

Engineers' News

May 2016

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[www.FortWayneEngineersClub.org](http://www.FortWayneEngineersClub.org)



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## May Tour



[TekVenture](http://www.tekventure.org)

[1800 Broadway, Fort Wayne, IN 46802](http://www.tekventure.org)

Thursday, May 26th at 6:30 PM

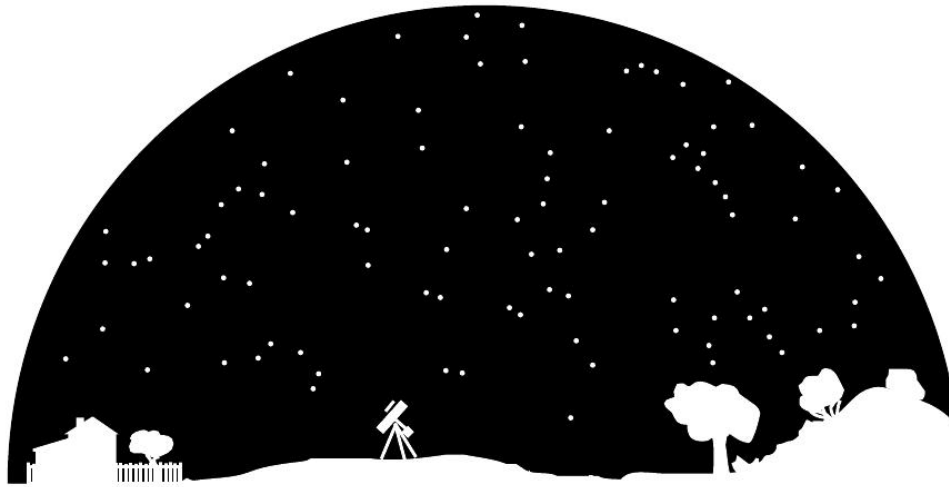
FWEC Treasurer Ryan Stark has arranged a tour of TekVenture. FWEC members are welcome to stop by Mad Anthony Brewery (a previous tour host) for dinner and drinks prior to the tour.

The Mission of TekVenture is to provide an environment offering space, tools, materials, and mentors where the community can realize their creative potential, satisfy their need to make things, talk shop with other makers and engage with emerging technologies and the artisans and industries that use them. Formerly located in a trailer across from the library up until 2014, they are now in the old Allen County Sweeper Shop. The Vision of the TekVenture sees a member-driven, regionally-centered, neighborhood-friendly, non-profit organization and facility interconnecting imagination, technology and community, by providing members access to tools and equipment they cannot afford to own, offering informal education to the public through technical workshops, and providing design,

technical and prototyping services to artists, inventors, educators and entrepreneurs. TekVenture features digitally-controlled rapid prototyping and "personal fabrication" tools including a CNC router and milling machines, 3D printers, metal lathe small injection molder, vacuum forming prototyper, welders, foundry and forges, electronics and robotics shops, wood shop, sewing center, vehicle bay, assembly areas and other tools for making things.

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## June Star Party



[Fort Wayne Astronomical Society \(FWAS\)](#)

[Jefferson Township Park, 1702 S Webster Road, New Haven, IN 46774](#)

Thursday June 2nd, 2016; Sunset at 9:07 PM EDT

[Weather Permitting](#), Back Up Date: Saturday June 4th, 2016

Members of the Fort Wayne Astronomical Society (FWAS) host the FWEC at a Star Party. FWAS guides will assist with viewing through the [16" Richard Johnson telescope](#). Assistance with individual telescopes can also be provided by FWAS members.

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## Volunteers Needed - FY17 FWEC Open Council Positions

The FWEC will begin FY17 in September. We currently have open council positions and need volunteers to help our club to continue to grow and interface with the community.

Board members are expected to attend board meetings, generally held on the first Tuesday of the month, and assist with club duties.

Available positions for FY17:

- Treasurer trainee
  - Train with existing Treasurer Ryan Stark with the intention of becoming Treasurer in FY18

Full duties can be found in the [FWEC Constitution](#). Please contact [info@fortwayneengineersclub.org](mailto:info@fortwayneengineersclub.org) with questions or interest.



*Fluid Power, Safety and Automation Specialists*

Jake Dinius Sales Engineer (260) 797-9819 Cell  
[jdinius@sidenereng.com](mailto:jdinius@sidenereng.com) (260) 423-2595 Office



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## FWEC Membership

The FWEC exists through funding of its membership. Please forward your copy of the Engineers' News to prospective members and encourage their attendance at tours. Remember, the FWEC is the best deal in town, annual membership is \$10. We offer free monthly tours September through May. Please be sure to recommend FWEC membership to your colleagues and friends.

## **FWEC Board Meetings**

Fort Wayne Engineers' Club board meetings are open to all FWEC members. The next FWEC board meeting will be Tuesday August 30th at 7:00 PM. Board meetings are held on the [Indiana Tech campus in the Academic Center](#) in room ACC-201.

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### **2015-2016 Membership Year FWEC Board**

President: Rod Vargo

Vice President: Dave Schaller

Treasurer: Ryan Stark

Secretary: Elizabeth Garr

1st Year Board Members: Marna Renteria & Ellsworth Smith

2nd Year Board Members: Mike Magsam & Jack Phlipot

3rd Year Board Members: John Magsam & Rob Cisz

Northeast Indiana DiscoverE Committee Chair: Jake Dinius

Resident Agent: Ryan Stark

Board positions are crucial to the planning of tours and events for the FWEC. Please consult the [FWEC constitution](#) or contact us at [info@fortwayneengineersclub.org](mailto:info@fortwayneengineersclub.org) for information on specific duties on board positions.

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### **Advertise in the Engineers' News**

The FWEC provides advertising space within the Engineers' News. Advertisements are \$10 per issue and limited to ½ page of content. For submissions please contact [info@fortwayneengineersclub.org](mailto:info@fortwayneengineersclub.org).

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### **April Tour History - FW City Utilities Tunnel Works**



FWEC President Rod Vargo provides our March tour history. (Rod Vargo is a member of Utilities Advisory Group, formerly Sewer Advisory Group.)

Presentation on Deep Tunnel Project, City Utilities.

Thirty-nine members and guests attended a presentation by Senior Program Manager T.J. Short, P.E., on a tunnel planned to intercept combined sewer water which currently overflows into the Saint Mary's and Maumee Rivers. This project ultimately arose from prolonged legal affairs involving EPA. (City Utilities made exceptional use of local volunteers for field work, design ideas, and politicking.)

Many areas of Fort Wayne have viable sewer systems which combine both stormwater and sewage together in the same pipes. The original designs emptied into waterways, but were later plumbed near the rivers into larger pipes ("interceptors") leading to the sewage treatment plant initially built in the 1970's. The interceptors were large (up to 11' I.D.) but still designed to overflow during as little as one-half inch of rain per day. By the 1990's, public health problems led to greater restrictions on overflows.

New sewers for only stormwater were retrofitted where possible. Despite years of trying, new stormwater and/or "sanitary" (fully closed septic) sewers could not be readily installed into most places dating to before World War II. (Reasons included mature urban clutter and substandard building foundations. EPA favored bulldozing some popular neighborhoods. Local mini-treatment plants and pumped "force mains" were installed where plausible economically or politically.)

Plans also had to be shelved for a "big dig" surface trenching through downtown to the sewage treatment plant (in large part because too much underground infrastructure was undocumented.) Ultimately, the most expensive single project in City history became by far the most cost-effective approach: a tunnel deep in bedrock beneath the overflows and

also very isolated from existing property/infrastructure.

The tunnel will slope downward at 0.15% from Indian Village Park or the Foster Park Golf Course for about 5 miles towards the west end of Dwenger Avenue, increasing slightly in slope there to provide some scouring action against debris and sludge. Plans are to trench a relief sewer across Foster Park towards the deep bore tunnel, but public concern over the trenching may induce spending on a longer deep bore. Either solution would take flow from an existing overloaded, therefore over-pressurized, pipe.

The treatment plant on Dwenger Avenue has been steadily upgraded and will soon have a sustained capacity of 100 million gallons per day, but 200 million gallons can be stored in existing upgraded ponds nearby and the tunnel itself will facilitate another 30-40 million if needed (partly by scouring sludge currently in the interceptors). During major storm events, the higher elevation of the Foster or Indian Village Parks will provide substantial energy-saving flow into the ponds, while also acting as a surge damper against powerful forces including potential geysers. A very high capacity pump at the low point in the tunnel will keep it empty as often as possible, probably also prevent sludge accumulation. A large pump plant recently built at the storage ponds will manage surface distribution.

Tunnel construction will start at the low point near Dwenger Avenue and work upslope. Most work will probably be done with a continuous boring machine, although a few contractors "still do it the old fashioned way." The machines are custom made or refurbished in various diameters but are about 215' long and use rotary cutting heads. Double-pass machines bore the tunnel and then back out while grouting a cement-like liner ("wall") about 1 foot thick. Single-pass machines bore, then pause to install a ring of pre-cast stressed concrete panels (made aboveground) behind it. Single-pass machines cannot back up into the smaller lined bore and usually remain underground at the end of the project. Exceptions include where a tunnel ends up shallow enough to justify a wide vertical shaft or where a tunnel ends in a pump room or existing old quarry, potentially utilized for water storage. (Minerals in groundwater here are such that leaving the machine would be irrelevant.)

Single-pass is used where massive water intrusion requires immediately lining the bore. Double-pass relies on less porous rock and/or grouting porous or fractured rock before boring. Grouting can be done through the head or through probes from the surface.

Navigation is managed by aligning with a laser built into the boring machine or by more traditional laser-surveying methods. Tolerances are centimeters across entire projects. The machines need a 4-5 megawatt power supply from the surface which includes debris removal to the surface. Debris is usually moved by horizontal and vertical conveyor

systems, but conventional mine carts and elevators are an option. As much as another 4 MW can be needed for "dewatering" pumps against groundwater intrusion.

This bore will have a diameter of 18 feet, leaving a lined tunnel of about 16 feet. Size was decided from the worst five-year storm data on record. Again, the tunnel is intended primarily to convey wet-weather overflows, not store them. Existing interceptors near the surface will continue as day-to-day sewers to the treatment plant.

Research for the tunnel included 28 soil cores to depths of 55-90 feet and 55 hard rock borings. Sampling can be vertical or inclined. The number and extent of these somewhat random probes are determined by a national "standard of care", which basically shields professionals from too much liability. For instance, a boring machine for Columbus, OH, was delayed two years after encountering an undetected underground stream, but the initial engineering research had been done properly.

Research results closely resemble the view at Hanson Quarry, about 3 miles southwest of Foster Park. An average 60 feet of overburden sits atop an average 10 feet of Traverse Limestone, then circa 40 feet of Detroit River Dolomite, and 60-130 feet of Wabash Dolomite. Widely separated long-distance fractures run at the usual (for limestone) 88-degree angles to each other and roughly 25 degrees left-hand from cardinal compass lines.

The Wabash layer is thick enough to provide a single rock strata to tunnel in despite undulations of the strata and the 0.15% incline needed in the tunnel for drainage. The floor of the quarry is in a 130-foot layer of Louisville Limestone, but the extra distance below ground level would add substantial expense.

Unfortunately, the Wabash Limestone is extremely erratic and often visibly porous remains of reefs which allow groundwater flows horizontally and vertically. A single pass boring may be needed, would be slow and expensive. Aquifer permeability and pumping tests will soon begin in 46 wells. (Projected bore elevation averages roughly 40' below the surface of Lake Erie.)

The physical excavation would start near Dwenger Avenue by digging a vertical shaft and horizontal niche for assembling a boring machine. Its diameter would be about 8 feet, requiring directional drilling-dynamiting mining methods. Debris from boring will be removed through this shaft. Additional drop shafts for the sewer overflows can be as narrow as 3 feet and not necessarily require explosives. Drops would also act as standpipes for pressure equalization and surge control.

Many residents fear explosives will exacerbate problems with inadequate foundations under buildings. The total number of shafts has been reduced, to nine at this time, by finding ways to connect overflows closer to the surface. This also reduces the number of systems required to separate debris from the water before descending the shafts.

The limestone debris cannot be sold because the project would be regulated as a mine. City Utilities will probably stockpile it for internal uses.

Questions included impact on aquifer levels or river flood levels. The capacity of the tunnel, ponds, and plant are irrelevant in comparison (similar to concerns regarding flooding and the Hosey Dam). Some favor lowered groundwater levels downtown, but would require distinctly different projects.

Inspections of existing bore tunnels were conducted at least every ten years at costs approaching \$1.5 million, partly due to worker safety concerns. Results indicated these deep systems did not need the inspections and should last well beyond their 100-year design life without significant intervention. Robotics may soon make viewing easy and inexpensive.

This presentation was arranged long ago but became a time of severe workload for TJ Short. We greatly enjoyed and appreciated his presentation, time, and detail.

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## Fort Wayne Coder Dojo



The [Fort Wayne Coder Dojo](#) will meet on Saturday May 21st. The Fort Wayne CoderDojo meets at [Indiana Tech's Zollner Engineering Center \(Building 10 on the campus map\)](#) in Room Z103, the Software Engineering Lab.



The [Fort Wayne Coder Dojo](#) is an evolving club comprised of +/- 12 to 16 year old kids who share an interest in exploring, making and enjoying technology.

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## Fort Wayne Inventors Club



The [Fort Wayne Inventors Club](#) will have its next meeting on Thursday May 12th at 7:00 PM on the [Indiana Tech Campus Center for Creative Collaboration \(C3\)](#).

During meetings FWIC members discuss our experiences—the successes, the failures, the aha's, and the oh-no's. We also bring in speakers to share what inventors need to know. The club is particularly useful as a venue to give inventors time to showcase their work and receive feedback about it from their peer inventors. We also point inventors to resources they need to be more effective and help them meet people to collaborate with on projects.

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## Fort Wayne Astronomical Society



Fort Wayne Astronomical Society, Inc.

P.O. BOX 11093 • FORT WAYNE, IN 46855 • USA 1959

FortWayneAstronomicalSociety.com

The [Fort Wayne Astronomical Society](#) will have their next general meeting on Tuesday May 17th at 7:30 pm at the [University of Saint Francis Schouweiler Planetarium](#).

**Getting the Most Out of Your Observing** By Mark Anderson

Mark Anderson is the Society's premier visual observer. Completing the Messier catalogue multiple times, Mark has or is near completion of the Herschel 400, a goal worth bragging about. He will teach the basics and detail of observing and recording very faint objects and confirmations using hard copy star charts and reference.

"The heights of great men (observers) reached and kept, were not obtained by sudden flight. But they, while their companions slept, were toiling upward in the night" - Henry Wadsworth Longfellow

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## Northeast Indiana Chapter Project Management Institute



The Northeast Indiana Chapter of the Project Management Institute is hosting a [Professional Development Day](#) on June 16th and 17th.

The Speaker line-up for the 2016 PDD just keeps getting more amazing! It is a virtual "Who's Who" from Fort Wayne and Indiana plus undisputed PMI and industry heavy-weight champions.

The Keynote Speakers list includes:

- Ron Double, Chief Information Officer, Parkview Health
- Mark Pierce, MD, Chief Medical Informatics Officer, Parkview Health
- Karl Bandemer, Fort Wayne's Deputy Mayor
- Robert Paglia, Chief Administrative Officer, Indiana State Office of Technology
- Dr. Cigdem Z. Gurgur, IPFW, Director of MBA Program & Center of Excellence in Business Analytics

The Industry Experts list includes:

- Andy Crowe, PMI Legend, Best Selling Author and CEO, Velociteach, Inc.
- Erick Burton, CSP, Leadership Guru and Founder, Erick Burton Leadership Institute (EBLI)
- John Stenbeck, Amazon #1 Best Selling Author and President, GR8PM, Inc.
- Rick Morris, Host of The Work/Life Balance show, Voice America Business Network talk radio and Founder of R2 Consulting

- Mr. O'Brochta, President, Zozer Inc., and retired Senior Project Manager at the Central Intelligence Agency

What does all of that mean to you?

1. This is an unbelievable chance to make **powerful network connections** and also meet many of Ft. Wayne's top hiring managers.
2. A chance to collect up to **18 incredible PDUs**, and do it **quickly and affordably!**

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## TekVenture



### Spring Into Making Workshops

TekVenture is located at [1800 Broadway, Fort Wayne, IN 46802](#). Workshops are for TekVenture members and non-members; 20% discount for members. Individual, family, and associate memberships are available; people 12 yrs and up. Members access Tuesday through Friday Noon to 8:00 PM and Saturday 9:00 AM to 4:00 PM .

TekVenture workshops open at 9:00 AM with noted exceptions. All day workshops are specified. All workshops\* require advanced registration via [Eventbrite](#) - register now or call (260) 432-1095. \*Register for ARCH\*TEK workshops directly thru [archfw.org/events](#).

Workshops take place at TekVenture 1800 Broadway except Flame Working Sat. May 21. Participants are urged to attend by 9:00 to catch initial instructions.

All workshops cost \$35 unless otherwise specified. Members receive 20% discount. Kit of materials extra cost where specified.

4-MAKING TICKET: Pick any 4 Saturdays to attend workshops of your choice!\* \$100.  
\*First Come first served, advanced registration for this offer required by calling (260) 432-1095. Each Saturday = \$25

### **Week of May 8 -14**

### **Monday May 9 evening 6 - 9 PM**

TekGarage: Motorcycle Maintenance for Women

Similar to Seasonal Motorcycle Maintenance workshop offered on Sunday May 1st above, but this workshop is exclusively for women motorcycle owners and riders. Bring your motorcycle to TekVenture and learn how to perform basic seasonal maintenance to keep your bike safe and reliable for all seasons . Professional motorcycle mechanic for 25 years, Chris Law, will cover many topics of interest to women riders.

### **Sat. May 14**

FREE GARDEN TOOLS TUNE UP: 2 PM

It's time to sharpen your hoes, spades, planters and dibbles. Don't know what a dibble is? Find out at this workshop. Bring in your tools and Chris Knipstein and the folks from Food Not Lawns will help you fix up your tools, ready for serious gardening.

CoSponsor: FOOD NOT LAWNS

Machineworx: Milling Your Own "Two Slider"      Cost: \$60

This workshop will teach you how to use and maintain a milling machine, cutting tools, indicators and other measuring devices while creating a small hand cranked machine that converts rotary motion into reciprocal motion. No previous machining experience is required.

All day workshop with lunch break.      Kit cost: \$10

Woodworx: ARCH\*TEK Restoration Woodworx: Windows

NOTE: This is not a free workshop; \$10 Arch Members, \$16 TekVenture Members, \$20 for non-members.

Windows: The class will focus on repair to double-hung and fixed windows. Traditional wood sash can be repaired by replacing just the damaged elements. This may be simply removing and replacing glass, or might involve replacing damaged wooden elements.

Cords for sash weights are replaceable. Weatherizing will also be discussed.

\*Register for ARCH\*TEK workshops directly thru [archfw.org/events](http://archfw.org/events).

'BOTZ & VOLTZ: Electronic Archeology:

Deconstructing Computers and other electronic devices for Fun, Knowledge and Profit!

Novice makers are demystified about the fundamental components of the common desktop computer while simultaneously increasing their comfort in replacing internal components. Also learn methods of maximizing profits in recycling circuit boards and components. Bring your old computer(s), printers, VCR's or other dead digital devices!

## **Week of May 15 - 21**

### **Thursday May 19 evening 6 - 9 PM**

RPC: Make a Custom Tool Holder or Apron.

For the male or female who has never learned how to use a sewing machine, now's your chance to learn from sewing machine teacher, Betsy Gemmer and costumer, Tonia Brown. Bring old jeans or your favorite fabric. Fabric available for those who are threadbare.

### **Sat. May 21**

TekVenture has a booth @ Farmers Market, Parkview Field 9 AM - 1 PM. Sign up for Summer Workshops!

RPC: Draw Your Invention: Get started with SketchUp®

SketchUp® is one of the easiest CAD (Computer Aided Design) programs available free to aspiring designers. Engineer Peter Bolakowski helps you find your way around the program to draw your model or ideas. Workshop includes tour of the drawing, scaling and maneuvering tools, creating and saving files, accessing on-line files and generating G-code for 3D printing, routing and machining among other topics.

Machineworx: Building the Air Rocket Launcher

Gain basic assembly and machining skills while building a manually-operated pneumatic rocket launcher using PVC piping that will launch a paper rocket. A fun family project. Rocket builders will use the drill press, lathe and hand tools. Kit cost: \$10

Woodworx: Light Up Your Life: Make An Art Lamp

Woodmeister Leon Kowalenko shows you how to use the wood lathe and/or bandsaw to make a working lamp from wood (and other parts). Kit cost for electric parts or bring your own. Kit cost: \$12

Botz & Voltz: Electricity: Plug Into This Invisible Force

Electricity flows: how is it monitored, how is it effected by loads, how is mechanical motion turned into electricity, how is electricity turned into mechanical motion? Explore circuit definition, effects of parallel loads, effects of parallel sources, effects of series loads and sources, Ohm's Law, the Power Equation, the Energy Equation, the importance of wire size, dangerous voltages, flavors of electricity: DC, AC, 120V 220V 3 Phase. Take away a digital multi-meter, battery stick and light bulbs. Kit: \$6.

HotShop: Gas Welding for Beginners

Portable gas welding and cutting requires no electricity. Learn Oxyacetylene welding and cutting equipment set-up, safety, job set-up cutting, brazing, fusion welding, filler rod

welding, tips and techniques including vertical up and down welding. Wear old jeans, long sleeved cotton or wool shirts, closed toed shoes. Safety gear is provided. No previous experience required. Ages 16 thru Adult

Sat. May 21: Flameworking at GlassPark [This is an Off-Site Workshop]

Noted glass artist, Eran Park introduces you to the gas flame working of glass in his studio GlassPark at 4037 South Wayne Avenue just South of the Friendly Fox Café. Workshop includes tour of the shop, safety, tools and demonstration of technique. Participants may make a small glass marble, pendant, leaf or other trinket.

### **Week of May 22 -28**

#### **Sat. May 28**

Machineworx: Clamp It! \$60

A refresher workshop for folks who already have some basic machining experience, this workshop will review the basic machining skills required to use the mill and lathe to produce a simple machinist's clamp or mill stop tool. This is an all-day workshop with break for lunch. Kit cost: \$5

HotShop: Introduction to Forging

Overview of small forge blacksmithing by blacksmith Clint Casey, a member of the Indiana Blacksmith's Association. Topics include safety, tools, materials, basic techniques with the hammer and anvil and more. Participants in this workshop will view one of the forge types which will be built in a Summer workshop on Building a Propane Forge. Participants must wear older jeans, sturdy shoes, long-sleeved cotton or wool shirts, no synthetic clothes. Safety gear will be provided.

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## **Maumee Valley Blacksmiths**



The Maumee Valley Blacksmiths, part of the [Maumee Valley Antique Steam & Gas Association](#), meet on the 2nd Saturday of each month in the blacksmith building at showgrounds of [Jefferson Township Park](#), New Haven and also meet on the 4th Saturday of each month at the [Solomon Farm](#).

For more information please contact John Schamber via e-mail at: [fwtoolman@hotmail.com](mailto:fwtoolman@hotmail.com).

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## Engineers' News Past

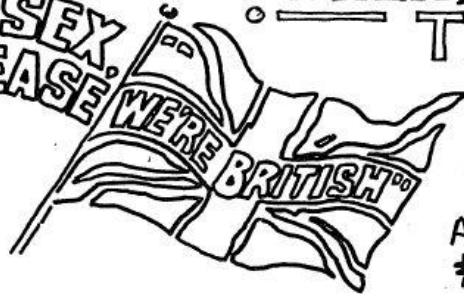
The FWEC has a significant history; Treasurer Ryan Stark and his wife were able to find past Engineers News documents dating back to 1938! Here is an excerpt of the past newsletter (a scanned copy of the entire newsletter is available through the FWEC website):

May 1986

**May 29 F.W. ENGINEERS CLUB**

**DINNER /  
THEATRE**

**NO SEX  
PLEASE!**



by  
Anthony Marriott  
& Alistair Foot

at  
the FORT WAYNE  
CIVIC THEATRE  
303 E. MAIN ST., FT. WAYNE

**Tickets \$15<sup>00</sup> per person**

**5:30 Social Period** (Cash bar - maybe)

**6:00 Dinner** Buffet - Roast Beef & Turkey

**7:30 Play** Potato, Veg, salad, dessert

**Reservations - Keith Hood**

Send payment to  
Confirm by May 20

9624 Wolf River Place  
Fort Wayne, In. 46804  
(H) 432-2902 / 425-2364 (W)

(make checks payable to Keith N. Hood)

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