

That'll Come In Handy

Presented by The President

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I was introduced to the MAE several years ago when I attended a lecture given by my brother Dr Allan Mann on the 'Millenium Wheel' or as it is now known 'The London Eye'. I have always enjoyed the sort of lectures that we have and used to be very keen on watching programs like 'Tomorrow's World' and 'The Royal Institution Christmas Lectures' and any scientific type of documentary program. So I was enthralled by the prospect of joining the MAE and experiencing the lectures live.

At one of the dinner dances that I attended I was asked by one of the members wife's what sort of engineering I did? I was a little no plussed as I am an amateur engineer and cannot claim to have any specialist field. However after a brief explanation of my fields of experience she classified me as a "Shedy".



Am I A Shedy?

More literally I am a "Cellary" as I have my workshops in the basement but the title is still probably fairly apt!

When trying to decide on a suitable topic to talk about for this lecture I thought back to that episode about the shed

And decided that in the early days of engineering there must have been a lot of ‘Sheddies’ as the disciplines we now know had all yet to be developed. Early engineering must have had a considerable element of knocking things up on the kitchen table and seeing if they worked?

Some Views of My Workshop Facilities



Woodwork Shop



Engineering Shop



One of the Lathes



Part of Laboratory

Our family has always been noted for hoarding. We keep a plethora of come in useful things and it is always a delight to be able to find a use for some item that has sat in storage for many years in the certain and unshakeable knowledge that one day **‘It Will Come In Handy’**.

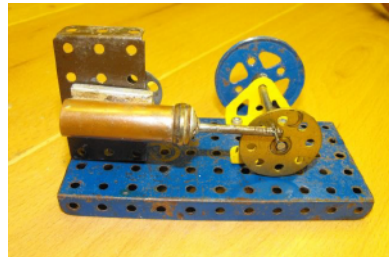
I started young as the next picture shows. This is me on Christmas morning with my first tool set.



Christmas Morning

One of my earliest ventures into engineering was to try and build a small steam engine. I had been fascinated by a steam engine my Grandfather had sent to my brothers and wanted to try and build one. Materials and skills and mostly lack of a lathe were problems but I managed to build a small oscillating engine without any plans from scraps of copper pipe and misc. parts including some mecano. I operated the engine quite satisfactorily on compressed air supplied via a bicycle pump.

In the present climate of recycling mania it is questionable if much material sent for recycling could not be better used. Certainly much of what is scrapped has life left in it and a lot of energy and money could be saved by re-using



First Steam Engine

Later as my skills and ambition improved I went on to build larger projects but I have always tried to use scrap material and recycle materials rather than buy new. This is cost effective and has allowed me to make a lot more items than if I had used all new materials. It has reduced waste and has not produced items that are in anyway inferior.

This habit was probably inherited from my father who was very accomplished at obtaining materials and managed to supply me with most of my raw materials when I was starting out. My father had a friend and

Business associate who worked for a large timber importer. In the process of kiln drying their timber a large number of scrap pieces of timber were used as kiln samples to check the moisture content of their products. I was supplied with quantities of this timber which would otherwise have been burnt. One of the results was this:-

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Talk of the Town

by Tom Grafton

Jonathan's £150 spinning wheel out of scraps

SCRAPS of wood, seasoning samples which would normally have been used to fire a seasoning kiln, have been used by Timperley schoolboy Jonathan Mann of 165 Shaftsbury Avenue to create an authentic and working spinning wheel which his woodwork master says you wouldn't buy for less than £100, and the firm where the samples came from, value at £150.

"Mann-made," says Jonathan with a grin, showing me his remarkable piece of work in the woodwork room at St Ambrose College, Hale Barns, where it was mostly made; under the supervision of handicraft master Don Hibbert, who lives in Sandway and whose heart is really out in the woodwork room; but this is the first time a spinning wheel has emerged.

ON HOLIDAY

Jonathan (16 last month) is in his fifth year of woodwork and hopes to do the subject at "O" level this year. Does he spin? No. Or another member of his family? No. Then why the wheel?

"I saw the idea in a handicraft magazine and it was the wheel that attracted me really. I'd never made one and I wanted to learn how." He'd also seen them in craftshops in Wales, where the family has a holiday home. He brought the idea to Don Hibbert but couldn't wait for September and the school term to start, he spent four happy days at the Colwyn Bay house making most of the frame, during his holidays. The rest was done in the woodwork room with Don Hibbert.

The materials. He's lucky in his father, Thomas, whose business takes in, among other things, wood flooring. Through this "contact" his son visited the Manchester

timber firm where he picked up the small seasoning samples of elm, ash, beech and maple which have made up this craftsman's piece.

The wheel itself is in six sections, for strength, and Jonathan had to make a special wooden "chuck" (a frame for holding the wheel) to fit on the school lathe.

One snag he struck was a fault in the plans put out by the magazine ("they'd been photo-copied the wrong way round") and other things had to be modified. Surely, surely he had to buy SOMETHING! Yes, 12 brass hooks cost 24p, and leather thong to work the wheel (a sort of furbie, in fact) was £2.60. It's been finished by hand-sanding, using the polish his father makes, Gilsop. Necessary over his for things like specific parts came, he said, "from old school desks."

And before the spinning wheel? He'd mostly made things for the home, he said. Coffee table, fitted wardrobe for his parents' bedroom, sink unit, headboard for a bed. His sparetime hobby?

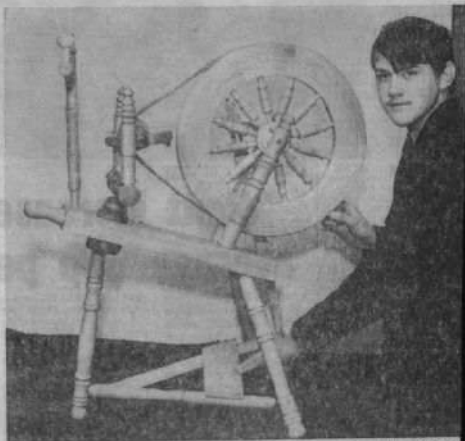
"Woodwork," he says firmly. The purpose of a spinning wheel is to spin and yes, he means to do this, and perhaps weaving too. He's tried using the wheel with hair from his Yorkshire lambs, Trudy and Jenny.

"It didn't work very well. But I'll get some wool from the hedges, and spin that."

And the next project? "I don't know. I like lace work, turning wood. I'd like to do some metal work."

And after school? "Everybody asks me that. I don't know."

MARY PHILLIPS



Jonathan with the spinning wheel he made from scrap seasoning samples and now valued by experts at £150. (Photo No M402/12).

Other examples of timber recycling can be seen in the following photos



Spinning Wheel



Rocking Chair

Both these items and several more were produced from off cuts of timber from the front of the stage at the 'Palace Theatre' Manchester. I went on a tour of the theatre during its renovation and noticed the off cuts in the skip. The site manager very kindly put them on one side for me and I produced these items from waste.

I now do a lot of my own timber manufacturing and produce my own off cuts. The larger useful off cuts are dutifully recycled as the following pictures show.



These radiator covers of which I produced over a hundred had large cutouts of MDF. These were transformed into:-

This Dalek for my daughter !

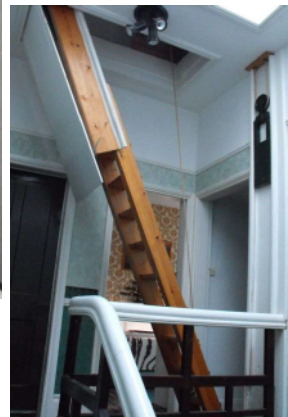
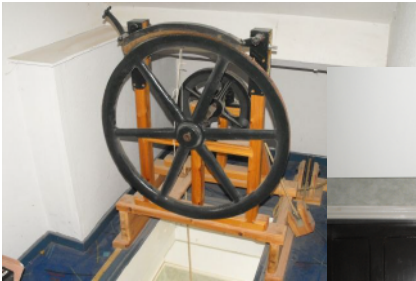


Another job involved producing replacement barge boards for a Victorian property. These had large semi circular scallops taken out of them. By gluing these together to make circles the off cuts produced a number of stools.



Stools from Off cuts

Often in the course of my work I come across items that are just too good to throw away. The following is an example. Whilst working in a hotel that was being converted to flats the old ‘Dumb Waiter’ had been stripped out. The owner asked me if I had any use for it and although I could think of none at the time I gave it a good home for several years before its rebirth as a retractable loft ladder mechanism.



the cables supporting the mast (shrouds) to the mast spreaders and is basically a sort of clamp. However the manufacturers of the mast went out of business over ten years ago and extensive searching of the Internet failed to reveal a source for a new one.

Luckily having the original component albeit in two parts I was able to make a plaster mould and then cast a new aluminium component which I could machine up to match the original. The alloy for the casting was a melted down aluminium scaffold tube from my come in handy supply.



Failed Component



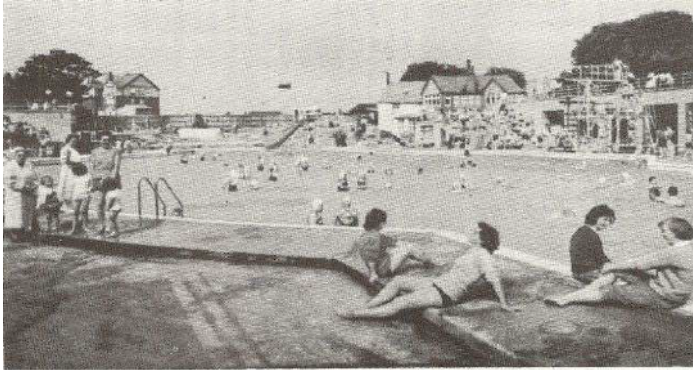
Casting Blanks



Stages in Machining



Completed New Spreader End



Rhos Open Air Swimming Pool Circa 1967

Another example of reuse as opposed to recycling is the fate of the Rhos on Sea swimming pool pictured above. Just visible in the photo is the top of one of the pool ladders made of stainless steel. The pool also had a large quantity of stainless steel tubular handrail and fittings. When the pool was closed I was offered a quantity of these fittings and have put them to use ever since. Those pool ladder ends in the photo first served as the end supports for my sons synthesiser stand. They then had a second reincarnation at his twenty first birthday as shown below.



Hog Roast

Incidentally the wheel to rotate this spit started life as a shop display unit for aprons.

Further uses for this tubing were as follows :-



Boat Handrail



Bathing Ladder



Bar Footrail

The yacht has been a major area for product re use. Boat fittings being very expensive it is an area where cost cutting is most beneficial. I re-used some kitchen work top as my saloon table by turning it upside down and re covering it with formica.

Over my galley area I have a copper cooker hood which started life as the hot water cylinder in my house until it split. It was then cut open, flattened and re shaped into the hood featured in the following photos.

In a similar manner the helmsmans chair started life as a swivel office chair until the legs fell off and it was thrown in a skip. Rescuing it I welded the seat to a scaffold tube. Welded on a foot rest and produced an ocean going helms chair also featured in the next photos.



Copper cylinder converted to cooker hood



Helm Chair from broken chair

Chairs often have useful components from wheels to screw threads and the metal of their construction. Another gadget constructed from a chair the remains of a car exhaust pipe and some upholstery springs etc was this flight yoke. A realistic computer joystick that I made to add realism to flight simulator computer games.



Plastic is a product that seems to cause some problem in recycling mainly from the issue of separating out the different types. For the amateur engineers the prospect of moulding plastics is quite attractive and I have done several experiments along these lines however I find that many plastic components are useful in the come in handy box.

Indeed one of my main problems is how to store the thousands of small items I have collected in some order so that they can be found when needed. Commercial racking and bin storage is expensive but I found the answer in the form of plastic milk bottles.

By cutting six pint bottles in half they form a useful container for screws, nails, plumbing and just about everything else. By arranging racking along a small cupboard in the workshop I was able to store a large number of components. However as my needs grew and more space was needed I came up with the idea of a second set of shelves on wheels that roll out of the cupboard. To give even more storage as can be seen below.



Milk bottle storage



Wheeled storage rack

I also find these bottles useful for cleaning paint brushes, mixing grout and any number of other jobs.

I often come across interesting bits of plastic which arrive as parts of broken items or packing pieces or just spare parts. I store a selection of promising components in case of need.

Recently a friend approached me with a problem. He had installed a high level WC cistern and was troubled by the volume of water in the flush splashing out of the toilet bowl on to the floor. Having tried adjusting the float valve and putting a brick in the cistern we determined it was not the volume of water in the cistern but the flow rate that was causing the problem. A rummage in the plastic supplies unearthed a plastic tubular bush which with a little work on the lathe was turned down to fit the flush pipe with a slight lip to hold it in place. The resulting 30% reduction in cross sectional area solved the problem.



Turning plastic to size



The restrictor in place

Waste pieces of pipe are often useful. I have made various racks in the workshop out of short lengths of square plastic down pipe super glued together to hold lengths of rod, pipe, drills etc. I often use short lengths of pipes as ducts for cabling through walls or drains through retaining walls etc.

One use of spare pipe which has been very popular however is my potato cannon. This is made up out some plastic pipe off cuts and



Storage rack

a few fittings attached to an old sack truck. In use a potato is pushed down the barrel with a ram rod and the combustion chamber charged with some propellant. Typically we use hair spray or deodorant. It is then fired by inserting a piezo igniter through the touch hole. The gun will fire a spud approximately 100m and was extremely popular on scout camps as a campfire entertainment.



Spud Gun

Some times people re cycle quite unusual items. A friend has two aeroplane cockpits in his garage. One is his project the other his sons. His cockpit from a 'Sea Venom' had seen service as part of an aircraft but had suffered the indignity of being use for fire fighting practise and had been stripped bare and burnt. With great patience and skill he has rebuilt the cockpit and displays it at shows. However obtaining all the



Sea Venom Cockpit

Many of the instruments have been stripped down and their workings replaced with stepper motors so that they can be interfaced with a computer for simulation.

I am very interested in computers and recycle many of them. It amazes me how often perfectly good computers are discarded for a new model. It is quite easy to upgrade computers and I now have between fourteen and twenty networked around my home mainly as an academic exercise.



Inside view of cockpit

I have however found other uses for old computers. One was combined with a shop mannequin, a child's trike and many other parts to form a robot. However eventually space was needed and I disassembled it and reused the computer to make the children an arcade style games machine out of a redundant television and some old shutter ply. This has been a real hit at parties when used to play 'retro' games such as 'Space Invaders' and 'Pac-Man'.

Another friend who happens to own a company making wiring harnesses and consequently is not short of wire introduced me to many



This was my robot until her brain became an arcade machine !

unusual schemes. One of the most spectacular being his home built 'Tesla Coil'. Many people are familiar these days with the novelty Plasma balls available from gadget shops.

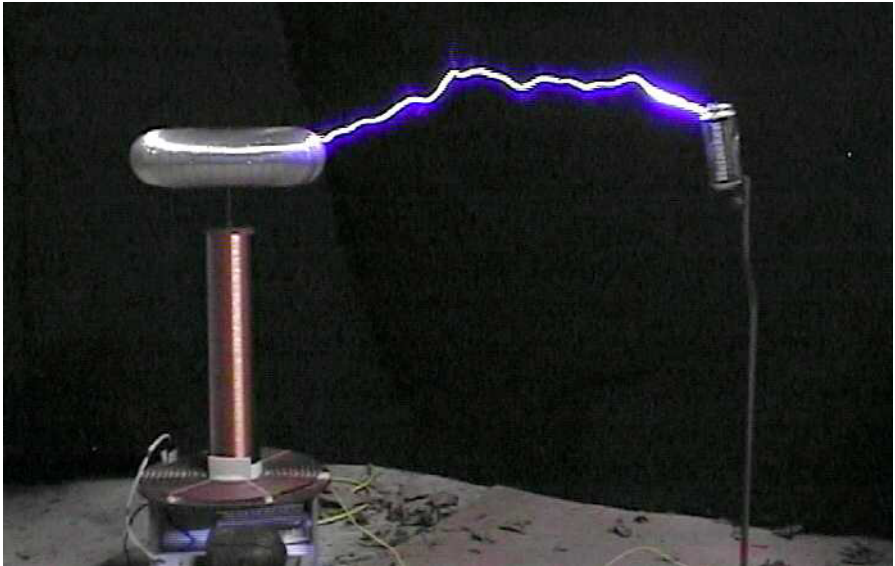
These are spectacular but when you have a lot of wire and some know how it is possible to produce something with much more of a 'Wow'.

By winding a primary coil out of micro bore refrigeration pipe and a secondary coil consisting of approximately 250m of magnetic wire on a 100mm diameter x 500mm high former, that in true recycling style was scrounged from a roadside sewage repair in Ireland, he has produced a machine capable of producing lightening that will jump a 1.5m spark gap.



Plasma Ball

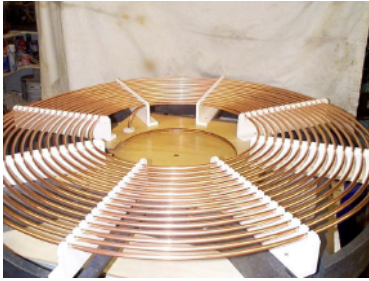
This is not however the end of the story as having succeeded with Mk 1 the Mk2 model is well under construction and on a much greater scale.



The Mk 1 Tesla Coil producing a 1.5m spark to an earthed beer can



Making your own Lightning is an enjoyable pass time



This is the Mk2 primary coil
Consisting of micro bore pipe
wound on a timber former.

The secondary coil for the Mk2
Is considerably larger note the door.
This contains approx. 1.2km of
magnetic wire and took a whole
Saturday morning to wind!



Of course you need a rather large
transformer to excite the primary
coil and this is where the recycling
comes in again . Scrounging one
of these is quite a feat in itself !



And then of course you need some
pretty heavy controls.....

This project isn't finished yet but if
the first set of pictures are anything
to judge by the results should be
extraordinary.



Sometimes I get requests to produce quite unusual items. A friend of mine who is into amateur film production needed to film an actor riding a bicycle but filmed close up from straight ahead. We came up with the following project based on available come in handy bicycle parts.



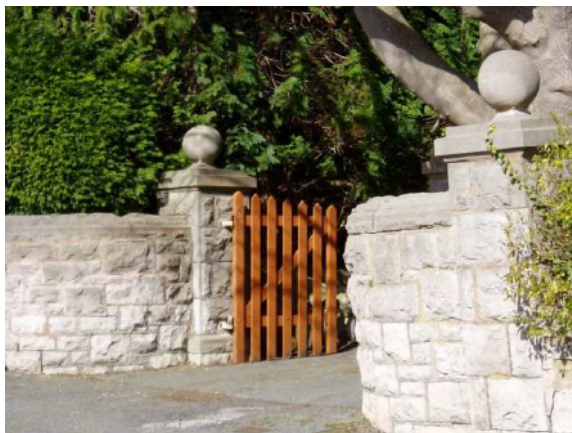
By welding a bicycle to the back of a tricycle we achieved stability for slow speed. A helper could pedal the tricycle to achieve motion whilst the camera man sat facing backwards on the Tricycle to film the actor on the rear bicycle.



This is the ultimate case of recycling cycles



Sometimes necessity is the mother of invention. This photo depicts a problem some years ago. I arrived at a job with a mini excavator to find that the only access was up a one metre high wall to an elevated site. Luckily having a block and tackle I improvised a ramp from spare scaffolding and winched the machine up to the work area. Its not pretty but it did the job and shows what you can do if you have to.



A similar problem is shown here. The balls on the gate posts are two of ten similar ones that vandals had pushed off. The plan was to replace them with steel pins glued into the ball and gate posts to prevent them being pushed off again. However the balls were very heavy and I had to devise a way of lifting them almost two metres and then lower them gently onto a pin.

The answer was to convert my Landrover into a mobile crane.

Once again using spare scaffolding to form a jib. I used a block and tackle to raise and lower the jib . A chain block to lift the load. This enabled me to drive into position with the ball suspended from the jib and then carefully lower the balls In to position.

Landrovers are wonderful tools for this sort of adaptation.



Conclusion

I started by saying that in the early days of engineering everything had to be learnt. Engineers started out with basic tools and little knowledge but had the ingenuity and insight to achieve everything we have today.

Much early engineering must have been by trial and error and it is only now based on the achievements and lessons learnt in those earlier times that we have the knowledge and data to understand and design the machines and structures that we take for granted.

However engineering in its most basic form allows those of us who practice it to overcome many of the problems we face by using the same ingenuity that those early pioneers needed. By utilising what we have to hand and improvising we can achieve great personal satisfaction in solving many problems and in so doing are reinforcing the pioneering spirit of Engineering and the 'Sheddy Tradition'

Moral - Never Throw Anything Away (It might come in handy)