZU REMOVAL, YOU CAN PUT BACK THROUGH LEGAL COMMERCIAL/INDUSTRIAL ACTIVITY. THE EXISTING CARBON FOOTPRINT IS NOT INCREASED (MAYBE EVEN REDUCED A BIT) ALTHOUGH THE REGIONAL COMMERCIAL/INDUSTRIAL CAPABILITY IS INCREASED.

So, subtract the carbon that kudzu creates in Lauderdale County, and allow businesses to put some back, given that the air quality is already reasonable with the present kudzu load. Trade kudzu for business, jobs, and things people want while giving the developer some sort of extra benefit or tax break related to their kudzu removal rate, perhaps as some sort of renewable energy certificate.



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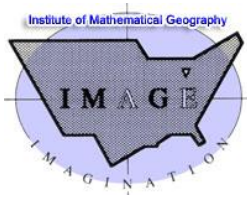
IMPLEMENTING KUDZU REMOVAL: PLANNING APPROACHES

Various approaches to encourage kudzu management in any new or improved project that requires meeting development regulations, are no doubt possible. We suggest two, below, that might be implemented separately, or better yet, together.

- Start with local and state ordinances that deal with invasive species.
- Approach 1
 - Require that invasive species need to be permanently removed as part of any building permit issued.
 - Add to environmental impact statements and development regulations that kudzu removal is one way to mitigate any negative environmental impact a proposed project poses.
- Approach 2: numerical values based on information from Moulton, Robert H. 1919, Kudzu the Latest Forage Plant. *Scientific American Supplement*.
 - Require permanent removal of 5 tons (per acre, per year) of kudzu on the property, or within 1 mile on public property (Amtrak corridor, for example), and maintain it over a period of 10 years.
 - Implement the requirement as a deed restriction that runs with the land and is imposed on the owner in exchange for increasing height or density, or other benefits, in project approval process.

ENVIRONMENTAL IMPACT ISSUES: CITY INPUT

As developers are aiding the municipality by providing kudzu removal as part of a balanced program to help ensure a favorable urban environmental balance, the City, might also want to continue to assure, in terms of long-range planning, that the



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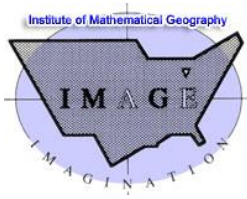
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subterranean and other networks associated with water and waste transport remain in excellent condition. When the opportunity to examine the existing systems arises, as for example in road repaving, the City might take advantage of that opportunity to repair and update (and add to) existing water distribution networks and sewage removal networks. Spilled sewage from broken pipes would not enhance aquifer recharge.

There might well be other hydrological and environmental strategies for sustaining Meridian's prize resource. Combinations of those above as well as the introduction of various others would offer a fine public/private partnership opportunity for regional advancement and consequent economic improvement of local residents. Collaboration of City Departments, in constructive cooperation with Real Estate Developers, should identify opportunity for individual businesses, where the focus is on the long-range preservation of Meridian's aquifer through careful environmental management—an advantage to both the Developer and to the City.

EXAMPLES

1. One style of business that might be a target to bring to Meridian is a craft brewery. Target, for example, one of the nation's leading craft breweries and encourage them to come to Meridian to create a high-end product using our fine water. They can charge a great deal for this product, produced in a small facility in limited quantity, when they advertise that it is made with the 'finest water in America' or some such. Our proximity to good rail, interstate, and air transport would also be a selling point, as would our low property acquisition prices. Before such an approach could be



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viable, the State would need to bring its laws for handling alcoholic beverages into contemporary mode in order to compete with other states for such business. That process appears to be in the works.

2. Kudzu Opportunity Zones.

- a. One target for offsite kudzu removal would be the Amtrak corridor. Initial discussions with Amtrak suggest that there might be interest in that direction.
- b. Private parcels, often in blighted areas, might be identified as potential redevelopment sites, involving funded projects, if they exhibit long-term existing massive vegetative blight from invasive species such as kudzu.

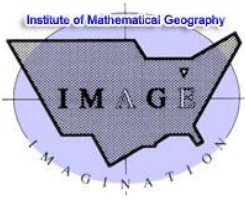
3. Interesting possible spin-offs.

- a. Compost. One benefit of removed kudzu might be a compost program. Kudzu can be composted and kept from regrowing. There is interesting work (Marin Carbon Project) where compost not only improves the soil but sequesters additional carbon - a double benefit.

<https://www.marincarbonproject.org/> King county Washington requires all development to bring the organic content for the development area soil up to a higher standard. This can help drive the market for compostable materials.

<https://kingcounty.gov/~media/depts/dnrp/solid-waste/green-building/documents/Post-Construction-Soil-Standard.ashx?la=en>

- b. Food. There is a current effort to work creatively with a Chapter of Les Dames d'Escoffier, a high-end haute cuisine association, to find linkages of mutual interest in seeing kudzu as a food source. Recent publication (2020) describing this interest: <http://www.ldei.org/uploads/archives/96.pdf>



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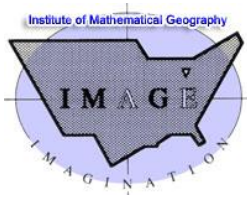
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- c. Craft art possibly in association with the emerging art programs throughout the City.
4. Indirect possible extra benefits, resulting from incentives to attract new business to the area, employing a few experts from elsewhere as well as a number of local workers at all levels of expertise.
- a. Increased job opportunities coming from modest population increase
 - i. For real estate managers
 - ii. For medical professionals
 - iii. For GIS and other mapping experts in association with aerial monitoring, assessment, analysis, and action.
 - iv. Opportunity for Meridian to serve as a consultant to other municipalities in invasive species removal coupled with business opportunity increase.
 - b. Reductions
 - i. Taxpayer burden to remove kudzu from public lands
 - ii. Unemployment burden

REFERENCES

Arlinghaus, S. L., Arlinghaus, W. E., and Lindemann, W. "Kudzu Cascades: Bonus Uses Lead to Economic Opportunity." *Solstice: An Electronic Journal of Geography and Mathematics*, Volume XXX, Number 2, December 2018. Institute of Mathematical Geography: <http://www.imagenet.org/> (scroll down).

Arlinghaus, S. L.; Arlinghaus, W. E.; and Lindemann, W. "Eating the 'Vine that Ate the South,' Turnabout Is Fair Play." *Les Dames d'Escoffier International, Quarterly*, Spring 2020, p. 28 in the 'Green Tables' section. <http://www.ldei.org/uploads/archives/96.pdf>



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Project My Heart / Your Heart[^]: Update on the Mississippi Connection

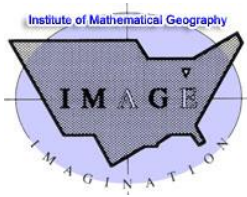
Notes of William E. Arlinghaus* communicated to the Editor.

During the period in the Spring of 2020 when folks in Mississippi could not legally gather in groups (due to shelter-in-place requirements from the Governor in association with managing the 2019 Coronavirus global outbreak), the nature of funerals changed. For many, the funeral is a service for the living, gathered around the casket of a loved one. Mississippi has the lowest cremation rate in the nation. However, as the disease caused by the virus spiked, so too (sadly) did the number of deaths, as did the number of cremations (over and above from the mere increase in deaths). There was no need to have the loved one buried in a casket because there was no permitted formal traditional graveside ceremony or funeral home visitation. Hence, there was greater need for pacemaker removal than usual, given that pacemakers must be removed prior to crematorium use, and therefore greater than normal used pacemaker availability.

During the late spring and later, extra effort was therefore taken to encourage funeral home directors in Mississippi to send their increased supply of pacemakers to [Project My Heart / Your Heart](#) for pacemaker reuse / recycling in individuals at need around the world.

[^]Project My Heart / Your Heart is an international project, housed at The University of Michigan Frankel Cardiovascular Center, co-directed by Dr. Kim Eagle, and MH/YH currently directed by Dr. Thomas Crawford. The link to that website, above, offers many details of administrative nature, legal forms associated with pacemaker submission, and links to publications.

*Mr. Arlinghaus is a licensed crematorium operator (among other things).



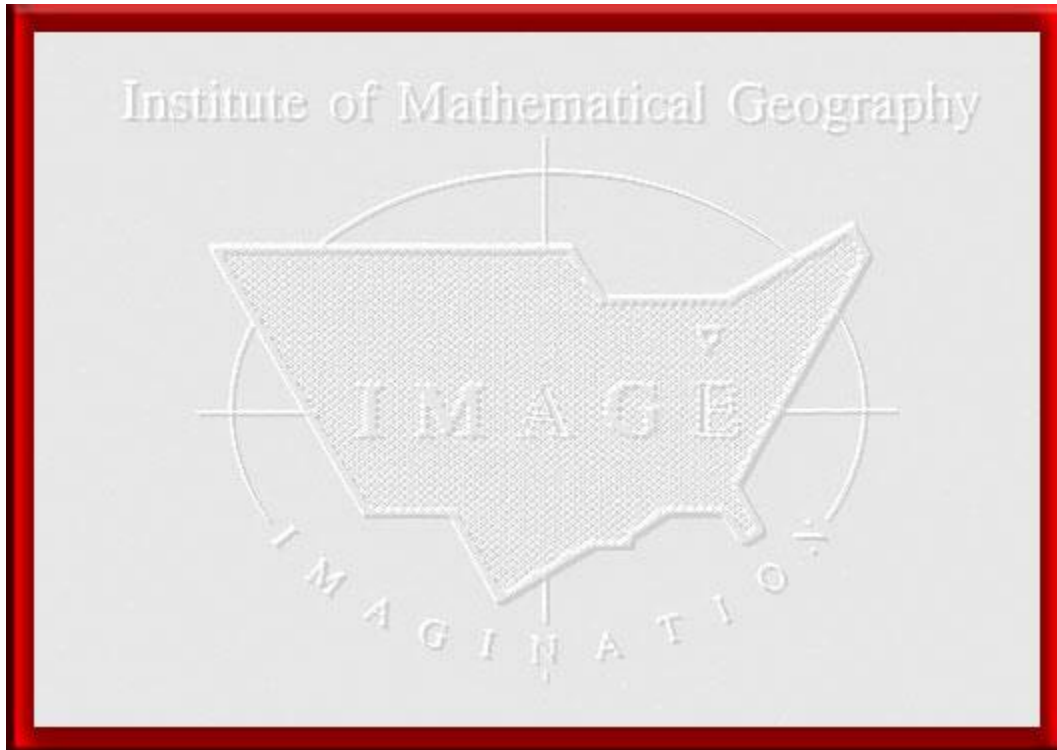
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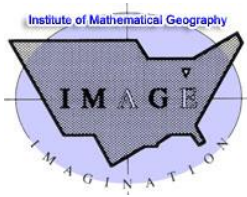
Endmatter



Original logo designed by Sandra L. Arlinghaus and stylized and redrafted by Allen K. Philbrick.

AWARDS AND SELECTED COMMENTS

- *Solstice* page translated into Belorussian, April, 2016; many thanks to Valerie Bastiaan.
- *Solstice* cover materials translated into Ukrainian, August 25, 2011; many thanks to Galina Miklosic.
- *Solstice* was a Pirelli INTERNETional Award Semi-Finalist, 2001 (top 80 out of over 1000 entries worldwide)
- One article in *Solstice* was a Pirelli INTERNETional Award Semi-Finalist, 2003 (Spatial Synthesis Sampler).
- *American Mathematical Monthly*, September 1992, in Telegraphic Reviews section notes *Solstice* as "one of the world's first electronic journals using TeX." L. A. Steen.
- [Science News](#), 25 January, 1992. Article about *Solstice*.
- [Science](#), AAAS, 29 November, 1991. Article about *Solstice*.



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LISTINGS IN DIRECTORIES AND DATABASES

- IMaGe is listed as a "Collection" in the persistent online archive, [DeepBlue](#), of The University of Michigan library. It is listed under "Mathematical Geography" on the Collections link.
- *Solstice* has been listed in the Directory of Open Access Journals (for its first 28 years) maintained by the University of Lund.
- *Solstice* is listed on the journals section of the website of the American Mathematical Society, <http://www.ams.org/>
- *Solstice* has been listed in the EBSCO database.
- IMaGe has been listed on the website of the Numerical Cartography Lab of The Ohio State University, with thanks to Harold Moellering.
- *Solstice* is listed in Geoscience e-Journals, with thanks to Bruno Granier, as in the table below:

Geoscience e-Journals			
Previous	Random	Next	List



Sandra L. Arlinghaus, celebrating 30 full years of archived *Solstice* publication in June, 2020.

Moving into a new decade with this issue...